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OFFICE MEMORANDUM

TO: Files

DATE: January 11, 1979

FROM: Gloria Davis, Anthropologist (AEPLS)

SUBJECT: Draft Working Paper on Transmigration

The following paper consists of case studies and recommendations for increasing spontaneous migration in the Indonesian Transmigration Program. The argument is made through the cases but recommendations begin on page 28.

GDavis:mjc

MOVING WITH THE FLOW

The Case for Spontaneous Migration in the Indonesian Transmigration Program

In July of 1978 the Government of Indonesia proposed a new approach to transmigration, one which emphasized the movement of large numbers of migrants at relatively low cost. At present, however, the full implications of this new approach have yet to be articulated within government or within the Bank. Only a system which facilitates spontaneous migration can be expected to affect many people, minimize dependency and be accomplished at a modest cost. Yet, although this is widely understood no systematic program for promoting spontaneous migration has so far been developed.

The following paper is a step in this direction. It has two parts. The first section presents four brief case studies which provide the data for analysis:

(a) Parigi - A case of spontaneous migration

(b) Way Abung - A case of sponsored migration

(c) Baturaja - The impact of employment diversification

(d) Rimbobujang - A new area and an example of things to come

This section argues that spontaneous migration contributes to community development as well as being an indicator of its success. It shows that such migration increases in response to employment opportunities and that it occurs along pre-existing chains of economic and social support.

The second section argues that the way to promote spontaneous migration is to remove existing constraints, stimulate employment, and use existing networks to recruit, support and settle new immigrants. A focus on agricultural production alone, has in the past produced policies which have hindered spontaneous migration rather than helped. For this reason this paper places land settlement in a wider context and proposes a strategy, for moving with, rather than against, the normal migration flow.

I. LEARNING FROM THE PAST

Although there has been a consistent interest in spontaneous migration over the years, measures to promote it have only occasionally found their way into the transmigration program. One clear reason for this is that the process of spontaneous migration is so poorly understood. The following cases have been chosen to illustrate what actually happens in the migration process. They attempt to show that spontaneous migration is not random and unplanned, but that it involves systematic cooperation between early migrants and those who follow. The cases also illustrate the fact that movement is in response to labor shortages and employment creation and they suggest the degree of spontaneous settlement in a range of migrant communities.

Spontaneous Migration - The case of Parigi (Central Sulawesi Province)

In 1950 the Balinese community in Parigi consisted of only 17 households - all descendants of Hindu Balinese families who had been exiled to Sulawesi in the early years of this century for crimes against adat or customary law. Between 1906 and 1928 about sixty families were banished to Parigi and settled among the Islamic peoples of the area. Thanks to high mountains and year-round rainfall, they established their traditional irrigation systems, produced wet rice and in early 1920s both crops and community flourished. When amnesty was proclaimed in 1928, however, all but six extended families returned home. In the ensuing years a mere handful of people were attracted to the area and by the early 1950s the community seemed about to disappear. When one resident returned to Bali in 1953 to seek new families for Parigi, not a single family from his village would return. Parigi was too far, too isolated and too unknown.

Then, in 1957, five families of Christian Balinese were deflected from their original destination in Sumatera and moved to Parigi instead. Unlike the Hindu Balinese who were tied to their home villages by kin networks and responsibilities to their temples and gods, these Christians were seeking an opportunity to move. Most of them had been driven from their natal villages in Central Bali when they converted to Christianity and prior to migration all of them were living with Christians who had been relocated in western Bali a generation before. In other words, not only did they have an incentive to move but they had model upon which patterns of adaptation in a new area could be based.

In spite of their relative experience and sophistication the first five Christian families found early adjustment difficult. Refusing to settle with the Hindus in the town of Parigi, they initially laid claim to an area of primary forest 15 km to the south. After about two months, however, the enormity of the task, their small numbers and the threat of political disturbances in the area so overwhelmed them that they returned to the town to join another group of Christian refugees. Among these people they found both mediation and support.

In late 1957 two young Balinese brothers joined this group, and with their arrival the pattern of future immigration was set. Although there were only thirty Balinese households in Parigi at the time, all future in-migration was to occur through networks which they created to provide information and social support. Virtually every one of the 10,000 people who followed was in some way connected with those who were in Parigi in 1957.

After three years in the area the Balinese Christians were sufficiently confident of themselves, the area and its productivity to think of recruiting their kinsmen and friends. Among the first to depart was one of the Christian youths who returned to Bali to bring his parents to Parigi. While in Bali he discussed the area with other Christians still waiting to go to Sumatera and twenty families agreed to move. Upon arriving in Parigi this group - hoping for the eventual arrival of additional kinsmen - moved again to the forested area in the south. With knowledge of resettlement learned from the relocated Christians in western Bali they constructed a dormitory, surveyed the land, distributed it by lottery and began to fell the forest. They named their town Massari - the source of prosperity and when relatives wrote to ask if it was safe, the answer was yes.

The next group of nine families then set out on its own, and their story illustrates the problems which beset inexperienced and unaccompanied migrants. First they traveled from west to north Bali where they waited for ten days for a ship. This ship took them only as far as Makassar where they again waited 40 days for a boat to take them to Donggala, the main port on Central Sulawesi. Even in Donggala they were subject to administrative delays and were finally allowed to proceed only after intervention by those in Parigi. Eventually, however, they arrived in Massari where they took up residence in the homes of the earlier arrivals.

Seeing that there was opportunity in Parigi additional families in Bali agreed to move, but because of the problems of this group they wrote to Sulawesi asking for someone to escort them. With this, the first Balinese youth again went to Bali and returned to Parigi with 48 families. With 77 families, nearly 500 people, in Massari these migrants made relatively rapid headway. They cleared the land and planted rainfed rice, they established churches and schools. After nearly two years of clearing and cultivating, however, a group of locals laid claim to much of the land near the mountains. Suspecting that they were too politically weak to protest and fearing that any additional work would also be lost, thirty-five of the Christian families abandoned their land to begin anew in primary forest seven kilometers to the south.

In spite of the set-back the Christians in Parigi were still anxious to see the immigration of additional Balinese; because of the set-back they hoped to persuade local officials that an adjacent area, which had already been set aside for transmigration (and was therefore protected against the claims of locals) should be used to settle their kinsmen. In 1962, at the instigation of Balinese already in Parigi, the provincial government agreed to settle 100 families from Bali in an official transmigration site just south of Massari. Of these, 52 families arrived. All were recruited in the districts of west Bali from which the first Christians had come; all had prior knowledge of Parigi.

Labor Shortages in the Migrant Area

In the years between 1957 and 1967 nearly 200 Balinese families were attracted to Parigi, three-fourths were Christian and most moved there to join kinsmen or friends. In the mid-1960s, however, several events foreshadowed a rapid acceleration of migration:

(a) the construction of irrigation systems south of Parigi in 1963;

(b) the introduction of the green revolution rices in the area in 1965;

(c) worsening of conditions in Bali particularly after 1965; and

(d) the improved capacity of the government to sponsor and assist migration after 1967.

Owing, in part, to the advantages of government sponsorship and back-up support, within a year of their arrival the condition of the government supported migrants nearly approximated that of the communities to the north. By mid-1963 both communities had cleared one-half to one hectare of land per family and were in a position to seek water for sawah (wet rice fields). Because of an advantageous location the government sponsored transmigrants actually had irrigated fields earlier than those who had arrived before them.

Access to water was not an unmitigated blessing, however. While it increased the probability of surplus it also increased the amount of work. Whereas the migrants had previously been planting rice in dry fields, with irrigation they had to bund and level their land, construct ditches, and do demanding field preparation. At the same time they were pressed to open the primary forest which remained, both to bring additional land into production and to reduce widespread damage from pests, particularly pigs.

Then in 1965 yet another factor was added to the equation with the introduction of green revolution rice. The significance of the new rices in Parigi was not in their highly touted per hectare yield (which proved unpredictable at best) but in their rapid growth. Whereas traditional Balinese rices ripened in 165 to 180 days the hybrid varieties matured in 120 days or less. The most common hybrid in the area had a growing period of only 105 days. With these rapidly maturing, non-photoperiodic rices, with year-round water, government pressure to increase rice production, and their own proclivity for work, the Balinese began to plant and harvest five times in two years. Surpluses increased and at the same time the strain of this effort on two hectares of land led to feelings of acute labor shortage.

During this same period conditions bearing on an evaluation of Bali and Parigi were also changing. In Bali population pressure had increased: the central districts of the island had population densities of 750/sq km to 1,500 sq km; at least one in four owned no land; fully one third were underemployed; and community solidarity had been seriously damaged by the aftermath of the 1965 coup. In Sulawesi, however, land and water were still free and the community was becoming increasingly well known. Relatives and friends who were doubtful at first now had concrete evidence of the success of those who had gone before.

In 1966, knowing of the changing conditions at home and sharply aware of their own labor shortages, the Balinese in Parigi dispatched a delegation of 12 representatives to Bali to recruit new settlers and attempt to find sponsorship for them. Once in Bali the delegation obtained the approval and assistance of both provincial and national transmigration offices and 200 families - 1,000 people - were sent to Sulawesi in 1967. All of these people had connections with previous migrants.

Although their departure was delayed, and the boat trip was long and arduous this group arrived with an optimistic attitude toward the area. They were settled just to the south of their kinsmen, and although they had been prepared for the worst, when they arrived the government assisted them in building houses and clearing land. It also provided them with modest health and education facilities and 12 months of provisions. The new immigrants were also entitled by adat (customary law) to help in the harvest of those who had crops and keep up to one-fourth of the yield. With the arrival of the 1967 migrants none of the old settlers harvested their own fields again and it was, in part, this symbiotic relationship between the old migrants and new upon which the success of these and future immigrants was to be based.

The Mass Migrants

With the labor needs of the old migrants satisfied and the new immigrants still in precarious financial condition, in-migration temporarily declined. In 1968 and 1969 only about 100 families found their way to Parigi. But this decline was the metaphorical lull before the storm. When the 1967 immigrants were fully settled, producing a surplus and feeling the labor demands entailed in the cultivation of the new rice, immigration again climbed. In 1970, 300 families arrived in Parigi; in 1971, 500 more. In 1972 - five years after the government sponsored migrants arrived - 1,500 families (5,000 Balinese) moved to Central Sulawesi: these "mass migrants" doubled the Balinese population in Parigi in a single year.

Faced with such a startling up-turn in immigration the government decided to halt recruitment and reserve the remaining land for normal population growth. Despite government discouragement, however, more than 2,000 immigrants arrived in 1973. Without provincial controls 8,000 had been expected. Since no land was available most new immigrants declared themselves "visitors" and settled with family and friends. The fact that they were heartily welcomed attests, in part to the labor shortages which the previous migrants had felt.

In many ways this later phase of mass migration was very different than the first. In the early 1970s the community reached a threshold which allowed diversification of labor, elaboration of arts and services and the exertion of a Balinese identity. This increase in numbers, arts and ethnicity in turn made Sulawesi increasingly attractive at a time when over-population, poverty and communal strife made life in Bali increasingly grim. Under these circumstances ever increasing numbers of people moved. School teachers, tailors, shopkeepers, and nurses found a ready place in the community and many individuals visited who would never have considered it before. Among the later migrants were people who had money and bought desirable land from those who had done the hard work but were now weary of the effort. Others sold everything to invest in commerce. The market in the most southern community had 3 coffee shops in 1972 and 35 permanent buildings in 1974.

Not all of the later migrants who went to Parigi liked what they saw. Whereas most of the earlier migrants were either forced from Bali or too poor to return, among the later migrants some looked around and went back. Even visitors contributed to outmigration, however, by carrying back to Bali the information upon which future decisions were based.

So strong was the migration stream which had been developed in 1972 that even the end of free land in Parigi could not stem the flow. The know-how and knowledge of the long-term settlers was used to seek out new villages where additional Balinese communities might be established. By 1974, 8 satellite communities with about 400 families ringed the gulf of Tomini (see map next page) and the Balinese looked forward to the day when the culture of homeland would be combined with prosperity of Sulawesi and the Gulf of Tomini would have its own Hotel Bali Beach.

The Conditions of Development. The movement of Balinese to Central Sulawesi cannot be regarded as typical of transmigration movements in Indonesia, it was spontaneous, it was by Balinese, and it was unusually successful. But the ingredients for mass movement are well illustrated by the example. To be successful migrants require:

(a) a means of support until their first crops are harvested; and

(b) minimal conditions for development: available land, access and critical mass.

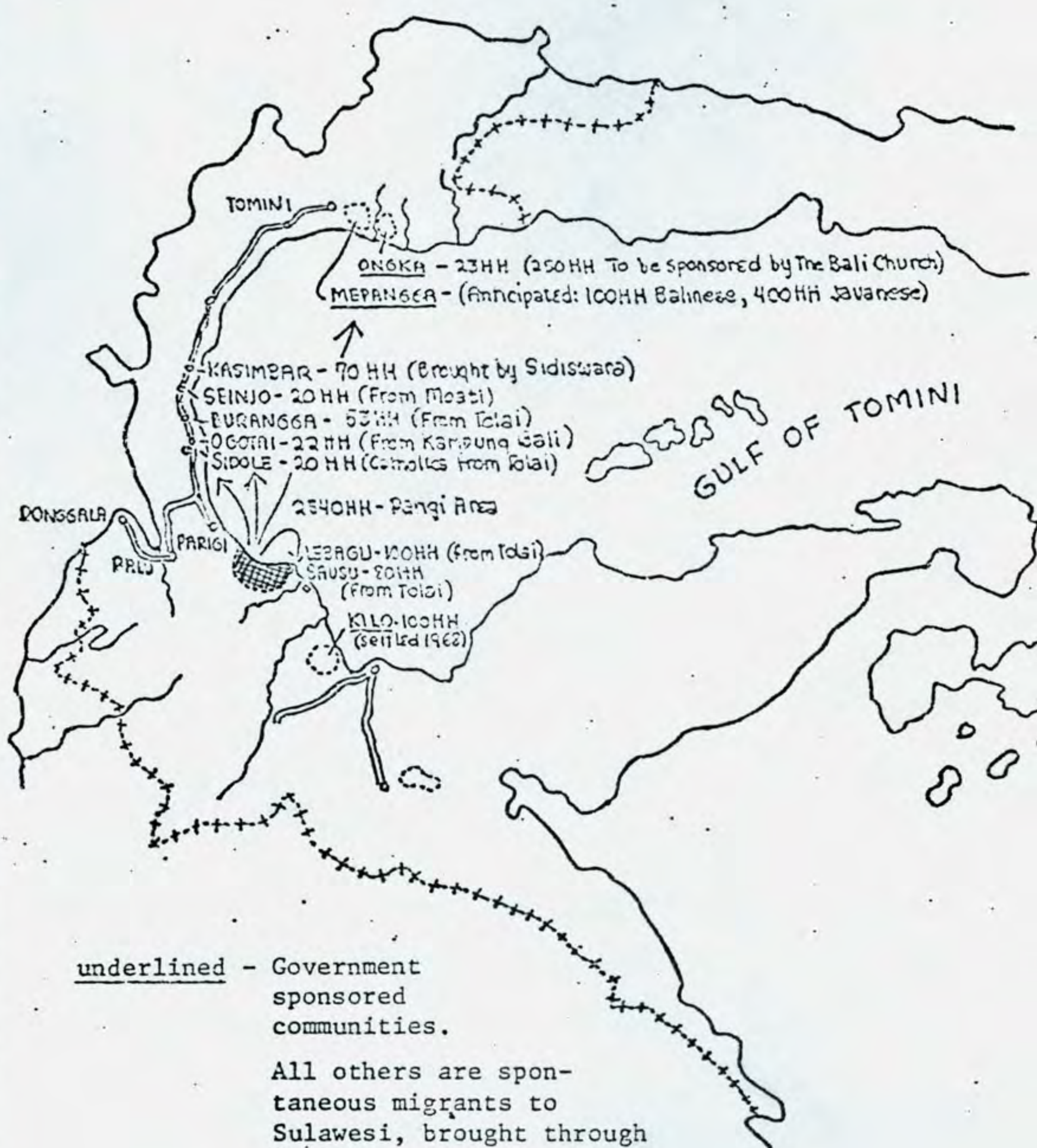
The movement to Sulawesi was facilitated by the fact that all migrants virtually without exception had kinsmen or neighbors in the receiving area who could teach them what to do and provide them with back-up support. In addition to having altruistic motives, each group required the help of the other. The early immigrants required labor, the new settlers required cash wages or shares of the harvests until they were established.

The Balinese were also fortunate to find an area which allowed a continuation and expansion of their traditional cultivation practices. In Central Sulawesi they settled on a narrow alluvial plain which was frequently crossed by small year-round rivers. Although soil in the area was rather poor, both the early availability of water and later of fertilizer enabled the Balinese to sustain low yields of 1.0 to 1.5 tons of rice per hectare per harvest and this was enough to meet subsistence needs and still allow reinvestment and growth.

The physical circumstances favored the Balinese in yet another way. Until well into the 1970s all of the communities were within five kilometers of the sea. In other words, although as spontaneous migrants they lacked the resources to construct an adequate access road from Parigi which was 15 to 35 km to the north, most villages were able to open and maintain tracks to the sea and it was along these tracks that surpluses were sent out and needed goods and services received.

Another positive feature was the availability of land and enthusiastic government support. The Tana Boa, or empty quarter, into which the Balinese moved, had been depopulated at the end of the 19th century and the

BALINESE MIGRANTS IN CENTRAL SULAWESI - MARCH 1974



underlined - Government sponsored communities.

All others are spontaneous migrants to Sulawesi, brought through family connections.

only indigenous people to be found there were refugees from the mountains who also had limited claim to the land. Except for the earliest Christian immigrants few land conflicts were encountered and the Balinese could proceed with the feeling that land they opened would not be jeopardized by the claims of locals. These feelings were enhanced by the very real support for Balinese immigration which was provided by local officials who, for their own reasons, were concerned to see provincial rice production increased. Finally with about 10,000 resident settlers, the Parigi area attained the critical mass required to begin internal differentiation and growth. In one year the market increased from 3 shops to 35 and school teachers, tailors, petty tradesmen, carpenters and other craftsmen moved deliberately to Sulawesi to practice their skills.

Lessons from Parigi

The case of Parigi has two main lessons:

(a) labor shortages lead to increased immigration; and

(b) this migration occurs through pre-existing chains.

As evidence of the latter claim a 1974 census of 959 families in Parigi (nearly half the total families) showed that all respondents came from the five districts (kabupaten) already represented among the 30 families present in 1957. Those three kabupaten which had no representatives in 1957 had none in 1974.

CHAIN MIGRATION

Districts in Bali	% total Balinese outmigration 1969-1973	% Sulawesi sample, 1974
Districts represented in Parigi in 1957		
1. Bandung	14.1	46.8
2. Jembrana	17.0	21.4
3. Tabanan	18.0	16.4
4. Buleleng	6.5	10.4
5. Gianyar	5.6	2.9
Districts not represented in Parigi in 1957		
6. Karangasem	26.0	0.0
7. Klungkung	8.1	0.0
8. Bangli	4.7	0.0

Fully one third the sample (324 households) were from four of Bali's presumed 10,000 village clusters. All four of these villages were represented in 1957.

The household is the basic unit of production and consumption in Indonesia. If households have food surpluses and labor shortages they recruit help to fill the void. Rural Balinese recruit help within their home villages and urban dwellers draw relatives from the countryside. Migrants too, recruit relatives and friends both to provide assistance to them and to obtain assistance from them. These chains of mutual support are what make migration work. In Parigi the efficacy of these chains was increased by early food surpluses and acute labor shortages; they were enhanced by available land and work opportunities which permitted dependent immigrants to eventually stand on their own. Spontaneous migration is limited if early migrants remain at subsistence levels or if policies prevail which break supporting chains or limit opportunities to those who follow; and as the case of Way Abung illustrates, the latter conditions have often prevailed.

Sponsored Migration - Way Abung (Lampung Province Sumatera)

Way Abung, like Parigi, was largely settled after 1965 and most immigrants in both areas arrived between 1972-1974. But whereas Parigi was settled primarily by spontaneous migrants who moved on their own resources, Way Abung consists of 12,000 families, 60,000 people, virtually all of whom were settled by the regular government transmigration program with various degrees of sponsorship. And whereas Parigi was a model of spontaneous growth and success in 1974, Way Abung was regarded as a problem area which was economically depressed. The condition of the migrants was believed sufficiently serious, in fact, that the rehabilitation of Way Abung was included as a component of the first Bank-assisted loan for transmigration. Of interest here, however, is not the strategy for intervention,/1 but the way in which the differences between these two communities evolved.

Way Abung is a vast area of some 30,000 hectares mainly of alang alang (grasslands) and secondary forest. It is located in Lampung province 24 km from the nearest major road. The first 600 families arrived in August of 1965 and were given quarter-hectare houselots, houses, and 1.75 hectares of land usually in alang alang. Settlers were told that the land would one day be irrigated but until that time they would have to rely on rainfed crops. Each settler was also guaranteed 12 months of food and supplies. In September of 1965, however, the government went through a period of political turmoil which left the Department of Transmigration seriously weakened. The promised supplies ceased and the plans for irrigation were dropped.

Unlike the migrants to Parigi the new settlers in Way Abung had neither kinsmen, capital nor experience to fall back upon. Without either money or supplies they abandoned their farming to seek whatever work they could find. They hoed for locals, made charcoal and engaged in petty trade. After this there was little time left for the agricultural work upon which their own subsistence was based. Under these circumstances two thirds of the

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/1 See Beyond Subsistence: A report on the agricultural economies of Way Abung and Baturaja. World Bank Working Document, June 1978.

initial families left. In 1967 two new communities were begun in the area and by 1970/71 a series of good harvests had significantly improved the lot of those who stayed.

By 1972/73 the Department of Transmigration was sufficiently recovered to begin a crash program to settle the land which remained in Way Abung. During the two ensuing years approximately 7,500 families were moved, of which about 60% were fully sponsored and received transportation, cleared houselots, houses, and 12 months of supplies. Most of the others were semi-sponsored migrants who received land, transport and three to eight months of supplies. What is striking about the second wave of migrants to Way Abung is that like the migrants to Parigi the later arrivals managed to rapidly equal and in many cases surpass the condition of those who had arrived before. In a sample of 20 migrants in each of 12 villages it was found that those who arrived after 1970 had an average of 1.33 hectares of land under cultivation while those who arrived before 1970 had only 1.03 hectares which they tilled.

HECTARES UNDER CULTIVATION BY DATE OF ARRIVAL

Date of Arrival	Ha land opened	Ha land cultivated	
1965-69	1.03	1.02	n = (39)
1970-71	1.43	1.38	(57)
1972	1.44	1.39	(43)
1973	1.15	1.17	(69)
1974	1.14	1.10	(24)
1975 +	0.96	1.00	(7)
Average	1.24	1.21	n = 239

The reasons for this are complex. After 1970 regular transmigrants received their first twelve months of support and therefore had time to invest the first year in clearing and cultivating their fields. They also received limited but improved agricultural inputs and advice. Village infrastructure and health and education facilities improved, as did opportunities for off-farm work. The type of migrant also appears to have some bearing on success. For example, social welfare (indigent) migrants were less successful than regular migrants while semi-sponsored migrants appeared to be slightly more successful, at least in terms of land under cultivation at the end of five years.

In July of 1973 the Social Welfare Department moved 800 families from the cities of Java to a village in the most northern area in Way Abung. Few of these families were from farms and at the time of recruitment most were a part of the population of urban unemployed. For this reason most were unaccustomed to the hard work of land clearing and cultivation and the constant effort of farm life. Some lasted only three months, others six, but when their year of provisions ceased nearly 80% moved out of the community to find work elsewhere in Lampung. Those remaining had an average of only 0.56 hectares of land under cultivation and in a brief survey 19 of 20 were found to have opened 0.75 hectares - less than a subsistence sized plot. Yields per family were also the lowest in the survey. Interestingly, however, with the maturation of Way Abung and the growth of opportunity for off farm work, many have begun to return to their plots. In 1978, 446 of the original 800 families were on site. Not all families, then, thrive on agricultural life.

Approximately 40% of the families moved to Way Abung after 1970 came on programs that provided only partial support. Both anecdotal evidence and survey data suggest, however, that in contrast to the social welfare migrants, semi-sponsored migrants did as well or better than the fully sponsored migrants in Way Abung. This, in spite of the fact that they arrived later and received less.

SPONSORED AND SEMI-SPONSORED MIGRANTS IN WAY ABUNG

	Regular migrants	Semi-sponsored or spontaneous
1. Percent of sample arriving after 1972	52%	66%
2. Percent with more than 1.0 ha of land under cultivation	45.9	65.4
3. Mean hectares under cultivation	1.20	1.36
4. Mean family rice production/year	680 kg	1,000 kg
5. Percent families with major household possessions	51%	74%
6. Mean number of possessions	0.8	1.4

The major difference between sponsored migrants and those moving on their own or with partial support is that semi-sponsored migrants were generally but not always individuals who elected a smaller government package in order to move to an area they preferred. Those who signed up for full sponsorship seldom had a choice of destination. This means that in Way Abung as in Parigi the semi-sponsored migrants in general, and spontaneous migrants in particular:

(a) had previous knowledge of the area (usually from kinsmen or fellow villagers who were already there);

(b) were sufficiently motivated to move that they spent their own resources to do so.

In other words, they both had resources of their own upon arrival and they had kinsmen to fall back upon in times of difficulty.

Because semi-sponsored and spontaneous migrants must have money to move, it is easy to hypothesize that they were wealthier in Java, brought more money with them, and therefore had a head start. Survey data indicate, however, that this is not true; both groups, appear to come from roughly the same stratum of Javanese society and if anything the semi-sponsored migrants were poorer.

CONDITIONS IN JAVA BY TYPE OF MIGRANT

	Regular migrants	Semi-sponsored/ spontaneous
1. Mean land owned in Java (all migrants)	0.28 ha	0.30 ha
2. Mean farm size for those with land in Java	0.55 ha	0.42 ha
3. Percent living in Bamboo houses	43.0%	55.0%
4. Number with major possessions	25.5%	24.8%
5. Mean number of goods	0.47	0.42
6. Average amount brought from Java - Rps ($1.00 = Rp 415)	15,000 ($36)	61,000 ($146)

Of these variables only the amount brought from Java distinguishes fully sponsored and semi-sponsored migrants and this is, of course, necessitated by the fact that partially supported migrants must be self sufficient even before their first harvest.

In discussing the adaptation of semi-sponsored migrants in Way Abung one additional point bears mentioning. Ordinarily it takes several harvests before early immigrants are ready to assist in the support of incoming relatives and friends. In Parigi, in fact, a clear five-year cycle is evident. Settling semi-sponsored migrants at precisely the same time as sponsored migrants means in effect that the semi-sponsored have the worst of both possible worlds - they have the disadvantage of less support without the advantage of supportive social networks at the new site. This suggests that planned immigration, like truly spontaneous movement, should be phased.

In taking all these points into consideration it is surprising that semi-sponsored migrants did as well as they have. In searching for an explanation one additional distinguishing feature was found. Although the families of semi-sponsored and spontaneous migrants are smaller, they have more workers per family. This in turn is consistent with the fact that they appear to have recruited more laborers from Java.

AVAILABLE LABOR AMONG MIGRANTS IN WAY ABUNG

	Regular migrants	Semi-sponsored/ spontaneous
1. Mean family size	6.3	6.07
2. Mean number of workers per family	2.05	2.34
3. Mean number of people recruited from Java/family	0.67	1.10

In other words, not only do successful migrants import laborers as in Parigi, but the presence of additional laborers appears to contribute to migrant success. Unfortunately the early data on Way Abung are incomplete and it is therefore difficult to disaggregate cause and effect. The second Bank-assisted community Baturaja has been closely monitored from its inception, however, and it therefore provides a better laboratory for the study of labor shortages, in-migration and the migration process - topics to which this paper will return.

Conditions for Development

Although conditions were difficult for migrants in Parigi, there can be no question that the Way Abung settlers were disadvantaged by comparison. In the first place their means of support was insecure: Way Abung has soils of low fertility and erratic rainfall. These are not insurmountable obstacles if a farmer has enough land under cultivation, diversified crops, appropriate cropping patterns and/or agricultural inputs, but the Way Abung migrants - particularly the early Way Abung migrants - had none of the above. Only one-fourth hectare was felled upon arrival and their families were labor short. They had too little land and capital to diversify crops. Appropriate cropping patterns for annuals were unknown, and agricultural inputs were largely unavailable, i.e. their subsistence base was precarious at best.

The migrants were also handicapped by difficult access. The closest town to the first village was 24 km away over what was frequently an impassable track, and between the first and last of Way Abung's 20 villages was an additional 50 km road which could be travelled in something between eight hours and a week. Poor infrastructure hampered both the sale of products and hindered access to essential goods and services. In addition the early community also suffered from substandard facilities for health, education, administration and the like.

The one thing Way Abung did have was critical mass. The density of settlement (200 people per sq km) was justified on the grounds of economy in providing future irrigation and initially it was of little importance as labor shortages prevented the cultivation of even the full two hectares migrants were given. Poor infrastructure and the sorry state of the migrants themselves also prevented much internal growth and differentiation. In recent years, however, it appears that Way Abung may have too many people, too densely settled. In many of the central areas land is no longer available even to married children and in one of the older villages (Purbasakti) this has already led to a fragmentation of houselots. In a second village the desire to obtain land for kinsmen has led to a program to "eliminate" locals through land purchase and social exclusion. At the same time, the impetus for spontaneous movement has been reduced by the absence of available land within communities which are just now improving.

Lessons of Way Abung

Among the lessons from Way Abung three relate to the general argument which is being made.

(a) As in Parigi, first migrants had the most difficult time;

(b) Semi-sponsored migrants were as successful as fully sponsored migrants, at least when they arrived in the second wave;

(c) Areas which were fully settled have little potential for future growth and diversification.

Taken together these three premises appear to argue for providing different support at different stages. Early communities require the most assistance but once migrants are in an area additional immigrants can be attracted with fewer incentives, no doubt because they have other avenues of social and economic support. Conversely if all land is settled at a single time a maturing community wil be unable to attract spontaneous settlers even though it has the resources to do so. Finally, there is some evidence in Way Abung that spontaneous migrants contribute to the welfare of settler families, but it is left to the Baturaja example to explain how.

Labor Diversification - The case of Baturaja (South Sumatera Province)

Baturaja which is located in South Sumatera province is the second of two communities in Transmigration I - the first Bank-assisted transmigration program in Indonesia. Unlike Way Abung, however, it is a new community; the first 406 families arrived in November of 1976 the second wave in October 1977. By September of 1978, 1,100 of the 4,500 anticipated families had been settled. Because of their newness only the first block of 406 families are discussed here; at the time of this study they had been in place for 16 months.

Although from the point of view of the Bank the Baturaja project has encountered numerous financial and organizational problems, from the point of view of the migrants it has been an early success. Prior to the arrival of the first migrants, roads were constructed, land cleared and village infrastructure including provision for health care, education and extension, established. Upon arrival each migrant family received a house and two hectares of land, one half hectare of which had been clean-cleared. Migrants in Units II and III were later provided with one hectare of cleared land. An additional four hectares were promised to them presumably for perennial crops and one of these was planted in immature rubber by the time migrants arrived. Settlers were provided with subsistence supplies for 12 months and they also received agricultural inputs - tools, seeds and fertilizers as well as extension advice. Cattle were to be provided although they were not on site at the time of this study. In the early years of the project migrants found ample off-farm employment in the construction of subsequent villages and rubber planting; and under these circumstances, after 16 months, 11 people in Unit I had departed (mostly single men) while 440 spontaneous immigrants had arrived.

Conditions of Development. In Baturaja land rights have not been a problem and access is good. The community is adjacent to the southern part of the Trans-Sumatera Highway and the wide project road moves large numbers of vehicles for construction and labor recruitment. Many of these vehicles also take passengers and for Rp 135 (30 cents) migrants can obtain public transportation to the town of Baturaja which is 17 km away. Of most interest in the new program, however, is the apparent improvement in agriculture which only modest inputs from the government have produced.

For example, the clean clearing of one-half hectare of land in Unit I seems to have given the migrants a favorable start. After 16 months settlers had an average of 0.96 hectares in production; 28% had already begun to cultivate their second hectare; 16% had opened more than 1.50 hectares and five of 68 informants claimed they had opened their full 2 hectares of land. These statistics compare well with cultivation figures for migrants who have been in Way Abung as long as five years.

LAND UNDER CULTIVATION FEBRUARY 1978

Place/Date of Arrival	(N)	Hectares under cultivation (%)			
		>0.75	0.76-1.00	1.01-1.99	2.00 +
Way Abung 1973	(69)	24	38	26	10
Way Abung 1974-75	(31)	32	32	26	10
Baturaja I 1976	(68)	22	47	21	7
Baturaja II 1977 /a	(43)	83	9	2	-

/a Migrants in BR II who arrived in the beginning of the planting season have cleaned and cultivated only 0.56 ha of land. This is approximately the same amount which the farmers cultivated in Village I in 1976/77.

Furthermore, even though the migrants in Unit I planted on relatively infertile soils which had been abandoned to alang alang, their yields were higher than in Way Abung. A DGT study listed the following per hectare yields in Unit I: 1,119 kg padi (unhulled rice), 988 kg maize, 1,725 kg soybeans and 11,692 kg of cassava. Not only was this an improvement in absolute yields when compared to Way Abung it showed a variety of crops and cropping strategies unheard of in Way Abung until recent years. Diversification of perennial crops was also increasingly common. The migrants in Unit I had planted more trees after 16 months than the migrants in Way Abung had planted over all preceeding years - 82 per family in Baturaja, 58 in Way Abung. (This does not include the full hectare of rubber which has been planted for the Baturaja migrants.)

This is not to imply that there have not been problems in Baturaja. From the point of view of the farmers the worst problems have been poor seed and the difficulties of selling their produce - particularly cassava. Animal and insect pests have also taken a serious toll. Nevertheless, even early income figures show total family incomes of US$500, a substantial improvement when compared to US$212 the estimated annual income of families in areas from which migrants come./1

INCOME IN BATURAJA AFTER 12 MONTHS ON-SITE
(in Rp)

Baturaja (Dec. 1977)	On-farm	Off-farm	Total
Best farmers /a	203,734	74,875	278,609
Average farmers	98,421	100,133	198,554
Poor farmers	73,453	98,889	172,342
Mean	125,202	91,299	216,501

/a Determined by the amount of land under cultivation.

Source: Subroto, Income Levels in Baturaja. Unpublished figures.

Further indication of their early progress is the fact that migrants are investing in their own farm production. The Subroto study suggests that the best farmers (n = 16) have invested an average of Rp 15,000 in planting materials and supplies even when fertilizer is provided by the project.

/1 A later study by SCET (April 1978) gives Rps 120,951 (US$295) as the income for the wet season alone (November-April).

Although the income figures for Baturaja and Way Abung have been gathered by different sources and are therefore not comparable a survey of household possessions such as pressure lamps, sewing machines, radios and the like also suggests the relative prosperity of Baturaja settlers when compared to those in Way Abung. Whereas 48% of the migrants in Baturaja own pressure lamps and 47% have radios or tapes, in Way Abung the number is only about one-third. In fact, as the following figures suggest Baturaja migrants are more likely to have major household possessions than any but the longest term residents of Way Abung.

COMPARISON OF POSSESSIONS IN WAY ABUNG AND BATURAJA

	Way Abung				Baturaja	
Date of Arrival	1965-69	1970-71	1972	1973	1976	1977
Percent with possessions in Sumatera	75	70	56	54	69	67
Mean number of items	1.25	1.36	0.93	1.02	1.12	1.10

The Cycle of Development - Although the Unit I migrants have been in place less than two years the fact that they have access to five hectares of land and off-farm work has dramatically hastened community diversification and growth. Because of the amount of off-farm work available in the vicinity several employment strategies have begun to emerge. Some subvillages or blocks appear to be emphasizing off-farm work, others stress bringing land into production. Others have brought additional laborers into the family to provide a consistent if small cash flow while the household head works on farm.

INCOME SURVEY APRIL 1978 /a

Blocks Ordered By Amount of Land in Production

Blocks			Total Cultivated land (ha)	Net Farm Income	Off-farm	% Off-farm	% (PNP)	Total
I.	- Q	(21)	0.50	38,050	63,375	62.5	(21.4)	101,425
	A1	(26)	0.52	74,105	87,800	54.2	(32.2)	161,905
	O	(18)	0.56	41,996	11,250	21.1	(2.8)	53,246
	N	(20)	0.60	70,473	88,150	55.6	(54.6)	158,623
						Group I average		118,800
II.	- C	(13)	0.67	66,283	3,933	5.6	(3.0)	70,814
	M	(34)	0.68	26,700	86,824	69.2	(18.8)	86,855
	RII	(14)	0.70	49,805	29,050	36.8	(29.6)	78,855
	AII	(19)	0.72	47,475	37,000	43.8	(25.9)	84,475
	E	(23)	0.74	73,907	29,917	28.8	(0.0)	103,824
						Group II average		84,837
III.	- K	(37)	0.76	156,704	44,821	22.2	(22.2)	201,725
	P	(27)	0.80	57,110	39,200	40.7	(31.0)	96,310
	R1	(20)	0.81	42,340	50,300	54.3	(30.5)	92,640
	B	(18)	0.81	51,215	29,763	36.8	(23.1)	80,978
						Group III average		118,000
IV.	- J	(26)	0.90	195,706	49,750	20.3	(20.3)	245,456
	S	(25)	0.92	63,525	24,967	54.1	(14.9)	138,492
	D	(26)	1.00	78,958	20,733	20.8	(0.7)	99,731
	L	(33)	1.07	115,420	49,657	30.1	(19.7)	165,077
						Group IV average		162,169

/a Source: SCET Supervision Report

Of the four blocks with the highest off-farm income (Al, M, S, and Q), three have 0.60 hectares or less under cultivation (recall that 0.50 hectares were open upon arrival). Farmers in these units earn an average of Rp 78,575/year off-farm and cultivate an average of 0.63 hectares. In the three blocks in which farmers make more than Rps 100,000 on annual food crops, an average of Rps 48,000 is earned off-farm and an average of 0.91 hectares is under cultivation./1

In a study intended to determine whether doing wage work for the PNP (estate group) planting rubber interfered with farming, a difference in these subsistence strategies was also confirmed

IMPACT OF PNP WORK ON LAND UNDER CULTIVATION - UNIT I

If Father does not work for PNP	(ha)
And no one else in family does	0.99 ha
And someone else in family does	1.08 ha
Average	1.01 ha
If Father does work for PNP	
And no one else in family does	0.66 ha
And someone else in family does	0.88 ha
Average	0.81 ha

If the head of the household remains on the land the average hectares under cultivation after 16 months is about 1.00. Presumably the increase in land under cultivation if someone else works is due to the ability to pay occasional help or the simple presence of two workers in the family. If, however, the head of the household does work for PNP the average amount of land under cultivation is only 0.66 hectares, unless someone else is also working, in which case it is again likely that enough capital is available to invest in clearing land.

In the past migrant families have not had enough labor available to do both off-farm work and bring land into production. The reasons are simple: their families are small and young and the main agricultural laborer is generally the husband; extended family members are not available to do child care and this deprives the husband even of the help of his wife. Yet there are advantages to having additional labor, not only does it allow one to open more land and thereby increase production, but off-farm laborers can, under the proper circumstances, supply a steady income even when agricultural periods are slack. They can also ease labor constraints during peak periods of on-farm work.

/1 Interestingly both the first quartile who have little under cultivation and have relatively large off-farm incomes and those in the third quartile which have emphasized bringing land under cultivation have the same average wet season incomes - Rp 118,000/year.

Apparently the migrants in Baturaja recognize this potential and are recruiting additional laborers as rapidly as they can be supported. A census of spontaneous immigrants at the beginning of the second planting season found 44 families (262 individuals) among the 400 households in Baturaja I, while a census after the April harvest found 117 families (440 people) there. As additional evidence of either their prosperity or optimism, Unit I migrants appear to be as likely to return to Java as their predecessors in Way Abung and they appear to recruit more people. This, in spite of the fact that those in Way Abung have been in place longer and are considerably (200 km) closer to home.

LABOR RECRUITMENT AND DEPLOYMENT

	Way Abung				Baturaja	
Unit I	1965-69	1970-71	1972	1973	1976	1977
Percent families with one member working off-farm	30.7	22.8	20.0	45.0	54.4	81.0
Average number of days worked	9.3	8.3	5.8	10.2	19.78	23.25
Mean household size	5.35	6.50	5.90	6.11	5.38	5.34
Mean number of workers	2.07	2.22	1.95	2.11	2.4	3.0
Percent visiting Java	40	53	52	33	47	16
Mean number who followed	0.66	1.12	0.48	0.71	1.22	0.60

Baturaja II suggests a somewhat different pattern of labor recruitment. There, small family size, a small number of return visits but a large number of workers per family (3.0, highest in the sample) suggests that these migrants know enough about the area to bring additional workers with them when they come. Additional research is required, however before this can be confirmed.

The influx of spontaneous migrants in Baturaja has so far been wholly unplanned. Existing migrants aware of labor opportunites have apparently recruited their relatives and friends. Employers report increasing numbers of immigrants available to work with limited recruitment on their part. While this response to employment creation is heartening it has also exposed a clear flaw in the system. At present no mechanism exists for integrating spontaneous migrants into the communities they serve. Welders, blacksmiths, furniture makers and housebuilders camp in lean-tos on relatives' houses. Agriculturalists in Baturaja for a season pack up their families and return to their vilages in Java to register for transmigration. In spite of the fact that in Baturaja they already have ways to support themselves, they also want land. In other words, the government policy of settling only sponsored migrants in transmigrant projects is moving against the flow; it hinders rather than helps the ultimate goal.

Lessons from Baturaja

Although the community is new, the lessons from Baturaja are pronounced.

(a) Initial investment in the agricultural sector has given the migrants a rapid start, promoted surplus production and contributed to the influx of spontaneous migrants.

(b) Off-farm work has hastened spontaneous immigration and increased overall settler welfare.

(c) Failure to consider manpower arrangements has prevented the integration of spontaneous migrants into communities to which they have moved.

Foreshadowing Issues to Come - Rimbobujang (Jambi Province Sumatera)

Rimbobujang is the first of the regular transmigrant communities to be settled within the project area designated for Transmigration II and as such it is of special interest to the Bank./1 In many ways the project resembles Baturaja. Both projects have been established in areas of low fertility soils - latosols and podsolics with a pH of 4.5-5.0. Both provide the migrant with five hectares of land, one hectare of which is now clean cleared for food crops when migrants arrive. All migrants are provided with house, tools, planting materials, agricultural inputs and 12 months of subsistence supplies. Village, health, education and administrative services are much the same. Roads within both projects are good.

There are some differences between the two communities. Five hundred families were settled in Rimbobujang in the wet season 1975/76, a year before Baturaja was settled. The second phase of Rimbobujang (RB II) which consisted of 2,000 families corresponds to the settlement of 400 families in Unit I-Baturaja, and Phase III-Rimbobujang (1,500 families) was settled about the same time as Baturaja Unit II (400 families). In September of 1978 there were a total of 1,100 families in Baturaja and 4,550 families (21,000 people) in Rimbobujang.

Several other important differences exist between the communities, not the least of which is proximity to Java. It takes five or six hours by train or bus to go from Baturaja to the harbor on the southern tip of Sumatera and from there it is an overnight ride on the ferry to Java. It also takes five or six hours along the newly constructed Trans-Sumatera Highway to move from Rimbobujang to Padang, the nearest port, but from Padang transport by

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/1 Sitiung a sister community on the Rimbobujang border was opened by the Public Works Department and settled by Javanese displaced from the catchment area of the Wonogiri dam. For this reason both its physical development and social circumstances are somewhat different than in communities in the regular transmigration program.

freighter is costly, irregular and subject to frequent delays. For migrants with little money and no lodging this seriously constrains the amount of communication which can occur.

The physical environment also varies somewhat. Whereas the early Baturaja migrants were settled in areas of old alang alang (grasslands), the migrants in Rimbobujang are in the midst of primary forest. This is important because land preparation and the differences in these ecological settings affect the agricultural strategies of the migrants themselves. In Baturaja the first hectare has generally been clean cleared and plowed. Under these circumstances the Javanese do intensive field preparation in order to control alang alang, and they plant the area in food crops. In so doing they have brought an average of 0.96 hectares into production at the end of 16 months. In Rimbobujang, however, much of the land has simply been felled and burned. Weeds are not a serious problem in areas of primary forest for the first two to three years, so the migrants in Rimbobujang have elected to dibble rice and clear new land. In many cases when soil fertility decreases they plant perennials particularly coffee (which is both profitable and easy to plant) and fell new areas for rice. Under less intensive cultivation, migrants in Rimbobujang typically report nearly two hectares in production.

But perhaps the most important difference between Baturaja and Rimbobujang is in the availability of off-farm work. The small number of migrants in Baturaja has provided those who are there easy access to construction opportunities. The care and planting of the block-planted rubber is also done by the migrants themselves. Rimbobujang migrants are disadvantaged in two respects: household heads are forbidden to work in construction and no rubber planting has yet been undertaken.

Migrants do not necessarily have to work off-farm if they have markets for their goods or can earn petty cash. But the Rimbobujang migrants have had several problems in this respect. Given their large numbers and the tendency for all to produce the same things, and given their isolation even from domestic markets /1 migrants in Rimbobujang find absolutely no buyers for the two commodities which they have in excess - cassava and timber. Cassava requires processing, timber requires markets and timber concessionaries prefer to use lumber which they themselves provide in ongoing construction. In other words, in some ways the Rimbobujang settlers are more like those in Way Abung than Baturaja. In their early years they have little internal differentiation, no markets and limited access to off-farm employment. Under these circumstances two questions arise:

(a) Are spontaneous migrants still attracted to the community?

(b) If so, under what circumstances?

/1 Although the infrastructure exists the marketing networks have yet to evolve which link villagers to local and regional markets.

Unfortunately Rimbobujang is a new community which is less well monitored than communities within the Bank-assisted areas, and the answers to these questions must rest primarily on a labor survey of 500 families concluded in September 1978.

Early Labor Recruitment

The evidence for the potential of spontaneous immigration comes in part from anecdotal information on Unit I. Among the 500 families settled in Unit I, there were initially 400 regular migrants and 100 families from the Social Welfare Department. Like the social welfare migrants to Way Abung these people were the indigent of Javanese cities and like the Way Abung migrants they proved ill suited to the migrant life. During the second year, when their supplies ceased, 78 of these families fled. Within a year, however, these 78 homesteads had been occupied by the fissioning of extended households already in the area, and by inclusion of 15 spontaneous immigrants living with relatives in Unit I.

The presence of this number of available families is one line of evidence for spontaneous immigration. The labor survey also gives indication that the now familiar process of growth and diversification must already be taking place. For example, if we look at the ratio of laborers to families in Rimbobujang we find that recent arrivals have only slightly more adult males (1.18:1.00) and females (1.16:1.00) than would be expected by the normal husband and wife and occasional adult child of either sex. For families which have already had a harvest, however, the ratio for males climbs to 1.58 per household and females 1.32. Apparently the number of laborers in households has been increased.

RATIO OF ADULT MALES AND FEMALES TO NUMBER OF HOUSEHOLDS

	Males over 15	Females over 15
Phase I (1975/76)	1.42	1.21
Phase II (1976/77)	1.58	1.32
Phase III (1977/78	1.18	1.16

Auxilliary evidence suggests that the lower ratio in Phase I than Phase II is an artifact of the early fissioning of Unit I families./1 The larger ratio of females than males per family is no doubt also a factor of selective in-migration.

A more detailed breakdown between units reveals additional differences within the phases.

/1 If 78 adults are added to the 422 families which remained the ratio is at least 1.61 males per household head.

RATIO OF ADULT MALES AND FEMALES TO HOUSEHOLDS IN RIMBOBUJANG
(EXCLUDING THE HOUSEHOLD HEAD AND SPOUSE)

		Male		Female		Sample
	Unit	>15 Years	12-14 Years	>15 Years	12-14 Years	Size
Dec. 1975	I	0.42	0.21	0.21	0.15	
Dec. 1976	II	0.44	0.23	0.33	0.14	
Dec. 1976	III	0.49	0.32	0.27	0.16	
March 1977	IV	0.42	0.20	0.20	0.20	
March 1977	V	0.92	0.24	0.51	0.18	
Dec. 1977	VI	0.18	0.21	0.15	0.18	
Dec. 1977	VII	0.31	0.27	0.19	0.12	
March 1977	VIII	0.26	0.17	0.24	0.17	
May 1978	IX	0.09	0.20	0.14	0.11	
May 1978	X	0.13	0.10	0.13	0.25	
Total	RB	0.39	0.21	0.24	0.17	

Two points are particularly noteworthy. The first is the steady increase in the ratio of adult/males to households over time. Migrants in Units X and IX who arrived after the last harvest season (January-March) have the lowest number of auxillary males and are presumably representative of all populations just shortly after arrival. For those arriving after planting but before harvest was finished there is an appreciable increase in all age groups but particularly among adult males. Among those groups which have been in place through one planting season or more, the number of additional males is doubled.

The second striking point above the chart is that Unit V has nearly twice the number of adult males and females of any other group. Initial investigation of soils and history revealed no obvious reason why this should be so. The only piece of evidence was the map (next page). At the time of this labor survey, Unit XV was under construction and new migrants were beginning to arrive. Apparently Unit V the nearest community to Unit XV was the host village to those involved in construction activities.

Meeting Future Labor Requirements

Because Jambi has low population densities, because migrants are required to work on their own land, and because the transmigrant areas are far from Java, labor shortages in the area are already acute. Although


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construction companies estimate a casual labor force of about 1,000 males within the migrant population (excluding household heads) this is not enough. Timber concessionaires send foremen (mandors) to Lampung (South Sumatera) to recruit itinerant Javanese laborers (it is easier to recruit there than in Java, they say, because Javanese there have already made the decision to leave their homes) and to obtain laborers for a seed farm the transmigration office has allowed migrants in Unit VI to work one week in four.

The situation is made increasingly acute by preparations for Transmigration II, which proposes to settle 42,000 families in the region, and by the decision of government to request Bank assistance in developing a 5,000 hectare rubber estate adjacent to Rimbobujang while block planting two hectares of rubber for 6,000 migrant families and 2,000 local smallholders. The question is a simple one: where will the required labor come from?

The labor requirements for developing the estate and smallholder rubber are, taken by themselves, staggering enough. Assuming semi-mechanical land clearing requirements for unskilled labor alone may be summarized as follows:

UNSKILLED LABORERS REQUIRED FOR NES III - RIMBOBUJANG/MAN-YEARS

Year	Estate	Smallholder	Total
1 (1979)	1,747	0	1,747
3 (1980)	1,848	2,736	4,594
4 (1981)	1,724	4,787	6,511
5 (1982)	2,006	5,272	7,278
6 (1983)	1,547	6,139	7,686
7 (1984)	807	5,839	6,646
8 (1985)	383	2,669	3,052
9 (1986)	256	1,534	1,790
10 (1987)	151	1,030	1,181
11 (1988)	49	684	733
12 (1989)	0	294	294
Total	10,518	30,884	41,272

Source: Staff Appraisal Nucleus Estates III

Since these figures represent virtually full-time work it is unlikely that much of the labor will be provided by migrant household heads (although Baturaja figures do show nearly one-third of household heads engaged in such work). Instead, most laborers will have to be recruited.

This can be done in one of two ways, either the estate can recruit unskilled laborers in Java, house them temporarily and return them when the work lessens, or it can attempt to recruit through pre-existing chains. It is to the credit of PNP VI that they are willing to explore recruitment procedures which will allow laborers to be recruited through on-site families and that they have begun to explore ways in which those who wish to do so can be integrated into the community in a permanent and productive way (for example, some of these laborers will no doubt elect to become part of the population working on the nucleus estate).

Providing for these laborers is only the tip of the iceberg, however. With this number of people on site provisions must be made not only for their accommodation and their use of community resources, but arrangements must be made for the service sector which will follow as well. Add to this the influx of laborers to be involved in the clearing of 100,000 hectares of land, the creation of seven new settlement areas, construction of 42,000 houses, village infrastructure and those involved in the other components of Transmigration II and the magnitude of the problem is clear. Assessment of the manpower requirements of developing communities must now be made in order to promote spontaneous outmigration in a way which is consistent both with national interests and the welfare of those who move.

II. PLANNING FOR THE FUTURE

As the cases in the preceding chapter indicate transmigrant communities consist of more than autonomous, self-sufficient farmers. Their growth and development is predicated on employment creation, spontaneous immigration and community diversification. Thus far, however, the emphasis on agricultural production as an indicator of migrant - as opposed to community - success has tended to divert attention from other efforts which are required to stimulate economic development and promote migrant flow. This chapter considers two of the many ways which might be proposed to channel spontaneous migration:

(i) removing existing constraints; and

(ii) providing incentives through employment creation.

Implicit in the argument is the notion that viable communities which attract and incorporate spontaneous migrants are not only less costly but they are in many ways less risky and certainly more natural than communities which consist of sponsored migrants alone. It does not follow, however, that these communities can flourish unsupported and unplanned. It is an essential premise of this paper that greater support to early immigrants and sound planning for those who come behind will greatly improve migrant welfare and facilitate the settlement process.

REMOVING THE CONSTRAINTS TO OUT-MIGRATION

Since the data suggest that most migrants are better off in the outer islands than they were in Java, why don't more people move spontaneously? On one hand the answer to this question is that they do. Between 1905 and 1978 the government moved approximately one million people to the outer islands, primarily to Sumatera, and natural population increase and subsequent outmigration has resulted in what is conservatively estimated as a population of some five million Javanese in the outer islands. Yet most observers agree that inequity of population and maldistribution of the labor force continue to be major problems in Indonesia and the question remains why don't more move? Constraints on agricultural production are a part of the picture, but as the previous cases have indicated, Javanese are also prevented from moving by problems related to:

(i) land availability;

(ii) access to project sites; and

(iii) the difficulties of obtaining initial support.

Furthermore, in some cases, government policy has exacerbated these problems rather than helped.

Land Alienation. One of the critical issues in settling people on the outer islands is the problem of land transfer. Most indigenous smallholders do not have land title but are given the right to cultivate by the traditions subsumed under customary law (adat). In many parts of Indonesia adat, sanctioned by statutory law, places authority over land use in the hands of extended families or local territorial groups. Under these circumstances indigenous smallholders are seldom in a position to legally transfer the ownership of their land. If a spontaneous immigrant wants to use the land of a local cultivator, he does what is called ganti-rugi - compensate for loss. Compensation may be for the loss of the right to use the land or the loss of productive trees, but it is not generally for the land itself. Therefore if the land improves in value - as it does with increased immigration or the planting of perennial crops, migrants may be requested to pay additional money or return the land. They may even be subject to counterclaims that the person who received the initial payment was not the person who had the right to do so. If the immigrants are politically weak - and most are - they are extremely vulnerable to such manipulation. The Christians in Parigi, for example, abandoned their land after it had already been opened and cultivated rather than contest the questionable right of locals to reclaim it. For these reasons many Javanese are unwilling or unable to move without Government assistance in obtaining land.

One of the main reasons to move into a transmigrant community is that there - at least in theory - the Government has already obtained the right to the land and is able to transfer legal title to the migrant. In the past this right was acquired by negotiations with elders or officials and indigenous farmers were often overlooked. This situation improved with the basic Transmigration Act of 1972 which provided mechanisms for compensating displaced smallholders, but problems remain. For example, the government is not always able to compensate in a way which is regarded as equitable by the locals (e.g., Sitiung), or indigenous people may come along after the community is established and assert ownership in the interest of obtaining compensation (e.g., Baturaja). As late as 1977/78 a wave of extortion swept through Way Abung as land titles were about to be issued to migrants and feeling ran so high that in one dispute over land holdings a local man was killed.

The policy now in effect of filling all alienated land with sponsored migrants further inhibits spontaneous growth. At this time spontaneous migrants to Baturaja must return to Java to register for transmigration as the land outside the Baturaja project is marga land of uncertain ownership which makes ganti-rugi difficult. Spontaneous migrants in the second Bank-assisted project will face an even more serious problem since sites are located within areas now assigned to timber concessionaires. This will make ordinary procedures for ganti-rugi almost impossible and literally prevent homesteading and spontaneous movement unless plans are made to incorporate semi-sponsored and spontaneous migrants into the area in some systematic way.

A large step toward the smooth outflow of migrants could be taken:

(a) if mechanisms were available for the legal transfer of land between local cultivators and immigrants;

(b) if land within transmigration sites were reserved for spontaneous immigrants; and

(c) if spontaneous migrants were allowed to register for settlement in the project area once they were there.

Access

Access to the project area is now recognized as a precondition of success. Most of the projects proposed for future assistance are in areas being opened by either new agricultural strategies on new communications networks and most are relatively accessible from new or existing roads. But access to new areas is not limited by poor infrastructure alone. Javanese are limited in their ability to move freely by:

(a) a restrictive pass system; and

(b) their own poverty and lack of knowledge about accommodation and transport.

Technically in order to move, potential migrants must register in their home areas to get permission to leave. Permanent changes of residence are often sufficiently difficult to arrange that migrants retain a permanent home in the village and simply request permission to work or visit elsewhere. To sell one's possessions in an effort to obtain the money required to undertake a long move is a signal of the intention to move permanently and this cannot be done without evidence of support or participation in government programs of labor recruitment or transmigration. Understandably, under these circumstances a very high proportion of spontaneous migrants are listed in registers and censuses as temporary visitors.

Underlying the pass system, at least in part, is the paternalistic concern of the government to prevent the movement of undesirables, trouble-makers, and people who will be unable to care for themselves; and in many ways the concerns of the government are well founded. The Balinese migrants faced tremendous difficulties in transversing the oceans to Parigi, in organizing their own accommodation, in finding cheap food and lodging, and in predicting and arranging transport. For this reason virtually every new group of immigrants was accompanied by people who had made the trip before. Today transitos or hostels exist in many towns where bona fide migrants can lay down their mats and cook their own food, but visitors and others who are a bit irregular are often reluctant to avail themselves of these services.

These problems can be addressed by:

(a) reviewing the surat jalan (travel pass) and eliminating procedures which might impede spontaneous movement;

(b) systematically disseminating information on work opportunities, means of travel, costs and living arrangements enroute to migrant areas. This can be done by:

- providing existing migrants with such information so that they can send it to interested relatives and friends;

- giving out such information in target communities in sending areas.

(c) Constructing transitos for transmigrants in major cities and erecting barracks for them in settlement areas will also facilitate movement.

At this time the road to Southern Sumatera (Way Abung and Baturaja) is sufficiently well traveled and well known to provide minimal obstacles to communication - this is evidenced by the early and frequent trips taken there by the Baturaja migrants, but the Trans II settlements are sufficiently distant and remote from earlier centers of migration that access will be difficult if not planned.

Obtaining Initial Support

Agriculturalists who are able to feed themselves still require cash to supplement their own subsistence crops. They may obtain this by selling their surpluses or by working off-farm. Assuming that surpluses can be produced their sale entails a market and this market must be based on either internal differentiation or networks linking homogenous transmigrant communities with a more diverse market. For this reason attention has been given in project preparation to improving processing, cooperative marketing and transport. Nevertheless, it has been difficult to establish marketing networks as rapidly as migrants need them; and for the two crops which the migrants have in greatest abundance, cassava and timber, only a limited market exists. There appear to be two ways around this problem:

(a) provide alternate sources of cash e.g., off-farm work;

(b) encourage non-agricultural immigrants who provide a market for farmers crops.

A limited market is not an insurmountable handicap if migrants, and early migrants in particular, have access to off-farm work for cash. As the Baturaja example illustrates, however, if the household head himself works off-farm, less land is brought into production. Most Baturaja migrants have cirumvented this problem by adding laborers to their families. In such cases one member of the family produces a small but steady cash flow while the others bring land into production. It is a corellary of this point that the more workers there are in non-agricultural occupations the greater the domestic market for food crops becomes. At present, however, there are a number of constraints to income and community diversification:

(a) official transmigrants are forbidden to work off-farm;

(b) off-farm work frequently requires a full-time commitment which precludes participation by family heads (e.g., rubber planting in Baturaja or logging and construction in Rimbobujang);

(c) regular transmigrants are moved in nuclear families, so only two adult laborers are available and both are required on farm;

(d) spontaneous immigration is allowed but not systematically encouraged; and

(e) no planning or preparation exists for the incorporation or settlement of non-agricultural immigrants.

Removing these constraints is relatively straightforward:

(a) authorities should acknowledge the need to work off-farm and assist in arranging work opportunities which do not interfere with agricultural production. For example:

  (i) migrants in Unit VI - Rimbobujang rotate employment on a seed farm, each family sending a laborer to work one week in four; and

  (ii) in Baturaja intervention by DGT has caused the hours in rubber planting to be reduced from 7-3 p.m. to 7-1 p.m. This has created more part-time employment while leaving half days for on-farm work;

(b) in the future families could be allowed or encouraged to move with additional adult laborers; and

(c) arrangements could be made to encourage immigration to fill temporary and permanent labor shortages:

  (i) manpower centers could be established in core villages;

  (ii) employment information could be prepared and distributed through existing migrant families;

  (iii) land could be made available in quarter hectare houselots for non-agriculture immigrants; and

  (v) land could be reserved within villages for spontaneous growth.

Labor shortages and spontaneous movement go hand in hand; but before promoting labor shortages an easy but essential first step in facilitating spontaneous movement is to address those constraints to movement which already exist.

CREATING EMPLOYMENT

Establishing the Foundation

Agriculture will no doubt continue to be the core around which transmigrant communities are built because only an agricultural strategy weds the surplus labor of the inner islands and surplus land of the outer islands on a low-cost and practical way. It is also desirable to have agricultural surpluses available before encouraging labor diversification both to support the non-agricultural population and to prevent a drain on the country's food resources. Non-agriculturalists in turn stimulate production and marketing, lead to labor shortages on-farm, and therefore promote further immigration.

The first priority, therefore, should be to established core communities which can very rapidly produce surplus food crops. Project components in Trans II which include two hectares of cleared land; draught animals; and seed, fertilizer and pesticides at reduced rates, are steps in this direction. Since migrants in Way Abung do obtain bare subsistence (700-1,000 kg of upland rice) on one hectare of land without draught animals and with minimal inputs, increased provisions should be sufficient to allow a per family output of 2.5 tons rice and 5 tons maize plus cassava and legumes./1 Such surpluses, in turn, would be sufficient to support a substantial non-agricultural work force.

Increasing Agricultural Employment

There are also ways to increase the amount of employment generated within the agricultural sector and therefore increase either the number of people or the overall income level which this sector supports. One is to build labor shortages into the development plan. Two hectares of clean-cleared land not only produces surpluses but is the maximum a family can till. If they wish to do any other work - clear land for perennial crops, seek wage income, do complex cropping - they are forced to recruit and support additional laborers. The advantage in such a system is that labor recruitment of this type is done largely without cost to the government and it serves in effect as a training program for those who will eventually settle on their own. It also offers new immigrants back-up economic and social support.

/1 Estimated per farm output in Transmigration II areas in year five.

A second strategy for increasing employment in the agricultural sector is to diversify farm employment itself. Weitz, Pelley and Applebaum /1 state the problem very well:

> The prevailing type of agriculture in the countries under study is subsistence farming. The crop pattern of a subsistence farm is generally dominated by a single staple crop, and consequently the annual work schedule of the farm is uneven, with a peak demand for labor at the harvest season. If the farm family utilizes its total labor potential at that time, it is usually underemployed during the rest of the year. This feature renders the subsistence farm inadequate for the purpose of alleviating unemployment, since by its very nature this type of farm perpetuates a state of underemployment (p. 3).

Weitz, et al., then argue that the only means of circumventing this problem is to diversify production at the farm level (ibid). This means, in part, that agricultural production itself must be diversified by introducing crops and cropping strategies which spread the labor of the farm family over as much of the year as possible. Appropriate cropping patterns also assure that labor constraints in the production of one crop do not set the limit on overall productivity. Weitz and co-authors also mention a principle introduced in the Baturaja example, namely, that non-agricultural employment increases agricultural productivity by absorbing surplus labor in slack agricultural periods and freeing it for agricultural work when required.

> In fact, the role of diversification at the farm level is crucial for both the increase in production and the utilization of the labor potential. Only through the introduction of properly planned additional enterprises into the crop pattern, is it possible to fill the gaps of underemployment in the slack season of the agricultural year. The annual work schedule then becomes more evenly distributed, the labor potential of the farm family is utilized to a much greater extent, and the overall employment generating capacity of the farm increases. Any agricultural settlement project that has the creation of new employment opportunities as an objective, must therefore be based on diversified [work opportunities] (p. 4).

It is a fact often forgotten in the design of development projects that the social organization of work affects productivity as much as the provision of technical expertise.

/1 Weitz, Raanan, David Pelley and Levia Applebaum. New Settlement and Employment. Settlement Study Center. Rehobot, 1976.

Assisting the Service and Industrial Sectors

Surplus production not only provides opportunities for community differentiation, surplus production requires community differentiation.

> Agriculture does not develop by itself. It requires a complex institutional system to support it, market its products, and provide inputs, credits and professional advice. The rural community, which is the agent of agricultural development, needs services for its population, such as education, health, public facilities and commercial outlets. The efficiency and location of both producer and consumer services exert a strong influence on the success of agricultural development (p. 5).

The role of the service sector is frequently overlooked both in planning agricultural settlement and in counting its beneficiaries. As the chart on the next page indicates communities of 30,000 people with family incomes of $750 (the condition most closely resembling transmigration projects) generate nearly 70.2 service positions per 1,000 settlers. Assuming only one laborer per family this would mean that 70 families, more than 350 people, would be required to service an agricultural sector, consisting of 200 farm families. According to this model a settlement with 30,000 agriculturalists would attract and support 10,500 more in the service sector alone.

Employment Generated in Services per 1,000 Settlers at Different Project Sizes and Levels of Income

Level of Income	$750 /a		$1,800 /b		$3,000 /c	
Population	3,000	30,000	3,000	30,000	2,750	27,500
Education						
Kindergarten	-	-	2.0	2.3	3.6	4.0
Primary school	5.6	5.6	5.3	6.1	6.5	7.0
Secondary school	1.0	1.2	1.3	1.5	2.5	2.9
Vocational school	1.0	1.2	1.3	1.7	1.8	2.3
Health						
Village clinic	1.7	1.8	1.7	1.8	1.8	2.2
Rural clinic	2.0	2.2	2.0	2.1	2.1	2.5
Hospital	-	5.3	-	5.3	-	7.2
Public Services						
Registration	-	0.2	-	0.2	0.4	0.2
Police	2.0	2.0	2.0	1.8	2.2	2.0
Post and telegraph	0.7	0.8	0.7	1.0	0.7	0.8
Municipal administration	5.0	6.3	5.0	7.0	8.7	9.0
Rural Co-ops	2.3	2.3	2.3	3.3	2.9	4.3
Technical Rural Assistance						
Regional office	0.3	0.5	0.3	0.7	0.7	1.1
Rural office	2.3	2.3	2.3	2.7	2.9	3.6
Commerce						
Retail	6.3	11.0	8.3	11.3	17.5	18.0
Wholesale	0.6	1.3	0.7	1.6	0.7	2.5
Banks	1.6	2.7	1.7	2.8	1.8	3.3
Hotels	0.7	1.3	0.6	2.0	4.3	3.6
Petrol station	0.3	0.3	0.3	0.5	1.0	1.5
Various Services						
Culture and sport	2.0	2.0	2.0	2.3	2.9	3.5
Personal services	-	1.6	2.7	2.8	3.6	4.4
Domestic services	-	-	5.6	4.8	9.0	11.8
Construction	10.0	11.6	12.0	13.3	20.0	18.0
Transportation	5.0	6.7	7.0	8.3	11.0	11.0

/a Based on: I. Prion, Region ACU Apodi Brazil, 1974 (not published).

/b Calculated on the basis of I. Prion, Region Meridionale de Centandina (a hypothetical study region).

/c Calculated on the basis of: O. Schulz, D. Bruhis and I. Prion, Estudio y Diagnotico del Desarrollo Urbano-Rural Integrado por Etapas para la Costa Atlantica de Colombia, 1975-1990, OAS, Programa de Desarrollo Rural, Washington, Abril 1975 (mimeo).

Source: Weitz, Pelley and Applebaum, 1976, p. 45.

In looking at actual communities Weitz, et al., found that in existing settlements of 5,000 agricultural holdings (what they assumed to be a community of 30,000 people dependent on agriculture), 10 to 20% of the overall population was employed in agricultural industries and small shops.

Industrial Population in Projects with 5,000 Agricultural Holdings

Income/ family($)	Employed in industry	Dependent on industry	Total population	% of pop in industry
750	1,510	4,990	45,350	11%
1,800	2,430	8,030	53,540	15%
3,000	4,340	14,330	71,670	20%

Source: Weitz, et al., p. 48.

Taken together, the service and industry sectors generated over 8,000 jobs in a community of 5,000 agricultural families with average household incomes of $750 per year. In other words, if Weitz and co-authors are correct, a community of 30,000 dependent on agriculture, supports half again as many people in non-agricultural occupations. At full development, each village of 5,000 families supports up to 2,500 families engaged mainly in service and industry. To provide for such families and facilitate their integration into the community is a problem to which the transmigration program must now turn. /1

Employment in Industry and Services with 5,000 Agricultural Holdings

Income/ family	Agricultural population	Employed in services	Pop dependent on services	Employed in industry	Pop dependent on industry	Total population
750	30,000	3,180	10,500	1.510	4,990	45,490
1,800	30,000	4,725	15,590	2.430	8,030	53,620
3,000	27,500	9,125	30,120	4.340	14,330	71,950

Source: Weitz, et al., Table 19.

/1 In this the transmigration program is not alone. Having shown the magnitude of the service and industrial sector, Weitz remarks "strange as this may sound, only in a very few projects were the services included in the detailed plan [for project preparation]." (p. 63).

Assisting the Service and Industry Sector

The growth of services and industries can be facilitated if anticipated and planned:

(a) Spatial needs and infrastructure requirements of diversified communities must be anticipated.

(i) major processing facilities can be included in the development plan;

(ii) service industries, health, education, administration, seed farms, cattle stations and their labor requirements must be calculated, adequate housing and infrastructure provided;

(iii) substantial territory can be reserved for non-agricultural immigrants;

(iv) towns as rural service centers can be anticipated and their development facilitated./1

Weitz makes the point that the most important thing about land allocation is flexibility. He advocates providing agricultural land largely as needed. After initial parcels are distributed he claims that in many cases additional lands should be available to more successful farmers on lease. Similarly, small industries could pay to rent rather than buy additional land from the communities they were in. Such land holdings within the community itself could, in fact, serve as an impetus to community solidarity and development.

(b) Small-scale services and industries can be fostered in the private sector. For example:

(i) raw materials for tools can be brought into the community, forged and assembled there;

(ii) skills such as surveying and typing should be sought among migrants themselves. If absent they can be taught;

(iii) credit can be provided for small businesses like bicycle and vehicle repair;

(iv) small processing equipment like tempe and tofu makers (soyabean processors run by women entrepreneurs) can be made available for purchase or credit; and

(v) extension can be provided to teach community members to define needs, recruit those they need to help them and arrange their support (imams, teachers, co-op managers, etc.).

/1 The Jengka triangle project (Malaysia) anticipated a largely urban town for each 100,000 people.

(c) Larger-scale labor intensive industries can be established.

(i) cassava processing which uses migrant women;

(ii) milling which uses migrant lumber, migrant labor;

(iii) rubber or oil palm processing which requires local and migrants labor; and

(iv) transportation systems using local entrepreneurs.

Most important, a social environment must be established in which these activities are facilitated by government and impediments to flexibility and growth are systematically removed.

TOWARD A STRATEGY OF EMPLOYMENT CREATION AND REGIONAL GROWTH

In a review of Joan Harjono's book, Transmigration in Indonesia, A. W. Arndt and R. M. Sundrum/1 argue that the focus on agricultural small holdings as an incentive to outmigration is misguided:

> ... a more realistic alternative approach is needed than a fond belief that transmigration conceived purely as a land settlement program can trigger either broad based regional development in the other islands or the large-scale migration needed to supply the labor for such development. Such an alternative would not preclude cultivation of the land settlement type on a modest scale, but it would drastically change the thrust of transmigration policy (p. 7).

Basically Arndt and Sundrum argue for a shift in investment to the outer islands, particularly in public works, which would draw labor into the outer islands from Java. Such a program they argue would be consistent with the goals of regional development, would facilitate the integration of local people and transmigrants and would be the only possible way to promote large-scale outmigration from Java.

In spite of the authors' misgivings, however, employment creation is in no way inconsistent with a large-scale land development program; and it may, in fact, be stimulated by it. For example, estimates for land clearing now vary between 30-50 man-days per hectare depending on the amount of equipment used. If anywhere near correct this suggests that 3 to 5 million days of labor - 12,000 to 20,000 man-years - simply open the land needed to

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/1 Arndt, H.W. and R. Sundrum, transmigration: Land Settlement or Regional Development? A Paper Prepared for a Work in Progress Seminar, October 11, 1977. Australian National University. Mimeo.

the 42,000 families in the second loan proposed for bank support. This does not include the number of people involved in logging, planning, land surveys and land transfer, road construction, house construction and related transport.

To capitalize on the employment created as a necessary part of transmigration projects and to use this employment to promote community diversification and outmigration is one of the most important tasks in the transmigration program. Several of the steps required are:

(a) a comprehensive manpower plan;
(b) manpower co-ordination on site;
(c) measures for integrating laborers into the community; and
(d) phased community development.

Manpower Planning

As previous sections have indicated such things as village design require overall estimates of the laborers required in the community. In a highly centralized country such as Indonesia these estimates are also a pre-condition to planning for building transito, enlarging transportation networks, providing barracks and even assuring the proper distribution of food and supplies. As a first step towards a comprehensive manpower plan, estimates are required for the number of laborers each sector will require and consideration must be given to their support.

On-site Co-ordination. As the Rimbobujang smallholder rubber scheme indicates, facilitating the movement of such a vast number of people requires comprehensive manpower plan for the recruitment, dissemination and support of the laborers required. In initial stages agencies responsible for logging, construction and the like, will probably have to recruit either from adjacent areas or directly from Java but in later periods much of the manpower required can be recruited through pre-existing chains. This has the advantage of assuring laborers of supportive networks, permitting flexibility, facilitating transition into the area, and assuring assistance to farm families in peak labor periods. General procedures for recruiting labor could be used, but, once again, they would have to be organized, supported and planned.

For example, ordinarily the main village would have a labor recruitment center as part of its administrative apparatus and through this center most recruitment would occur. Village heads and individuals would notify the manpower office of the number of available workers in an area and contractors would approach the manpower office for information on villages where they might recruit. Ideally contractors would estimate manpower requirements three to six months in advance. The manpower office together with the contractor would then inform the villagers of the number of workers needed and the time work would begin, and migrants would be encouraged to recruit relatives or friends. When the work began the contractor would arrange pick-ups in their specific villages. Alternately where government work was to be organized or individuals widely recruited for short periods, community vehicles could be used to transport people to a central depot where they would collect for transfer to a new site. This is important, as transportation arrangements determine employment possibilites in diffusely settled transmigration sites.

Centralizing manpower coordintion has a number of advantages to the community:

(a) it brings together recruiters and workers;

(b) it provides employment opportunities even for those in remote areas;

(c) it allows advanced planning and information dissemination to migrants and locals; and

(d) it permits flexibility in filling jobs. When one job ends, for example, priority can be given to reemploying people already in the area rather than recruiting anew.

However, individuals - both migrants and locals - should be allowed either to register for employment or seek work on their own, as over-centralization leads to favoritism and inflexibility.

Several additional caveats are also required. Throughout the world, foremen (called mandors, in this area) are frequently responsible for organizing blocks of unsophisticated laborers and reporting their availability or finding them employment. This expedites the work of the manpower office and can be encouraged if safeguards are taken to prevent the exploitation of workers. Finally, since both men and women are productively employed in Indonesia work opportunities - where appropriate - should be available to both. Not only is this important by way of preserving the traditional access which Javanese women have to remunerative employment, it also encourages the immigration of couples, fosters a more balanced sex ratio and thereby reduces the tensions which are universally associated with a large male labor force in small rural towns.

Stabilizing the work force. Both as an incentive to immigration and a means of stabilizing the work force as labor opportunities move on, spontaneous migrants should be given the opportunity to register for land upon arrival in the community. After one year on site they should be allowed to settle on the cleared houselots within existing communities with the understanding that they would build their own houses and clear their own land. Alternately they would be eligible to move into the next available settlement preferably within the same general area with full government support. Every effort should be made to settle people from the same sending area together, within a general policy of first come first served.

Phasing Community Development

If the focus is shifted from agricultural production to the process of creating new communities both project beneficiaries and the task of planning are significantly altered. Different kinds and degrees of support as well as different work arrangements are required at different stages of development.

Initial Construction. In early stages of community development when few laborers are in the vicinity direct recruitment from Java may be required and heavy capital intensive-machinery is more appropriate. In this period infrastructure such as roads would be carved out of the forest and nucleus villages established on each of the sites. Nucleus villages ultimately servicing 5,000 farm families, initially would contain barracks and service facilities, seed farms, cattle holding grounds and administrative services such as clinics and schools. They might also have lumber mills and processing plants. It should be assumed that such a community would ultimately have a substantial proportion of its population engaged in non-agricultural work and provisions for land allocation should be made accordingly.

The Agricultural Core - Once nucleus communities are established, administrative services in place, and houses constructed, the first wave of agriculturalists should be settled. These farmers need land which is cleared and developed to get rapidly established and to begin to produce the surpluses upon which future growth is to be based. Careful planning for early immigrants is extremely important, however. As the evidence of Parigi and Way Abung indicates, the first migrants know the least and have the most limited social networks in the receiving area, and for this reason they require more support than later immigrants. Since the initial community is small, however, early planning can assure this increased support.

(a) Most of the total complement of extension workers and trainers can be on-site when the earliest migrants arrive. This would increase both the time of their training and the intensity of services to early immigrants.

(b) The proper provision of seeds, fertilizers and pesticides can establish new behavioral patterns among the first migrants and which would then be diffused by the migrants to those who come later.

(c) Contacts between farmers and research stations health workers, etc. can be intensified in the early period and normalized later on when new migrants would also have existing settlers to provide information and support.

Later development. After a core community of 2,000 families or 10,000 people is established within a site, every effort should be made to promote labor intensive strategies and use existing migrants to recruit additional workers to meet labor shortages. If these spontaneous immigrants are given the option of settling with full benefits in newly opened sites, presumably the pressure to settle reserve areas within the old communities would not be serious until these older communities were sufficiently stable and labor-short to welcome the immigrants homesteading would attract.

Homesteading. In the fifth year after settlement, transmigration communities are usually turned over to provincial authorities. It is also the time when perennials begin to yield, early immigrants begin to feel labor short, and spontaneous immigration begins to occur. For this reason transfer of transmigration sites to the provinces should be accompanied by the opening of reserve land within the sites for homesteading. Land settlement through homesteading is facilitated by the fact that relatives and friends can settle within the communities of those who must support them. They can also receive the benefits of administrative services, health and education facilities which are already in operation. Government for its part, however, must arrange for the orderly transfer of land to homesteaders, smallholders, and entrepreneurs, and it must be committed to increasing local level services as villages expand. After transfer to provincial authorities most growth should be expected to occur spontaneously. A doubling of village size within five years of transfer and a quadrupling of the population within 20 years of settlement are modest estimates of rate of growth, estimates which nevertheless illustrate the importance of early planning.

The Stages of Settlement

The overall strategy implied in the preceding pages assumes that the GOI wishes to facilitate migration and that it wishes to do so as efficiently and economically as possible. It argues:

(a) that infusions of capital and machinery (for road clearing and land development), are most important in the early communities and their importance then decreases over time;

(b) that the need for support, supplies and services is also most critical in the earliest communities and lessens over time; and

(c) that conversely spontaneous migrants should make up a growing proportion of each community as time goes on and that their arrival, employment and incorporation into new communities should be planned.

This model assumes both that it will take a relatively large amount of money to settle relatively few migrants in the first few years, and that successive waves of migrants can be settled at decreasing expense, thus greatly reducing the perceived per capita cost of settlement. It also argues that only a system which facilitates the use of existing support systems to promote spontaneous migration is harnessing the potential of the normal migration flow.

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BACKGROUND PAPER IN SUPPORT OF THE TRANSMIGRATION PROGRAM REVIEW

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SECTION I

ONGOING PROGRAMS WITH TRANSMIGRATION COMPONENTS

1. There are five main types of Bank-assisted agricultural projects in the Outer Islands which are either ongoing or potentially able to absorb transmigration labor: (a) the standard transmigration projects in rainfed areas; (b) transmigration efforts involving tidal reclamation, or (c) irrigation; (d) Nucleus Estates projects for smallholder tree crops; or (e) sugar and other cash crops. All of these projects have a number of common features and some significant differences which argue for their common consideration .

A. Regular (Rainfed) Transmigration Projects

2. As a part of its ongoing emphasis on reducing dependence on food imports, the Government of Indonesia is concerned to bring marginal lands in the Outer Islands into food crop production. As a part of its emphasis on equity, the GOI is also interested in resettling landless farmers from the core islands to new areas which can provide them with a livelihood and allow them to meet their own subsistence needs. As a result of these goals the transmigration program for REPELITA III is based on an agriculture package intended to maximize food crop production through rainfed agriculture in the Outer Islands. This package consists of 3.5 ha of land, one hectare of which is to be clean-cleared for food crops and a second hectare which is to be brought into food crop production by the migrants themselves. The remaining 1.5 ha plot is intended for tree crop development. Migrants are also provided with planting materials, fertilizer for three years, agricultural tools, cattle, extension advice and assistance in setting up co-operatives. Costs are estimated at $4,250 per family,/1 and incomes are projected at $350 per farm family in year 5 and $625 at full development./2

3. The implementation of transmigration projects during REPELITA III is allocated to the Directorates normally responsible for each sector - Public Works, Health, Education, Agriculture and the like. Line agencies of these Directorates are synchronized by a regional project co-ordinator in the provinces, and by an overall project co-ordinator in Jakarta. Within settlements, community management is the responsibility of officials appointed by the Directorate General of Transmigration (DGT), and agricultural development falls largely to the Directorate General of Food Crops within the Ministry of Agriculture (DGFCA). Under the new five year plan uniform agricultural components and organizational arrangements are to be used in both foreign asisted and Government sponsored programs. While this is deemed important by both GOI and the Bank in order to prevent the evolution of two classes of projects it also implies that no action can be contemplated for Bank projects without considering the implications for the program as a whole.

/1 Mid-1979 constant prices (after devaluation).

/2 On 1.25 ha of land assuming no futher improvements.

4. The Government has set very high targets for the transmigration program. During REPELITA III it has proposed to open 250 development units (SKP) suitable for 2,000 families each. Of these, 210 are in rainfed areas and 40 in tidal reclamation schemes, 120 are intended for Bank or other foreign assistance, and the rest are to be financed from the national development budget. Slow start-up and new organizational arrangements mean that these targets are unlikely to be met and even reduced targets of 200,000 families now appear optimistic. Nevertheless, it is the scale of this effort as much as technical problems involved which have caused concern.

TARGETS FOR REPELITA III
(Number of Development Units [SKP])

	1979/80	1980/81	1982/83	1983/84	1984/85	Total
Tidal reclamation	12	8	8	8	8	44
Upland food cropping	13	17	17	19	20	86
Proposed for IBRD assistance	-	13	25	35	47	120
Total	25	38	50	62	75	250
Number of families	50,000	75,000	100,000	125,000	150,000	500,000

5. Assuming the movement of 200,000 families, this would mean:

(a) screening some 5-10 million hectares of land in order to identify 1,000,000 ha suitable for settlement;

(b) developing a co-ordinating mechanism to monitor activities in seven major directorates working in 400 villages scattered over 20 provinces; and

(c) training about 4,000 DGT staff, 4,800 teachers, 400 health workers and 1,800 agricultural workers for field positions alone./1

Training and institution building activities therefore will be of major concern in the Program Review.

/1 Provisional estimates, to be determined more precisely during the course of the Transmigration Program Review.

B. Tidal Reclamation Projects

6. Sumatra and Kalimantan have nearly five million hectares of coastal swamp, of which two million hectares are thought to be suitable for the cultivation of wet rice. Transmigration projects based on tidal reclamation focus on drainage and land development. Through 1978 approximately 100,000 ha were opened under tidal reclamation projects and Government has proposed to open an additional 100,000 ha for settlement during REPELITA III.

7. Organizationally tidal reclamation schemes differ from rainfed schemes primarily in parentage. Whereas in the past the Directorate General of Transmigration generally contracted for land development and supervised all aspects of the standard transmigration projects, tidal reclamation schemes were within a special agency of Public Works, P4S./1 This agency was responsible for constructing drainage canals and other water works, initiating agricultural activity and supervising community development. After reorganization of the transmigraion program the Public Works Department remains responsible for land development but community supervision and agricutural development have been allocated to DGT and DGFCA respectively.

8. Settler families in tidal areas receive 2.0 ha of land for wet-field crops; one hectare cleared upon arrival, the second felled by the migrants themselves. Wet rice is the main crop although coconuts are grown extensively. One of the attractions of tidal schemes is that wet-field agriculture produces higher yields than rainfed agriculture without chemical fertilizers. As the table below indicates, higher rice yields have been maintained in Upang Delta - a tidal scheme, than in Way Abung, a rainfed scheme of comparable age. It also appears that with higher yields more land is brought into production and significantly higher total family yields obtained. Risks from overdrainage and exposure of acid sulphate soils are also high, however, and not all tidal developments have been successful.

/1 Proyek Pengembangan Persawahan Pasang Surut, a special body within the Directorate General of Water Resources Development for tidal land development.

RICE YIELDS REPORTED BY FARMERS IN WAY ABUNG (RAINFED) AND UPANG DELTA (TIDAL) - 1979 /a

Years settled (Average)	Rice yields (kg/ha)/b		Land under cultivation (ha)		Total Yield (kg/Family)	
	WA /c	UD	WA	UD	WA	UD
9 harvests	452	873	1.02	3.05	462	2,664
7-8 harvests	450	1,024	1.49	1.82	585	1,865
5-7 harvests	504	1,346	1.5	2.05	757	2,747
4-5 harvests	480	1,309	1.05	1.81	504	2,371
2 harvests	-	1,842	-	1.22	-	2,248

/a Results of a Bank Survey no fertilizer used. Total sample, in Way Abung, _____ in Upang Delta.

/b In Way Abung the area is intercropped with cassava but upland rice is planted at about 95% of normal rates. In Upang Delta cultivated areas are used for wet field rice varieties.

/c WA = Way Abung; UP = Upang Delta.

9. The Irrigation Program Review (1978) estimated the cost of land development in tidal schemes at about $1,000-$1,500/ha and a resettlement cost roughly the same as on rainfed schemes. It therefore was assumed that tidal reclamation would cost $700 to $2,000 more than rainfed resettlement (depending on land development assumptions). Recent experience in the identification of the first Bank assisted tidal development scheme suggests, however, that development costs may be considerably higher, as much as $4,000/family excluding resettlement costs. Unless yields can be raised by double cropping this may prove too expensive to be feasible on a large scale. This would be unfortunate as tidal areas are one of Indonesia's largest reserves of as yet unclaimed and unused land.

C. Transmigration to Irrigated Schemes in the Outer Islands

10. Early Dutch efforts to resettle Javanese in the Outer Islands were generally premised on irrigation infrastructure (constructed by either the migrants or Government) which would permit migrants to do wet-rice cultivation. The Dutch, in fact, assumed that without irrigation Javanese would not move and/or would find themselves unable to cope with new agricultural techniques; and in the literature early failures were typically attributed to lack of irrigation.

11. It is noteworthy, therefore, that no new transmigration schemes scheduled for REPELITA III are based on the assumption of irrigation, and conversely that at the time of the Irrigation Program Review in 1978 very

few irrigation schemes proposed for Bank assistance were located in the Outer Islands. Many of the reasons for this are obvious: rehabilitation efforts bring higher rates of return than new projects; projects on Java (which have better access and sunk costs) are less expensive than those in the Outer Islands, and even in the Outer Islands it is less costly to develop areas of existing wet rice cultivation rather than open new ones and such areas of existing cultivation are generally densely settled./1 It is also assumed that irrigation for local smallholders and existing transmigrants has higher priority than irrigation for newcomers.

12. On the other hand the recent priority given to transmigration, the importance of irrigation to regional priorities, and the renewed interest in small-scale irrigation systems, all suggest that these assumptions might merit review. For example, where regional development plans include irrigation and irrigation intensifies existing agriculture freeing some land for new settlement, or alternately where irrigation would be a major incentive to local people to consolidate their holdings and allow transmigrants to settle, thus increasing land productivity, both economic rates of return and social amenities might be viewed differently. A second advantage of settling transmigrants on irrigated land is that it would mean that yet another agency with proven managerial capacity would be involved in land development. A final argument for reexamining the role of irrigation in the transmigration program is the sheer potential for irrigation development in the Outer the Outer Islands. The Irrigation Sector Review identified over 4,000,000 ha potentially suitable for irrigation (excluding tidal lands), of which more than half were located in Sumatra alone.

AREAS IDENTIFIED FOR POSSIBLE FUTURE IRRIGATION DEVELOPMENT
(FROM IRRIGATION PROGRAM REVIEW, 1978)

Island	New Development	Rehabilitation	Groundwater (ha)	Total/a
Java/Bali	175,831	68,186	48,600	292,617
Sumatra	2,526,583	83,705	-	2,610,288
Kalimantan	683,620	24,275	-	707,895
Sulawesi	359,000	8,425	-	367,425
Other	279,950	81,490	-	361,440
	4,024,984	266,081	48,600	4,339,665

/a Excluding areas of tidal reclamation.

/1 The Irrigation Program Review assumed in 1978 that development costs would be about $2,500/ha for conventional irrigation in Sumatra, and $4,500/ha for transmigration schemes in Sumatra. These are predevaluation costs and the assumptions are subject to review.

13. Noting that 95% of new irrigation schemes potentially were located outside Java, the Irrigation Program Review concluded:

> ...Since the Government has identified regional development outside of Java and transmigration as major policy objectives... the mission recommends that it is an appropriate time to consider an increasing commitment of Bank funds for future irrigation development [in the Outer Islands] in order to assist the GOI to increase the rate of growth of food grain production and to promote regional development ... (p. 32).

Following this recommendation, a survey has been undertaken of areas of existing transmigrants to assess irrigation potential and the DGWRD has requested that project preparation on transmigration sites with irrigation potential include outline plans for irrigation infrastructure. There is not yet a policy on this matter.

D. Nucleus Estates for Tree Crops

14. Nucleus Estates/Smallholder (NES) projects are primarily intended to increase rubber, coconut and oil palm production for smallholders. The early NES projects also included rehabilitation programs intended to increase the number of estates /1 which had the capacity to implement smallholder development. In the recent NES projects the Estates is responsible for providing one hectare of food crop land and three hectares of block planted tree crops for each settler family. Some of the potential smallholders are employed as laborers by the Estate during the tree crop development period, others are to be brought in when production begins. At that time families construct their own houses under the supervision of the Estate, begin food cropping and continue the maintenance of their tree crops with the support and supervision of the Estate. For its role in establishing smallholders the Estate receives a management fee. Recent projects have had investment cost of $5,000 to $6,000 per settler family, most of which is repaid "in kind" through processing facilities associated with the Estate. The entire smallholder debt is repaid over a period of 12 to 15 years at an interest of 10.5%. Settler incomes are estimated at ________ at full development.

15. The first three NES projects will result in the planting and replanting of 66,400 ha of estate land and 62,200 ha of smallholdings. The smallholder component will benefit 9,750 local families in the vicinity of the projects and 19,350 relocated families, of which 15,420 are transmigrants. Six thousand of these families are already settled in transmigration projects in Jambi Province, all others will be new settlers from Java. The proposed NES IV and V projects will result in the movement of an additional 4,550 transmigrant families. In total,

/1 There are 28 Government-owned estates in Indonesia which come under the authority of the Ministry of Agriculture.

about 14,000 transmigrant families (roughly 70,000 people) will be moved by NES projects I-IV, and another 6,000 existing transmigrant families (30,000 people) will benefit from new plantings. Therefore 49% of NES smallholder beneficiaries will be transmigrants.

16. After 1983 NES projects are likely to be directed exclusively to smallholders, but agreement has not yet been reached as to the ratio between transmigrants and local beneficiaries. Nor has it been decided whether the Estates will provide tree crops to transmigrants settled on Bank and Government schemes or whether transmigrant tree crop development will be done through Project Management Units or self-help schemes. Under any circumstances the management task is enormous. Assuming that 200,000 families are settled in Repelita III (1979-1984), a Government commitment to 1.5 ha of "block planted" tree crops per family would entail new plantings of 300,000 ha of tree crops during Repelita IV (1984-1989), more than the total amount to be planted by all of the NES loans during that period (200,000 ha), and equal to the total anticipated output of the PMUs (60,000 ha/year). This does not take into consideration the demand for tree crops among the local smallholders for whom these programs are largely intended. The relevance of these concerns to program considerations in the transmigration sector hardly needs reiteration.

E. Sugar and Food Crop Schemes

17. Management capacity is the single largest constraint to the rapid expansion of agricultural projects in Indonesia. For this reason there have been a number of recent suggestions in which existing organizations - the the Estates, factories or private enterprises, use their management capacity to execute agricultural projects. For example, the President of Indonesia has recently instructed the Estate sector to use its own resources to become self-sufficient in food crops and to consider expanding further into commercial food production. At the same time the Ministry of Agriculture has been asked to consider a plan to use Estates to develop cash crops such as sugar./1 The DGFCA is also investigating the possibility of smallholder sugar production in association with privately owned factories and DGT is conducting an independent study focussing on sugar projection using transmigrant labor.

18. Since feasibility studies have yet to be done, it is too early to judge whether these activities are economically feasible or socially acceptable. But if sugar production, to take just one example, is initiated in the Outer Islands there is no question that large numbers of laborers would be involved. It is estimated that nearly 40,000 smallholder families might be required in five sites now under consideration and that mill work at these

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/1 Although Indonesia was traditionally one of the world's largest sugarcane producers it has recently become a sugar importer since increasing sugarcane production on irrigated padi lands in Java no longer seems feasible, Government has recently turned to the Outer Islands to identify land appropriate for rainfed sugar production.

sites would involve an additional 12,000 households. No information is available on the numbers of families which might be involved in Estate managed food production.

F. The Interrelationship of Projects with Resettlement Components

19. One of the major tasks of the Transmigration Program Review will be to evaluate the best way to use scarce resources - particularly manpower, money, and land - in support of the transmigration program. Since management and implementation capacity have been defined as the greatest constraints to program development, a substantial part of the Program Review will deal with organizational arrangements, staffing and training, and other forms of institution building. But money and available land are also scarce resources and for this reason one of the first tasks of the mission will be to update assumptions about overall costs for project preparation, land development settlement and the like in the various types of projects in the Outer Islands. It is not the intention of this exercise to reopen the fruitless question of which type of project is best - all have qualities to recommend them - but it will allow management and cost considerations to be put together in developing a program which will permit the maximum movement consistent with migrant welfare and regional development.

20. It is possible that an analysis of costs and manpower demands will not show that new style transmigration programs are significantly cheaper or easier to implement than those based on tree crops or other forms of land development (though this is by no means a foregone conclusion). Were this the case, a number of alternatives would be available to Government; the range of which is only meant to be suggested by the following:

(a) Additional emphasis might be given to establishing migrants on tree crop projects - this would speed the program by spreading management responsibilities and it would improve settler incomes, but it would not address the problem of food crop production.

(b) Greater attention might be placed on projects in grassland areas. These would be easier to prepare and have lower land development costs, they would, however, entail considerable strengthening of land alienation and compensation arrangements and involve more clearly defined benefits to locals.

(c) Greater emphasis could be given to the role of the regular transmigration program in fostering spontaneous transmigration, thus increasing the number of beneficiaries of any single project. This would require a systematic strengthening of services in support to spontaneous migration.

21. One of the advantages of the standard rainfed transmigration program, when compared with all others; is that assumptions about land development are (or at least were) sufficiently simple that the migrants can do much of the work themselves. Since the ultimate goal of the transmigration program is to promote a steady stream of spontaneous migrants to the Outer Islands who are able to establish themselves, activities in support of

the regular program (improving extension, fertiizer distribution, land acquisition, etc) are also those most likely to foster this goal. For this reason, while the Transmigration Program Review cannot consider in detail all the ways that Government might stimulate out-migration,/1 it will consider ways to use components of new projects to facilitate spontaneous migration at decreasing cost to government. It will evaluate, for example, whether increasing the costs of some components initially (infrastructure, additional cleared houselots or free fertilizer) could stimulate spontaneous immigration and thus reduce overall costs. It will be taken as a given that viable communities can double in size within 10 years of settlement if properly planned.

Summary

22. In summary, while slow start up and new organizational arrangements mean that Government is extremely unlikely to meet its objectives for REPELITA III, it is possible that this very large target could be met within the next decade. It is also possible that with proper planning this number could be doubled by spontaneous movement. If accomplished this would be the largest program of voluntary resettlement in the world.

/1 For an earlier Working Paper See: Moving With the Flow: The Case for

SECTION II

ISSUES THE ORGANIZATION AND IMPLEMENTATION OF THE TRANSMIGRATION PROGRAM

A. Issues in Land Identification, Project Preparation and Land Development

1. Through Repelita II all transmigration activities were carried out by the Directorate General of Transmigration or sub-contracted by it to specialized agencies and private concerns. However in August 1978, a new Presidential Decree allocated the responsibility for implementation of project components to those Directorates General normally responsible for each sector. Under the new arrangements the Directorate General of Highways became directly responsible for:

(a) land identification,
(b) mapping and other activities associated with the physical aspects of project preparation,
(c) road construction and
(d) land development.

Two Directorates within the DG Highways are involved: Cipta Karya, the Directorate of City and Regional Planning, which is charged with land identification and project preparation, and PTPT/1, a newly created agency, which has the responsiblity for roads and land development in transmigration schemes. Since both agencies are assuming new responsibilities, the October Program Review Mission will focus on issues associated with the duties of these agencies and on institution building in support of their activities.

Issues in Land Identification

2. In both NES projects and former transmigration projects, sites generally were identified by the executing agencies in the provinces /2 through, or in cooperation with, the Governors. Many good sites were identified in this way although the transmigration program also received some areas either too infertile or too remote to be suitable for agricultural development. Now, however, both the scale of the new transmigration program and the importance of appropriate land for food crop production necessitate new procedures for land identificaton. First steps in this direction have already been taken by the proposed formation of a screening division within TKTD (Directorate of City and Regional Planning). This

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/1 Directorate Penyiapan Tanah Pemukiman Transmigrasi.

/2 The Estate or the provincial office of the DGT.

unit would rapidly screen areas for transmigration potential and assign them priority for project preparation./1 Left unresolved in the proposal are two general issues to be covered by the Program Review Mission: (i) determining which (if any) criteria should be given priority in selecting land for agricultural development; and (ii) determining the institutional arrangements by which data are to be collected and sites selected.

3. Criteria for Site Selection. Choice of sites depends on a series of variables: actual or potential access, soil and topographic features, size of area, and previous habitation. Experience in the identification of Trans III makes the long-term tradeoffs between these variables clear. Where soils, topography and access are relatively good there are also likely to be enough indigenous settlers so that only small projects are possible. Under these circumstances agriculture and infrastructural developments may be more appropriately designed for (and costed against) the inhabitants of the region as a whole. Large areas of suitable land which are not densely settled are generally remote and heavily forested and therefore costly to develop. Projects in grassland areas which are easier to prepare and have lower land dvelopment costs also have land tenure problems. A further complication is introduced by the fact that Government appears to be reserving grassland areas for its own transmigration projects possibly because of lower development costs./2

4. To clarify the parameters within which land selection takes place the October mission will include a land use specialist who will inventory what land-related data exist, ennumerate what new date are being generated and by whom, and who will assess both the impediments to transfering information between agencies and gaps which exist in overall knowledge. If possible, mission members then will attempt to roughly assess the soil type, present and proposed land use and accessibility of proposed projects. This will be done in order to improve baseline knowledge, to allow analysis of the complementarity Government and foreign-funded projects, and to permit anticipation of those activities which will have to be under taken in support of the overall program.

5. Provincial Participation in Land Identification. In the past, land suitable for settlement was determined primarily (though not exclusively) in the provinces. Today provinces still submit the locations of areas thought suitable for settlement to agencies like the DGT and TKTD, but in the process of consolidating and evaluating this information, considerable local knowledge is lost. This gives rise to impressions: (i) that detailed and uniform information must be generated on all potential transmigration sites;

/1 For the details of this proposal see Saddington, Greenfield, Davis; Back-to-Office Report, August 3, 1979.

/2 There is a danger that without some sense of the complementarity of the two programs, obervers will assume that the Bank supports settlement in primary forest to the exclusion of grasslands, a position which is neither true nor ecologically sound.

and (ii) that to get this uniformity, collection of data should occur through centralized agencies: interpretation of aerial photography through Bakosurtonal, soil surveys through IPB and the like. This centralizing process has its problems. First is the inability of agencies to gather and transfer knowledge across ministerial lines. (Data on forest reserves, forest concessions, mining concessions, information on projected road networks, areas for irrigation development and information on local land use all exist, but in disparate places). Second, provincial priorities maybe lost. Generating data at the provincial level, on the other hand, requires technical manpower there and analytical and liaison capacity at the center which may not exist.

6. There are, therefore, two long-term alternatives for project identification each with slightly different implications for institution building:

(a) Support can be given to centralized agencies to generate uniform data on soils and topography, to identify potential transmigration sites, and then to check those against regional priorities. This has the advantage of consolidating planning and communication but runs the risk of ignoring provincial priorities and political realities while focussing on technical details.

(b) Alternately the long-term emphasis can be placed on improving the capacity of the provinces to do land identification for a variety of projects and on improving their ability to transfer this information to the center. The difficulty with this approach is that provinces do not now have the technical capacity to analyze such things as soil-type and agricultural potential and they may therefore make decisions not in the best interests of the transmigrants themselves.

These two approaches are not mutually exclusive and aspects of each will evolve hand-in-hand, but to improve our sense of the long-term strategy one mission member, the regional planner, will be asked to evaluate these alternate proposals and to discuss the possibilities for reconciling these conflicting demands.

Issues in Project Preparation

7. In REPELITA III the Government is using a sector approach to funding its own transmigration program. That is, funding is alloted by hectares to be developed, or families to be settled, rather than by project. Operationally this means that land is identified, areal photographs taken, sites identified and demarked and land development begun, all on the basis of a set of uniform criteria and the assumption of one or two standard agricultural plans (rainfed, tidal). In keeping with a strong desire to maintain uniform standards and prevent two classes of Bank and Government

projects, and to avoid establishing technical requirements for Bank-assisted projects which would drain the limited number of skilled professionals away from Government projects, the second loan for transmigration was designed to correspond as closely as possible to the Government's approach. Specifically this meant that appraisal was done after a large area along the Jambi highway had been identified and determined to be suitable for transmigration, and when an appropriate agricultural model had been defined.

8. Experience since then suggests that the Bank may have difficulty proceeding on this basis. Areas, which on the basis of ODM and Government work appeared suitable for at least 30,000 families have turned out with detailed reconnaissance to be more hilly than expected and the estimated amount of flat land, hence families to be settled, has been questioned. Subsequent efforts to add adjacent land to the project area presented land tenure problems, while the indentification of land in less accessible areas created additional infrastructure requirements. Attempts to better use undulating land confronted assumptions generated by the agricultural model (for this project 2.0 ha/family of land under 8% slope is required for food crop production). A series of compromises has led to the resolution of most of thse problems in TRANS II but two general issues remain:

(a) what degree of project preparation is to be required for Bank-assisted projects; and

(b) what degree of commitment to uniform agricultural models should be maintained?

9. The last transmigration mission to Indonesia began discussions with Government on these issues. At that time the mission proposed more detailed project preparation prior to funding. There are both advantages and disadvantages, however. On one hand, if detailed planning were done it would be technically possible to propose alternate agricultural models to better exploit available land (i.e., less flat land per family and earlier introduction of tree crops in the more undulating areas). On the other hand, dual standards of preparation might well establish two classes of projects, something all sides wish to avoid. In addition the proposal is unlikely to be enthusiastically received by Government, as a single set of criteria and a single agricultural model simplify the work of the implementing agencies. Government also has a firm committment to the food crop model as a means of increasing national food crop production. For these reasons, it is felt that a continuing dialogue on these questions would be constructive, and that an early discussion of these issues should separate short-term and long-term goals.

Issues in Land Development

10. Land development consists of a complex of activities ranging from land clearing and conservation measures in rainfed projects to planting and maintaining tree crops in projects such as NES. In Transmigration II land

development involves felling trees, burning and windrowing the residue along the contours; harrowing between windrows and sowing rock phosphate at a rate of 500 kg/ha; planting vegetative grasses along contour lines and sewing leguminous seed in areas not to be cultivated in the following rainy season. Given the newness of PTPT and the fact that it has land clearing operations underway in some 15 different areas, it is extremely unlikely that the organization has the capacity at this time to do more than fell trees. For this reason the October Mission will document the present capacity of PTPT and discuss with DGH measures which are to be taken to improve the capacity of PTPT to implement and supervise the land development and soil conservation measures required.

11. Land Clearing. The Transmigration Sector Review will contribute little to the technical issues surrounding the land clearing debate. This is partly because there is an emerging consensus on the issue which involves a mix of land clearing methods /1 and partly because field trials are about to be proposed which would compare the efficiency of the four main methods of land cleaning which have been discussed: (i) mechanical clearing; (ii) mix of manual and mechanical (essentially the method now in use); (iii) manual, using contract labor; and (iv) manual, using settlers to clear their own land with subsidies. FAO has agreed in principle to organize and monitor these trials in cooperation with the Directorate General of Public Works. In the course of these trials monitoring would be done on such things as rate of land clearing, employment generated, amount of erosion and silt load in streams, and agricultural yields. The Sector Review will, however, focus on three other aspects of land development (i) the use of timber resources in development schemes, (ii) the legal status of forest concessions, and (iii) environmental concerns.

12. The Use of Timber and Forest Byproducts. As noted earlier in this section Government has requested Bank assistance for developing a number of SKP in densely forested areas. Most of these areas will be logged before development is begun and in many cases the residual timber on site will be of so little value that it will be burned after logs suitable for village buildings have been removed. In areas such as East Kalimantan, however, the value of residual timber has been calculated at up to $10,000 per ha. Therefore to avoid the loss of a valuable natural resource and possibly to reduce the cost of land development it is imperative to assess whether the timber on land to be clean-cleared can be commercially exploited.

13. To improve settler viability it is also critical to assess whether migrants can be helped to exploit the timber and forest resources on their own undeveloped land. The DGT has already opened stationary sawmills in some sites such as Singkut where lumbering provides additional income for a substantial proportion of the transmigrants. But the problems are still

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/1 In Transmigration II the most likely method of land clearing will involve a mix of methods: underbrushing will be done manually, trees will be felled using chainsaws and machinery will be used for the heavy tasks of stacking and removing timber.

formidable; few migrants have the draft power required to move logs to the sawmill or the family labor available to pit saw them in the forest. But the decision on where sawmills should be located, in what numbers and who should be responsible for them; whether mobile sawmills would be more efficient and if so how many would be required; whether chain saws should be made available to migrants (not all of whom will be experts in their use); and whether there are other ways for migrants to use their forested lands: all are questions which have yet to be resolved.

14. Legal Aspects of Forest Concessions. Most transmigration areas in primary forest are a part of logging concessions. It is generally assumed that these areas will be logged prior to their designation as transmigration sites but this is not always true, especially where areas have not been previously logged. Government is now providing the concessionaire with one year notice of its intent to occupy the land, during which time the concessionaire can exploit the timber in the area. To avoid future problems, however, one mission member will document the legal basis for these assumptions and investigate any difficulties which might potentially occur.

15. Environmental Concerns - Because of the scale of the proposed transmigration program and the substantial land modificaton which it entails, the Transmigration Program Review mission will include an ecologist who will define and monitor environmental issues. In addition, this person will be asked to document those projects and agencies working in environmental fields which have relevance to transmigration and to analyze the input which they now have or might potentially have on the transmigration program. The ecologist will also review the proposed pipeline of projects to identify what data exist on such things as forest and wildlife reserves, to determine the mechanisms for transferring this information to the agencies responsible for site selection and land development and to make recommendations, should they be needed, to facilitiate the communication of this information.

B. Issues in Agricultural Development

16. Under the new organizational arrangements detailed in the Presidential decree of August 1978, three agencies are directly involved in agricultural development in transmigration schemes: The Ministry of Agricultural (MOA), the Bank Rakyat Indonesia (BRI), and the Directorate General of Co-operatives (DGC). This is a sharp departure from the past when DGT was responsible for agricultural development even though it worked in co-operation with the MOA. This change means that several agencies will be extending their services to remote areas on the Outer Islands for the first time, others will be dealing with transmigrants for the first time, and some will be experimenting with entirely new programs and organizational arrangements. Therefore, the integration of these efforts and their timely implementation will be of paramount concern for project success.

17. This section will focus on four topics which illustrate the importance of agricultural support services and which emphasize the technical and organizational issues which have yet to be resolved:

(a) the provision of extension services and their integration with research;

(b) the distribution of fertilizer and the role of credit and cooperatives;

(c) the provision of livestock; and

(d) the establishment of tree crops.

The importance of training and institution building, and the relationship between standards in Bank-assisted and Government sponsored projects are general issues implicit throughout the discussion.

18. The Transmigration Program Review will not contribute to the technical discussion centering around whether and for how long food crop production can be sustained in the Outer Islands. It accepts on the basis of existing settlements that subsistence needs can be met in rainfed areas - even without inputs/1 and that with new technology - particularly in the introduction of appropriate cropping patterns and fertilizer, that substantial increases can be realized. Justification is required, however for two assumptions upon which this assertion depends: (a) that in the face of risk, farmers will use this new technology; and (b) that the organizational arrangements exist to deliver it.

/1 See Bank Working Paper; Beyond Subsistence: A Report on the Agricultural Economies of Baturaja and Way Abung. July 18, 1978.

The Provision of Agricultural Inputs

Providing Appropriate Extension

19. The diversified cropping systems appropriate to the Outer Islands are generally new to most migrants and for this reason sound extension is critical to success in early years. Migrants, who are usually farm laborers in their own villages, also need considerable assistance in learning strategies for overall farm management. This orientation and support is the responsibility of village extension workers. Under the national extension program there is to be one extension worker for each 500 families in transmigrant settlements. The extension workers generally have a degree from an agricultural high school and one month of extension training - not necessarily on rainfed crops. They are not necessarily transmigrants and may not have had experience with the particular problems migrants face in the establishment period. Extension workers are not now provided with land and some have little experience with farm management themselves. A training and visit system is used and backed-up by extension supervisors and project matter specialists.

20. Although these standards are consistent with those in Indonesia as a whole, the critical importance of extension in transmigration communities in general and in upland cropping in particular suggests that more must be done to insure the input which is required. A number of suggestions have been made:

(a) that a special training school be established in a transmigrant area to orient extension workers to upland cropping and give them practical experience;

(b) that in-service training be increased;

(c) that extension workers be selected from among those old or new transmigrants who have the appropriate education or experience;

(d) that extension workers be given land to improve their commitment and compensation; and

(e) that special materials be produced specifically for transmigrant use.

The loan for Trans II provides technical assistance to the DGFCA to develop these alternatives. The Program Review will therefore consider actions which are to be taken and will document the relationship between national extension projects and activities exclusively in support of the transmigration program.

The Relationship between Research and Extension

21. A second matter of considerable importance is the relationship between research and extension. At present, general agricultural research on upland cropping systems, for example, is occurring under the direction of national research programs, while fertilizer trials and on-site adaptation are contracted by DGT or Public Works (depending on which agency had the lead in the project). This system must now be rationalized. It has been suggested that rate of application and macro-nutrient trials be done by the extension workers in the farmer's fields in order to get both the supervision required and the feedback the extension workers need. Under any circumstances mission members will have to document the type of on-site agricultural work intended by DGFCA in order to ascertain manpower requirements and the institutional linkages between on-site activities and centralized research.

7. The Bank is now assisting projects to improve research and extension components of the transmigration program but the full impact of these projects is still some years away. The Program Review therefore will have several tasks; keeping in mind wider national priorities and ongoing programs it would assist in:

(a) determining priorities for research and extension based on information gathered during the October mission on the climate and soils of potential settlement areas;

(b) documenting the relationship between research and extension agencies in transmigration communities and suggesting their appropriate coordination;

(c) making concrete proposals on the selecion and training of extension workers and the ways specialized training and compensation can be provided; and

(d) investigating alternate means of communicating agricultural information to transmigrants.

Credit for Fertilizer Distribution

8. In past projects the DGT arranged for fertilizer distribution to migrants during the initial settlement period. After 1-3 years of free inputs it was assumed that BIMAS - the agricultural credit system - would take over (as it does in villages producing wet-rice). However, migrant participation in the BIMAS schemes in rainfed areas has been very poor, partly because of the erratic performance of BIMAS in providing the timely delivery of fertilizer and pesticides required; and partly because of the risk of crop destruction even when inputs are used.

9. Because of the poor showing of BIMAS in upland areas, settlements financed by the loan for Transmigration II will be the first to use a fertilizer distribution system arranged through the village co-operatives. Under this plan DGFCA will provide co-operatives with fertilizer for the first three years. In year one, the farmers make no repayment, in year two they repay 50% of the cost of inputs and in year three they repay 75%. From year four the cooperative procures the fertilizer and pesticides and farmers repay the full cost. The money collected in years two and three remains in the co-operative as a part of a revolving credit fund. Both Bank and Government support staged repayment for its educative value but its legal status is still unclear. Legally, co-operatives have no coercive power and it is still uncertain what sanctions could or would be brought to bear on settlers who failed to repay.

10. The social acceptibility of co-operatives is also in question. Ordinarily, migrants who barely know their neighbors are not good candidates for forming enduring co-operatives. There are two reasons: (a) they do not know the leaders or have much social control over them; (b) they are at greater agricultural risk and thus behave quite conservatively. The loan for Transmigration II, in an effort to circumvent the former problem, contains the provision that trained managers be appointed for each village cooperative. These managers would be paid by the DGC for four years after which time they would be supported by the farmers themselves.

11. Whether this model would be applied to the entire transmigration program, is uncertain. If adopted in all settlements, the DGC would have to identify and train some 400 co-operative managers over the next five years./1 The presumption that cooperative managers would remain in the villages also suggests a series of issues surrounding their selection, training and compensation. Ideally, those trained would be transmigrants, hence people willing to resettle, and they would be given land, both to increase their commitment and their compensation. However, those willing to be transmigrants are unlikely to make the best business managers while those who with the ability might not be available for transmigration in the numbers required or for the time needed.

12. For all these reasons, Bank and Government would still like to pursue the question of alternative credit arrangements for transmigrants. The Bank has requested such a study under the conditions of the loan for the first transmigration project but the task has yet to be undertaken. Therefore, as part of the March mission a brief review of the alternatives is proposed in order to assist Government defining (a) the issues, (b) the type of study required and, (c) the institution in the best position to undertake it.

The Provision of Livestock

13. Recent appraisal work on a project intended to transfer cattle to farmers in the Outer Islands suggests that both the benefits of cattle

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/1 Assuming that 200,000 families are moved.

on transmigration schemes and the means of procuring them require review. The original justification for cattle in Transmigrant settlements stemmed from the expectation that farmers would be provided with two hectares of clean-cleared land, more than a single family could cultivate. This amount was subsequently reduced to 1.25 hectares and it is no longer assumed that this land will be either fully cleared or plowable. Although the farmers themselves value cattle for manure, for calves, and as a savings account which can hedge against emergency, without the requirement for traction the economic benefits from cattle in early years on forested land is subject to question. There may still be a strong case to be made for seeding cattle in remote areas to build up the herd for later years and in grasslands oxen may be critical for bringing additional land into production, but these claims need to be reviewed.

14. Assuming that the provision of cattle could be justified, procedures for procurement and distribution must also be re-examined. There are at least three different proposals for this: (a) establishing livestock ranches to provide the nucleus of the breeding and distribution system; (b) procuring cattle intended for slaughter in East Java and Sulawesi; or (c) purchasing cattle from Australia. Each of these alternatives have slightly different economic and social consequences which will be investigated in the course of the March mission. Government's intentions for non-foreign assisted projects will also be explored.

Establishing Tree Crops for Transmigrants

15. Bank and Government agree that 1.5 hectares of transmigrant land should be developed for tree crops. As yet, however, there are no concrete plans for doing so. Several alternatives have been suggested:

(a) Using Estates to block-plant tree crops. This is now being done in Rimbobujang (Jambi Province) where 2.0 hectares of rubber are being block planted for each migrant family. This is the most costly alternative ($1,200/ha) and it is limited by the capacity of estates. There is full cost recovery "in kind."

(b) Using the PMUs intended for rubber and coconut replanting. This alternative is slightly less costly ($920/ha) but has the same (or potentially more serious) management constraints. The hectarage to be planted for transmigrants equals the entire PMU target for Repelita IV. Cost recovery is through BRI.

(c) Obtaining planting materials and fertilizers through the Estates or PMUs. Under this system organizational arrangements would be left to the on-site agricultural authority or the DGT. This potentially would reduce the managerial drain on other tree crop projects. Wage subsidies for land clearing, planting and maintenance could be paid but this would entail organizational problems as those complex as in the PMU, with less experienced managers. If wage subsidies were paid, repayment would be required.

(d) World food program or wage subsidies used for land clearing while migrants take the full responsibility for planting and maintenance. This has already been attempted by Catholic Aid in Rimbobujang with limited success. The World Food Program, however, is prepared to assist in such a scheme and it may be the most feasible plan. WFP aid or other low input schemes would be on grant.

16. Government is obliged by the loan conditions of Transmigration II to submit a plan for tree crop development by June 1, 1980. Given the very real constraints faced by the agencies involved, however, no action has yet been taken. This is not critical for Transmigration II as those migrants will not be ready for tree crops for several years. However, the precedent established by providing two hectares of block-planted rubber in Rimbobujang is an important one and suggests that early consideration of the type and amount of assistance to be provided and its distribution between locals and transmigrants is required. An ancilliary issue which merits investigation is the possibility of establishing crops other than rubber, particularly coffee and coconuts, and determining when and by whom this decision should be taken. Oil palm is probably feasible only where the decision has been made to establish a factory as it is not possible for smallholders to market it themselves. Early experience with local farmers in Aeknebara suggests it might otherwise be an excellent smallholder crop.

Institutional Issues

On-Site Management of Agricultural Development

17. In Transmigration II each site will have one manager appointed by DGT and a second appointed by DGFCA. The site manager for agricultural development will be responsible for the activities of the Rural Extension Centers, Plant Protection Brigades, Seed Farms, Livestock Distribution Centers and work closely with Cooperatives. The coordination of transmigration and agricultural activities is critical to project success and for this reason will be the subject of review and discussion with the agencies involved.

Training for Agricultural Personnel

18. Transmigration II, which will resettle 30,000 families, requires the following personnel in agricultural fields - 82 cooperative managers, 70 extension workers, 13 extension supervisors and four subject matter specialists, 40 additional high school graduates and some 60 other staff (see chart next page). By extrapolation a program positing the movement of 200,000 families would require 540 + cooperative managers, 466 extension workers, 86 extension supervisors and 26 subject matter specialists. Therefore, in an effort to assist those engaged in manpower planning in the agricutural sector the mission will attempt to document to whatever extent possible how these people will be selected, trained and compensated. It will also review the special manpower requirements of the overall transmigration program.

INDONESIA

TRANSMIGRAION II

Required Agricultural Staff

Staff	No.	Yearly Payment /a Rp '000/yr.	Total Payment Rp million
Plant Protection Brigate			
-	5	300	1.5
Seed Farms			
SLTA (high school graduates)	22	194	4.3
Fixed Staff	26	110	2.9
SPMA (from agricultural high schools)	4	434	1.7
REC			
PPM (extension supervisors)	10	611	6.1
PPL (extension workers)	68	584	39.7
SLTA (high school graduates)	5	194	1.0
Fixed staff	15	110	1.7
District Agricultural Offices			
PPS (subject matter specialists)	2	701	1.4
Sub-District Agricultural Offices			
SLTA (high school graduates)	10	194	1.9
Mantri Tani (agricultural officer)	5	506	2.5
Kiosks and Mills			
Cooperative Managers	82	240	19.7
Livestock Reception and Distribution Center			
PPS (subject matter specialists)	2	701	1.4
PPM (extension supervisors)	3	611	1.8
Fixed staff	20	110	2.2
Total			89.9

/a These salaries are from mid-1978, before devaluation.

C. Issues in Community Development and Overall Organization and Management

1. Although some former activities of the Directorate General of Transmigration have been reduced by the Presidential Decree of August 1978 the DGT remains the cornerstone of community development. It also appears likely to serve as coordinator of all line agencies other than those in the Ministries of Agriculture and Public Works. This section will describe issues related to the activities of the DGT in selection and resettlement, in community development, and in coordination of on-site activities other than agriculture. It will also discuss the role of the DGT and Junior Minister for Transmigration in project planning and implementation. In so doing, it will define areas of further investigation for the March mission of the Program review.

Activities of the DGT

Selection and Resettlement

2. Over 500,000 families on Java, Bali and Lombok have already registered for transmigration. The appropriate selection of migrants and their early orientation will therefore be among the most important tasks of the DGT.

3. Selection of Migrants. In recent months the DGT has begun to consider solving several old problems by changing selection criteria. For example, to circumvent labor shortages in the initial years of settlement it has suggested that nuclear households be allowed to take at least one extra adult worker - this would be likely to be a sibling or possibly a parent. These individuals might later provide the nucleus of spontaneous settlement within the community. They would require less support than sponsored migrants as they would have kinsmen for back-up in the establishment period. Alternately the movement of older household heads with older children might be encouraged. The DGT is also exploring a mix of agricultural and nonagricultural workers to promote community diversification. Another important issue in selection is whether village personnel, teachers, health workers and agricultural personnel will be selected from among transmigrants or be introduced into the community by their line agencies. Allowing workers who are qualified to provide these services to migrate with their spouses might be the most desirable alternative as it would provide a worker committed to migrant life, and the provision of land would in some ways compensate for the hardship of a remote post.

4. A second aspect of selection that may soon become important is determining the proper migrants for the proper settlement type. In the near future DGT will be selecting migrants for both tidal and rainfed schemes and it will be important to determine whether migrants from particular back-

grounds do better in one type of setting or another. Estates now find settlers through their own recruiting procedures but it is also possible that settlers identified by the DGT might be allowed to express a preference for settlement on food crop or tree-crop smallholdings (only Javanese from very specific areas are likely to have enough experience with tree crops to permit them to elect this option). Settler identification need not imply DGT control of migrants in tree crop schemes as the point will be to maximize, not duplicate, management potential.

5. Orientation and Training. Not all families who have registered for transmigration can be moved in the immediate future. It is, therefore, important to notify migrants and give them some sense of their priority. On the other hand, when land clearing is completed in a particular settlement site and village construction is undertaken by the DGT, migrants should be told when they are to move and where. If provided with adequate orientation as to area and type of agriculture anticipated, migrants might be able to gather some of the information and supplies they need. At present, there is a tendency to encourage dependence by assuring migrants that everything they need will be provided for them. This may be a mistake, as migrants should be encouraged to do as much for themselves as they can. Realistic assessments by DGT of critical goods which migrants could collect - tools and seed, for example - would assist the physical transition to the new area. Realistic orientation to the hardships and potential activities of both women and men would ease the mental transition. Agricultural orientation for transmigration is appropriate in the sending area although agricultural training is probably better done in the new community. It will be the task of Program Review to update DGT activities in the areas of selection and training and ascertain that programs are being developed which will meet future demands.

6. Resettlement. Although fraught with difficulties, the actual process of moving government-sponsored settlers has posed no insurmountable problems. The DGT is now undertaking a study on the feasibility of moving transmigrants by air. This would clearly reduce the hardships, particularly to mothers and their children, but would probably increase cost. The mission will follow decisions taken in this area.

The Role of the DGT in Community Development

7. There are three critical areas of activity in community development which the Bank assumes would be under the authority of the DGT:

(a) the coordination of the on-site activities of all agencies other than Public Works and Agriculture (which have their own site managers). This would include the coordination of agencies such as Agraria (for land titles) Education, Health and Home Affairs.

(b) the identification of new activities, not now a part of transmigration, which would facilitate community development - for example, promoting small-scale enterprises and activities such as lumbering and

(c) the facilitation of spontaneous settlement.

It is probable that the DGT sees itself in the first role and perhaps the third, though whether it is willing and prepared to undertake experimental programs which might then be turned over to other agencies has yet to be discussed.

8. On-site Coordination. In spite of the fact that the institutional relationships under the new Presidential Decree are not yet fully resolved, because of its responsibility for village construction and because of its part on planning and monitoring community development, the DGT clearly will have the key role in coordinating services to migrants other than those provided through the Ministries of Agriculture and Public Works. This would probably involve such tasks as: arranging with appropriate agencies for equipping and staffing schools and health centers, coordinating the provision of land titles, and assisting in the establishment of those administrative structures - the village councils and LSDs - within which village governance eventually must occur. The main links in this series of activities will be the village head and the site manager both of whom are appointed by the DGT. Because of the complexity of the tasks these individuals need to be experienced and well trained. Yet the numbers required by the program (assuming 200,000 families moved) would be about 4,000 village heads and 500-800 site managers. The Bank-assisted projects do not yet include provisions for training DGT staff as this service was to be provided on a program designed by FAO. The FAO project assumes, however, that this training is to be done for those guiding agricultural development. Under the new organizational arrangements this assumption seems questionable, and preparation of this project should be closely observed.

9. Identification of Activities to Improve Settler Income. If DGT personnel are freed of the on-site coordination of agricultural activities, it is possible that they can focus on other aspects of community development. The DGT itself has proposed that it be involved in lumbering activities, both to provide timber for village construction and to provide an outlet for logs from land clearing and lumbering undertaken by migrants themselves. At the negotiations for Transmigration II it was decided that the DGT did not have the organizational capacity to do large-scale milling and this job remained with the land clearing contractor. The need to provide an outlet for migrant work suggests, however, that DGT supervision of portable saw-mills and chainsaws might be reopened. This topic will be examined by a consultant in the course of the October mission.

10. Another type of enterprise which might be appropriate for the DGT is the promotion of small-scale industries which focus on the processing of raw materials. The production of tofu and tempe (from soyabeans) and products from cassava flour are enterprises that can be started with small amounts of capital and guidance. Processing forest products such as rattan and resins or the production of bricks, tiles, thatch and wall mats all take minimal organization and would respond to the creation of a market by DGT

perhaps in association with village construction. In the past DGT has discouraged off-farm work feeling that it detracted from land development. However, effective organization of labor, particularly during the dry season can substantially increase family incomes and thereby facilitate investment in onfarm production. Under the new organizational arrangements it is clearly in the interest of the DGT to define its role on community development in the broadest possible sense.

Support for Spontaneous Migration

11. Success of the transmigration effort will depend on the establishment of spontaneous migration to the Outer Islands. This can be done in two ways: by using regular projects as a nucleus around which settlement occurs; and by developing the means for migrants to establish themselves in existing communities on their own - the so-called sisipan (slip-in) system. Both methods are under examination by government and both are worthy of support.

12. Transmigration II, intended as a model for other projects, includes several provisions intended to promote spontaneous transmigration in association with the projects which are being developed.

(a) Homesteading - Twenty percent of sites in blocks within five trial villages cleared in the first year would be planted with a cover crop but not settled. In the second year these plots would be opened to homesteading by relatives of settlers within the block.

(b) On-site Registration. DGT would register all spontaneous migrants who arrive on site. After one year those who meet the settler selection standards (married agriculturalists from poor or landless families) would be eligible to move with full support into the next available settlement.

(c) Nonagricultural Settlers. In all settlement units of 2,000 families at least 75 quarter hectare houselots would be cleared and made available to nonagricultural settlers. This land would be surveyed and the deeds transferred for a nominal administrative fee.

(d) Transitos. DGT would also explore the location, construction and staffing of transitos for spontaneous migrants and submit plans and cost estimates for their construction and maintenance.

Since on-site registration would reduce only the cost of movement its main advantages are: (i) that it rewards those with the incentive to move on their own; and (ii) it keeps new immigrants near family and friends who can assist them during the establishment period. To effectively reduce costs, however, priority must be given to homesteading. Under homesteading extra houselots would be cleared and planted to a cover crop. These plots plus undeveloped land would be transferred to anyone who would work them. DGT would still have to determine whether additional support was required for these migrants. With proper planning it is reasonable to expect that spontaneous migration could double the number of households within ten years of first settlement.

13. Government also has a number of proposals to promote spontaneous movement outside project areas; these include land banks of unused land which could be transferred by village heads or kecamatan level officials, and simplified certification of land transfer. Boards for the arbitration of land disputes and land compensation have also been suggested. Serious consideration of these proposals will require the formation of new unit, possibly within the office of the DGT, to deal exclusively with these issues and it should be the role of the Program Review to discuss actions which might be taken in support of these efforts.

Overall Organization and Management

14. In March of 1978 a Junior Minister for transmigration implementation was appointed by the President. In August 1978 implementation was allocated to the various Directorates normally charged with activities within each sector. At that time, fifty-three Directorates General in seven major ministries were potentially involved. /1 The DGT was to serve as the Secretariat to the JMT. Subsequently the Junior Minister has been appointed the Coordinator of the World Bank-financed projects, and the head of the DGT has been appointed his deputy. The nature of overall planning and coordination, regional coordination, and the institution building required to do both, are topics of major concern to the Program Review.

Overall Program Coordination

15. In spite of the details within the Presidential Decree there is still confusion about the way in which overall planning and implementation are to occur. In theory the Badan sets policy guidelines and Cipta Karya screens potential project areas. When areas are approved by the Badan (and presumably the financing agency) project preparation occurs. When project preparation is complete and the project is approved, PTPT begins land clearing, the DGT undertakes village construction, and selects and resettles the transmigrants. Once the farmers are on-site agricultural activity begins. Although this sequence of events is clear enough, each presumes a host of antecedent activities and their execution is the subject of considerable concern.

/1 Some of these Directorates have only token or advisory responsibilities.

16. In an effort to assist the planning and implementation of the overall program, the World Bank and UNDP have joined hands on a special project to provide $3,500,000 for technical assistance to the Junior Minister for Transmigration to improve the management and coordination of projects. Specifically this project would assist in the design of management procedures for the JMT, the project coordinator in Jakarta and the regional project coordinator(s). This project will commence at the beginning of 1980 and should assist in the clarification of administrative roles.

17. Regional Project Coordination. One bottleneck to efficient management is likely to be the lack of a clear on-site hierarchy of agencies and the very limited authority accorded to the regional project coordinator. The regional project coordinator is intended to integrate the efforts of the project managers of DGT, Agriculture and Public Works each of whom coordinates activities on several sites. In Transmigration II for example, there are three site managers for each of seven sites, each reports to his own regional head who communicates with the others through the Regional Project Coordinator.

18. It was originally assumed that under the new organization arrangement there would be very strong project management units located in the field. Under this system the PMU head would draw up work plans with the regional coordinators of the various line agencies, approve budget items, do supervision and sign off on dispersement. Since budgetary approval went through the PMU it was assumed that it had a clear way of monitoring and coordinating regional activities. Since then, this concept has been significantly modified. The project coordinator is located in Jakarta and the implementing agencies control their own budgets, supervision and dispersement. Coordination at the regional level is done primarily on the development and monitoring of work plans. Under these circumstances there is concern that the Regional Project Coordinator will have very little power.

19. It is too soon to tell whether the proposed plan will work, or whether the technical assistance team working with the JMT will be able to devise procedures to strengthen the role of the regional staff. The mission will monitor activities in this sector and attempt to ascertain whether they are consistent with actions in the regular Government program.

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1979

DRAFT FOR DISCUSSION

PLANNING FOR TRANSMIGRATION

I.D. HILL

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2.10.6 Schedule

PREFACE

This report was prepared during the period April to July 1979 whilst the author was employed as a consultant by the World Bank to assist with the planning of the Transmigration II programme.

During this time it became apparent that because of the desire to establish transmigration settlements as rapidly as possible, certain procedures had been adopted in an effort to speed up the planning process. Some of these procedures have led to confusion and others to bad design. This report has been written in an attempt to ensure that the situation is not repeated.

The report has been prepared after detailed discussions with both TKTD and World Bank permanent staff. Section 2.5 is largely the work of Mr. G. Cazaux, World Bank mapping consultant. Section 2.8 is based on terms of reference for soil surveys prepared by Lembaga Penelitian Tanah (Soils Research Institute) Bogor and has been discussed with LPT staff. Mr. C. Relf World Bank consultant on rural roads, provided much of the information in Section 2.10. The help of all these people is gratefully acknowledged.

PART I. THE PLANNING PROCESS

1.1 GENERAL

An important objective of the development of transmigration settlements under the third National Development Plan is increased production of food crops. The development of dryland areas for food crop production has a high priority for reasons of cost and speed of development.

The planning process described here is therefore specific to the planning of transmigration settlements in which initial development concentrates on dryland arable food crop production. This planning process aims at identifying and planning areas suitable for a pre-determined farm model or farming system, the dryland arable food crop model.

This process should be clearly distinguished from the more usual regional development planning process, which aims at identifying the natural resources of an area and then deciding what form of development is most suited to those resources.

Within the specific framework of the Indonesian transmigration programme, the planning process can be considered in three phases which are summarised in Table 1 and discussed below. The sequence of activities in this planning process is shown in Figure 1 and a tentative schedule in Figure 2. Technical specifications for these activities are given in later sections of this report.

Although the phased approach to planning described here would be applicable to forms of development involving other farming systems, the type of survey and planning would be different.

1.2 PHASE I. LONG RANGE REGIONAL PLANNING

The long range regional plan for transmigration, termed R 20, gives regional development objectives at a national level. It shows the interrelationships of regional development areas (WPP and SKP) and the relationships of proposed new settlements areas to existing centres of population. It is based on national development strategies and all existing information about the development potential of the regions.

what information

This long range regional planning has been completed in outline for the whole of Indonesia and is not discussed further here.

1.3 PHASE II. WPP/SKP OUTLINE PLANNING

1.3.1 Objectives

The WPP/SKP outline plan provides the basis for deciding on the suitability of an area for transmigration settlement and therefore the basis for deciding whether to proceed to detailed design. It shows the boundaries of the WPP and SKP and the general distribution of agricultural land. Access to the SKP and an outline road network within the SKP is also given.

WPP: Wilayah Pengembangan Partial. Partial (part of) Development Region

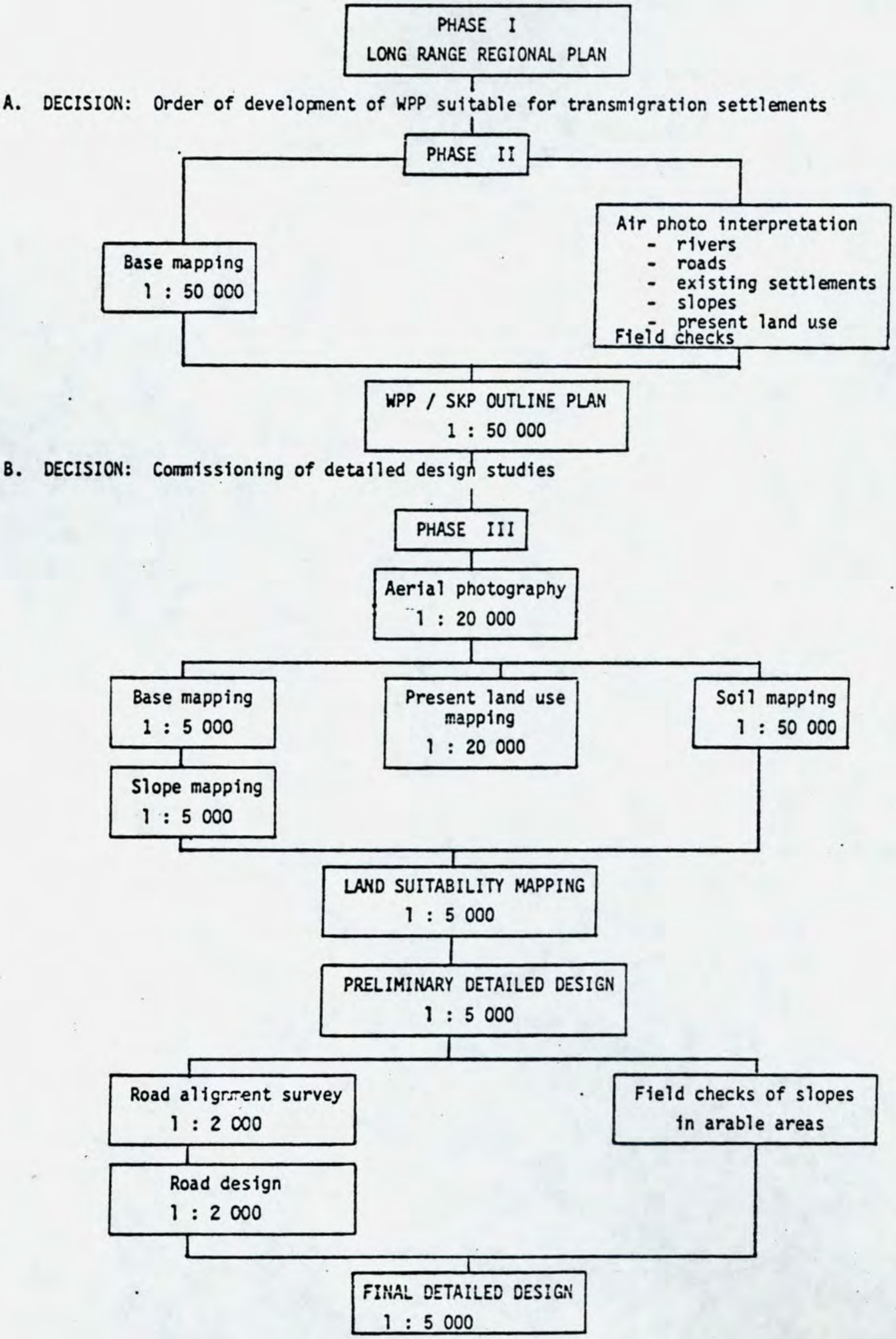
SKP: Satuan Kawasan Pengembangan. Development Area Unit.

The Planning Process

Process	Data Source	Product
PHASE I Long range regional planning	National development strategies Existing information on development potential	Small scale maps showing development regions (WPP)
PHASE II WPP/SKP Outline planning		
Base mapping	Existing maps Existing air photos at 1:35,000 - 1:65,000 Rarely new air photos at 1:50,000 or 1:20,000	1:50,000 uncontrolled base map showing - existing roads - rivers - existing settlements
Outline planning	Base map at 1:50,000 scale Present land use map and slope map at 1:50,000 scale derived from interpretation of existing air photos at scales of 1:35,000 - 1:65,000. Field checks of photo interpretation. Field observations of soils.	Outline plan for WPP/SKP at scale of 1:50,000 showing: - boundaries of SKP - distribution of agricultural land - accessibility and outline road network

The Planning Process

Process	Data Source	Product
PHASE III Detailed design of settlement units (SP)		
Aerial photography	Phase II studies to define area for which new photographs are required.	1:20 000 scale aerial photographs
Base mapping	Ground survey of horizontal & vertical control 1:10 000 scale photo mosaic made from enlarged 1:20 000 aerial photographs	1:10 000 scale contoured photo map
	Drainage network identified on 1:20 000 aerial photographs	1:5 000 scale line map enlarged from 1:10 000 photo map
Preliminary detailed designing	1:5 000 scale topographic map TKTD planning criteria	Preliminary detailed design
	Present land use map at 1:20 000 scale based on interpretation of recent 1:20 000 air photos. Soil map at 1:50 000 scale based on field survey. Rarely more detailed soil maps.	
	Slopes map at 1:5 000 scale derived from 1:5 000 scale topographic map.	
Field checking of detailed design	Field survey of road alignment and slopes in arable holdings.	Modifications to preliminary detailed design.
Road designing	Field survey of road alignment	Detailed road design
Final detailed designing	Preliminary detailed design Field checks.	Final detailed design



C. DECISION Site development

FIGURE 1. The planning process

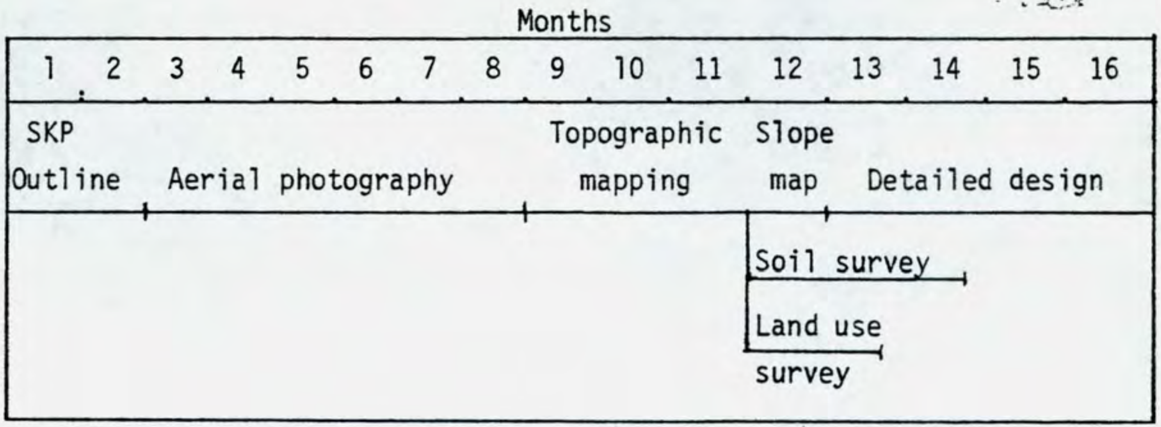


FIGURE 2 Schedule for planning, survey and design

1.3.2. Basis of the plan

The outline plan is based on existing 1:50,000 scale topographic maps or maps derived from existing photo mosaics or air photos. Control is derived from existing 1:100,000 or 1:250,000 maps. Outline planning is also based on data on slope, present land use, the drainage network, soils and existing communications. These data are derived from interpretation of existing air photos at a scale of 1:35,000 to 1:65,000 and from field work.

1.4 PHASE III. DETAILED DESIGN OF SETTLEMENT UNITS (SP)

1.4.1 Objectives

The detailed design for the settlement unit (SP) provides the basis of site development. It shows the location of houses and public facilities such as schools and markets, the boundaries of agricultural holdings and the boundaries of areas to be cleared. It includes road alignments and detailed road design. The design is the basis for tender documents for site development and together with detailed engineering drawings of roads and other structures, the basis for actual development.

1.4.2 Basis of design

The detailed design is based on the suitability of the land for the specific types of land use proposed for transmigration settlements. It is dependent on the availability of 1:20,000 scale aerial photographs which are used in the production of 1:5,000 scale topographic maps and thematic maps at various scales.

1.4.2.1 Aerial photographs. New aerial photographs at a scale 1:20,000 are required for the area of those SKP shown by the Phase II study to be suitable for settlement.

1.4.2.2 Topographic maps. The detailed design is produced from 1:5,000 scale topographic maps with a 5m contour interval (2.5 m interval in flat areas). These maps are produced as follows:

- ground survey of horizontal and vertical control
- production of 1:10,000 scale controlled photo mosaics
- production of contoured photo map at 1:10,000 scale
- production of line map at 1:10,000 scale and enlargement to 1:5,000

1.4.2.3 Thematic maps. Information is needed on present land use, soils and slopes, in order to assess land suitability for specific purposes.
Present land use. Boundaries of various land use categories (defined in Part 2) are derived from interpretation of 1:20,000 aerial photographs.
Soils. The level of detail of the soil survey will be dependent on the complexity of the area determined during Phase 2 studies. Soil association mapping at a scale of 1:50,000 will be adequate in most areas of upland soils. Only rarely will soil series mapping be necessary.
Slopes. Detailed slope maps are essential for detailed design. These should be derived from the 1:5,000 scale contoured maps.

1.4.2.4 Land suitability. The suitability of land for specific types of land use proposed for transmigration settlements is assessed from the environmental data collected during outline planning and in detail from the data collected during the Phase III soil, present land use and slope surveys.

1.5 EXECUTIVE DECISIONS

The sequence of activities in the planning process shown in Figure.1 indicates the need for executive decisions, as opposed to technical decisions after each phase of the planning process.

A. A decision as to which of the WPP thought to be suitable for transmigration settlements are to be developed first. This decision is based on the long range regional plan.
B. A decision as to whether detailed design studies should be commissioned. This is based on the results of the outline plan showing whether the area is suitable for transmigration settlements.
C. A decision as to whether the area should be developed or not. This is based on the detailed design and cost estimates.

It must be emphasized that a decision to commission detailed design studies is not the same as a decision to develop a site. Each phase of the planning process provides more detailed and more reliable information. Consequently the detailed design may show that the number of families that can be accomodated in an area is appreciably lower than predicted in the outline plan.

1.6 SCHEDULE

In Part 2 of this report, schedules are given for each of the activities in the planning process, based on assumptions about the sizes of survey teams and areas to be surveyed. These schedules are used to give an overall schedule for transmigration settlement units, which is presented in Figure 2.

This shows that from the start of outline planning to the completion of detailed design and the preparation of tender documents is likely to take 16 months. The main uncertainty is the length of time required to obtain new aerial photography, as this is dependent on the weather. An arbitary period of six months has been allocated to this activity, but as it could well take longer it is recommended that outline planning be started as early as possible and aerial photography planned one year in advance.

1.7 ORGANISATION

The schedules show that one outline planning team (Section 2.3) can study an area of 50,000 ha in two months. On the assumption that half the areas studied are unsuitable for transmigration settlements, this means that they should produce outline plans for 18 SKP each year.

However the schedule given in Figure 2 for the detailed design phase, applies only to one SKP. Thus, the outline planning team can theoretically service 18 planning groups consisting of topographic, land use and soil survey teams and design teams, who will produce detailed designs for 72 village units. Shortening the time available for planning will only result in unsatisfactory planning. If the number of village units is to be increased then more planning groups must be employed, together with the supporting survey teams. The size of the programme then leads to management problems.

Because of the size, speed and complexity of the transmigration programme the organisation of transmigration planning within TKTD needs careful consideration. One possibility is the establishment of a new Sub-Directorate in TKTD, to deal solely with the planning of transmigration settlements. Initially, one outline planning team could work within this Sub-Directorate. The work of the 18 separate planning groups should be supervised by this Sub-Directorate.

If the Repelita III target of 200 village units per year is to be met, the Sub-Directorate will eventually have to include three outline planning teams, servicing 54 planning groups.

TKTD: Tata Kota dan Tata Daerah, Directorate General Cipta Karya. (City & Regional Planning).

PART 2. TECHNICAL SPECIFICATIONS FOR ACTIVITIES IN THE PLANNING PROCESS

2.1 INTRODUCTION

In this part of the report technical specifications are presented for the various activities required for proper planning of transmigration settlements. These specifications should form the basis of full terms of reference for contractors assigned to the activities.

The specifications are presented in the sequence shown in Figure 1

2.2 WPP/SKP OUTLINE PLANNING

2.2.1 General

The long range regional plan demarcates areas as potential transmigration sites, but there is often little systematic information about the land resources and existing population of such areas. The reconnaissance surveys defined below are a means of providing this information rapidly, so that a decision can be made as to whether detailed design studies should be commissioned.

2.2.2 Background Data

All existing data will be consulted, including maps and aerial photographs and any existing regional plans or transportation studies. Climatic data, soil or land use surveys and geological surveys will also be consulted. A list of all available data sources will be compiled and if possible copies of all such documents presented with the survey results.

2.2.3 Scale of Survey

The survey results will be presented at a scale of 1:50,000 using the best available base maps. Often this will be an uncontrolled base map derived from print lay downs (Section 2.3).

Although all available aerial photographs will be consulted, the survey will be based on aerial photographs at scales of at least 1:35,000 to 1:65,000.

2.2.4 Access

The accessibility of the area will be considered in the light of existing or planned land or sea communications. The need for new roads or ports to provide adequate access for the development of the area will be indicated. Communications within the area will also be examined. Estimates will be given of the length of new roads or other works required to ensure adequate access.

2.2.5 Present Land Use

Various land use types (See Appendix 2.7) will be identified on existing aerial photographs at scales of 1:35,000 to 1:65,000, and their distribution shown on 1:50,000 scale maps. The validity of the land use interpretation will be checked by traverses in the field: a minimum of 1 km of traverse per 1,000 ha will be required. The location of all such traverses will be shown on the map. Exceptionally traverses by air may be used to check the land use interpretation but flight lines must be plotted on the land use map.

As existing aerial photographs may be some years old an indication must be given of the extent to which land use has changed.

2.2.6 Population

The number of people living in the survey area will be calculated either directly from census figures or more usually estimated by other means.

For example, the land use survey will provide data on the number of existing settlements: by estimating the number of households in each settlement and the number of people in each household, a crude estimate of population can be arrived at.

2.2.7 Land Forms

Land units with a repeating pattern of land form or closely associated land forms will be identified on existing aerial photographs at scales of 1:35,000 to 1:65,000 and mapped at a scale of 1:50,000. Land units will be related to the Catalogue of Landforms for Indonesia (LPT Working Paper No. 13.1977).

The predominant slopes in each land unit will be estimated. The percentages of each land unit occurring in three slope classes, 0-8%, 8-15% and>15% will be given. The accuracy of the slope estimates will be checked in the field, with a minimum of one observation per 100 ha. Helicopter surveys do not provide an adequate check of slopes, so ground observations will be essential. The location of all observation points will be shown on the 1:50,000 scale maps.

2.2.8 Soils

It is not possible to do a complete soil survey in the time available. Soil information will therefore be collected from auger borings along traverses selected on the aerial photographs. The number of traverses will be determined by the complexity of the area, but there will be at least one traverse in each land form type. Additional information will be collected from road cuttings or other available sections. No soil map will be prepared, but the information will be used to provide an indication of the range of soils present in each land form type. In particular, limitations due to soil factors such as deep peat or shallow stony soils will be identified.

2.2.9 Hydrology

The main drainage network will be shown on the 1:50,000 scale base map prepared for the outline planning. This will be supplemented by further stereoscopic examination of the aerial photographs to enable details of the drainage pattern to be mapped. The main hydrological characteristics of the area will be assessed from consideration of this drainage pattern and the catchment areas of the main rivers. In particular, the risk of flooding will be assessed and the suitability of the area for large or small scale irrigation works. Unless records of river flow already exist, only theoretical calculations will be made of water availability. As field checks of river conditions can only be short term, information will be collected from the population living in or close to the area.

2.2.10 Assessment of Suitability

The suitability of an area for a transmigration settlement site dependent on dryland food crop production will be assessed on the basis of the following main characteristics.

2.2.10.1 Accessibility. Remote areas requiring costly road or port building will be considered less suitable than areas served by existing communications networks.

2.2.10.2. Present Land Use. Areas which are presently densely populated and used are not considered suitable. Less intensively used areas may be considered for development but sites with less than 10% of the land presently used will be preferred.

2.2.10.3 Slopes. Areas in which all the slopes are greater than 8% will not be considered suitable for transmigration settlement. Areas with slopes less than 8% may be suitable for dryland arable cropping, provided the flatter land occurs in blocks of at least 50 ha and that there are no other limitations, such as peat soils or flooding.

2.2.10.4 Soils. Areas in which the soils present severe limitations to the growth of crops such as deep peat, shallowness or toxicity will not be considered suitable for transmigration settlement. Although low fertility is a limitation it does not preclude development of an area as it can be overcome by the use of fertiliser.

2.2.10.5 Flooding. Areas subject to permanent or seasonal flooding will not be considered suitable for transmigration settlements based on dryland food crop production.

2.2.11 Presentation

The results of the survey will be presented as a map showing land units, present land use and slopes. Areas considered suitable for transmigration settlement will be clearly marked. A short report of less than 5,000 words, summarising the main findings of the survey will be presented.

2.2.12 Reliability of Planning

The outline plan is based on rapid reconnaissance surveys of areas mainly larger than 20,000 ha. Estimates of the area of land available for transmigration settlement cannot therefore be precise and will be correct only to within 60-80% of actual totals.

2.2.13 Schedule

It is assumed i. Area equals 50,000 ha
ii. Staffing 1 land classifier/soil scientist (LC)
1 land use specialist (LUS)
1 regional planner/rural engineer (RP)
1 cartographer/photogrammetrist (C)
Team (T)

Activity	Month 1	Month 2	Month 3
Identify area to be studied	T		
Obtain existing maps and air photos	T		
Base map preparation	C		
Accessibility study	RP		
Population study	RP		
Air photo interpretation			
present land use	LUS		
land forms	LC		
hydrology	LC		
Field checks		T	
Map preparation		T	
Assessment of suitability		T	
Report preparation		T	

2.3 PREPARATION OF BASE MAPS AT 1:50,000 SCALE FOR WPP/SKP OUTLINE PLANNING

2.3.1 General

These maps are required for the presentation of preliminary data about the suitability of areas for transmigration settlements. They are not geodetically precise and are essentially working documents, for use in areas where 1:50,000 scale topographic maps do not exist.

2.3.2 Control

No new field surveyed control points are required. Control will be taken from existing small scale maps or from any other available control data.

2.3.3 Photo Mosaics and Print Lay Downs

In areas where photo mosaics exist, these will be used as the basis of map preparation, with appropriate scale adjustments. In other areas new photo mosaics will not be prepared. Instead, existing aerial photographs at scales of 1:35,000 to 1:65,000 will be laid down between identifiable points for example between a river and a main road shown on small scale maps. The photographs will then be adjusted to give a best fit.

2.3.4 Standard Map Sheets

All maps will conform to the standard map index published by Bakosurtanal. See Appendix 2.5.2. This grid is controlled by longitude and latitude so each map will show prime co-ordinates. Map sheets will be 50x50 cm in size, though this may vary slightly depending on the latitude.

2.3.5 Map Characteristics

2.3.5.1 Physical features. The base maps will show the drainage network and existing roads and settlements. Other readily identifiable features such as the summit of a prominent hill that may help the user will also be shown. All the above features will be identified by stereoscopic examination of existing aerial photographs at 1:35,000 to 1:65,000 scale. The features will be transferred from the aerial photographs to the base map with the aid of an instrument such as the Hilger and Watts Stereosketch.

2.3.5.2 Map legend. Each map sheet will have a legend identifying the symbols used on the map. It will include a small scale index map locating the map sheet and the surrounding map sheets.

2.3.5.3 Other data. The principal points and photo identification of all aerial photographs used will be shown on the face of the map. Where more than one set or contract of aerial photographs have been used a small scale index map showing the areas covered by each contract will be included in the map legend.

2.3.6 Presentation

Maps will be prepared on stable base material. One original and five paper copies will be presented.

2.3.7 Schedule

It is assumed

i. Area equals 50,000 ha
ii. Staffing one cartographer/photogrammetrist, part of the outline planning team
iii. Relevant aerial photographs and small scale maps are to hand.

Activity	Week		
	1	2	3
Enlarge small scale maps to 1:50,000			
Air photo identification of roads rivers and existing settlements			
Print lay down			
Transfer of detail from air photos to map			
Fair drawing			

2.4 AERIAL PHOTOGRAPHY AT 1:20,000 SCALE

A standard form of contract for aerial photography has been drawn up by Bakosurtanal which meets the contract requirements of both GOI and IBRD. This contract gives detailed specifications for aerial photography under such subjects as: timing, camera type and specifications, film, negatives, prints, flight details, spacing of photographs, tilt, drift and crabbing, stereoscopic coverage and aircraft and crew details.

An example of such a contract has been prepared and printed by Bakosurtanal as No. 01/IBRD.100.1/NRSMP/78 for 1:50,000 scale photography. This should be used as the basis for any future 1:20,000 scale aerial photography.

2.5 SURVEY AND PREPARATION OF BASE MAPS AT 1 : 10.000 OR 1 : 5.000 SCALE

2.5.1 Field Survey.

The field survey shall comprise:

- Monumenting
- Astronomical azimuth
- Horizontal control traverses
- Computation
- Spot height survey

The specifications and tolerances for each item are given in the following sections:

2.5.1.1 Monumenting. The location of each monument will be identified on the 1 : 20.000 scale aerial photographs.

Dimensions of the concrete monuments shall be 30 cm x 100 cm x 30 cm

A 2 cm diameter steel rod to be embedded in the concrete to a depth of 70 cm and to extend approximately 1 cm above the top of the concrete.

A number to be stamped on the top of the steel rod to identify the mark.

The monument will be placed in the ground leaving approximately 10 cm extending above the natural ground level.

At least two ties (in azimuth and distance) to be made from the monument to nearby prominent natural features.

After placing the monument, fill material should be placed and compacted to ensure the stability of the monument.

Where it is impracticable to place pre - cast monuments, steel plugs (2 cm) should be concreted to a depth of 15 cm in prepared holes in rock. An identification number should be stamped on top of the steel rod which should extend approximately 1 cm above the natural rock surface.

Between concrete monuments wooden pegs will be placed at an average distance of 100 m
The wooden pegs will be located wherever possible in a site identifiable on aerial photos.

2.5.1.2 Astronomical Azimuth. This will be measured with a 1 second theodolite (1") at the original datum point. For every 25 stations of traverse, another azimuth will be measured for orientation checking. The azimuth target will be a concrete monument located at least 1 Km from the original datum monument.

Preference will be given to star observation of the maximum digression (α Centaurus or southern star of South Cross constellation). The astronomical azimuth at the original datum will be measured on two different days. If the sun is used for azimuth measurements the 2 sets of measurements will be symmetrical : one in the morning, one in the afternoon. The difference between 2 sets will not exceed 10 seconds sexa.

2.5.1.3 Horizontal Control Traverses : Perimeter and Sub-Perimeter. A one - second direct reading theodolite must be used for all horizontal and vertical angle measurements (i.e. Wild T2 Theodolite or a similar instrument).
Four sets of horizontal angles should be read at each traverse station. Each set of angles to be : one face left reading on back - site station and forward station and one face right reading on forward station and closed to back site station.
The mean horizontal angle of each set should not exceed the mean of the four sets by more than five seconds of arc.
Electronic distance measuring equipment (i.e. Hewlett - Packard, Agalaser Geodimeter, Distomat or similar) must be used to measure all legs of the traverse networks.
A face left and face right vertical angle to be read to back distance measuring reflector and to forward distance measuring reflector.
The mean vertical angle to each distance measuring reflector will be used to reduce its respective slope distance to a horizontal distance.
Minimum length of side will be 200 m.
The acceptable closing accuracy for all horizontal traversing shall be 1 in 20.000 before traverse adjustments are made.
Angular closure error will not exceed $\pm$ 5" $\sqrt{n}$ (n : number of station).
All main traverse control points will be tied (referenced) to at least two nearby conspicuous natural features (azimuth and distance)

2.5.1.4 Levelling : Perimeter and Sub - Perimeter. Levelling instruments WILD NAK2, ZEIS N12 or any other instrument of similar specifications should be used for all control levelling.
All levelling runs will be repeated at approximately one kilometre intervals and the closure error checked. An accuracy for levelling of 10 $\sqrt{D}$ in millimeters where D is the distance in kilometers, will be used.
The theodolite to be used may be the same as the one used on the main route, or a compass theodolite may be used.
The distance should be measured with steel measuring tape or topowire.
Relative error tolerance for elevation should be $\pm$ 15 $\sqrt{D}$ in m.m. (D in km).

2.5.1.5 Computations. Computations will be carried out in the field at the same time as the measurement so that any error can be quickly detected and corrected. Computations will be performed twice by the survey contractor and by supervisory staff working independently.

2.5.1.6 Spot Height Survey.

2.5.1.6.1 Procedure. Altimetric survey will be performed by using barometric differential measurements. Procedures will include simultaneous measurements at close range (average distance 80 meters) and expeditious survey with double checking per station.

Measurements will be carried out along lines 200 meters apart and average length of one line will be 3 km. (Detailed description of the "Leap Frog" method is given in Appendix 2.5.1).

2.5.1.6.2 Equipment. Each survey team will require 2 aneroid barometers of high sensitity, ie. with 1 meter or 0.50 meter graduation, 2 compasses, 2 hand levels, and 1 tape, or preferably 1 topowire.

2.5.1.6.3 Computations. These will be performed daily, and plotting of spot heights will start in the field, as soon as controlled photomosaics are available.

2.5.2 Map Preparation

Map preparation involves the following steps:

- Radial Triangulation
- Production of controlled photomosaics
- Plotting of contour lines
- Map testing

2.5.2.1 Radial Triangulation. Radial triangulation will be prepared in advance, so that setting to the scale can be completed as soon as ground control results are available. In some cases radial triangulation will be done directly, by using pass points determined by the "overfly" technique with photos and control points of previous surveys. As new ground control will nevertheless be necessary, location of one concrete monument will be identified on the new photos, and corresponding coordinates will be determined with the stereoplotter, so that a uniform grid system can be used for all the mapping.

2.5.2.2 Controlled Photomosaic. As soon as passpoints are available, either from overfly operation or from radial triangulation based on new ground control, aerial photos at scale 1 : 20.000 will be rectified and assembled in a photomosaic at scale 1 : 10.000.
The scale of this photomosaic will be checked using the photo identified monuments.
Special attention will be paid to uniformization of tonalities, particularly between photos of different strips. Negative dogging will be used every time it is necessary. Size of photomosaic sheet will be 50 x 50 cm (See notes on standard map sheets Appendix 2.5.2)

2.5.2.3 Plotting of Contour Lines. Using the drainage network as a framework, contours with a 5 m vertical interval will be interpolated from the spot heights: the plotting will be performed with a mirror stereoscope. When the graphic distance between 2 contour lines exceeds 2 cm.(200 m) an intermediate contour line at the 2.50 m interval will be plotted as a dotted line. From the original photomosaic at scale 1 : 10,000 a line map will be prepared on polyester for the purpose of map reproduction and subsequent enlargement at scale 1 : 5,000 or 1 : 2,000.

2.5.2.4 Map Test. While mapping is in progress, map tests will be performed for each sheet of photomosaic (2.500 hectares). The map tests will take the form of profiles intersecting the barometric levelling lines of spot height survey.

A minimum of 5 Km. of profiles will be measured for each sheet. Procedure will be the same as for spot height survey, i.e. differential barometric measurements. When the difference between profile and map elevations is more than half the vertical interval (2.50 metres) the map test will be extended. If there are many discrepancies resurvey will be compulsory.

2.5.2.5 Map Sheets. Map sheets will conform to the standard map grid and numbering published by Bakosurtanal. Sudivision of the 1:50.000 sheets will be as shown in Appendix 2.5.2.
Map sheets will therefore be 50 x 50 cm, though this may be slightly larger depending on the latitude.

2.5.2.6. Map Legend. Each map will have a legend identifying the symbols used on the map. This will include a small scale index map locating the map sheet and the surrounding map sheets.

2.5.2.7 Presentation. The following material shall be delivered:

a). All field observation and levelling books together with the final list of benchmarks, coordinates and elevations.

b). Fully controlled and rectified mosaics on 1 : 10.000 scale:
- the original
- one negative
- two positive paper prints
- two screened film positives on stable base material

c). Topographic mapping with contours on positive film sheets on stable base material.

d). A combined product of (b) and (c) in the form of the controlled photo mosaic with a contour overlay:
- two negatives
- five positive paper prints
- two screened film positives

e). Key Plans.

2.5.3 Schedule

It is assumed that

i. The area is 8000 ha

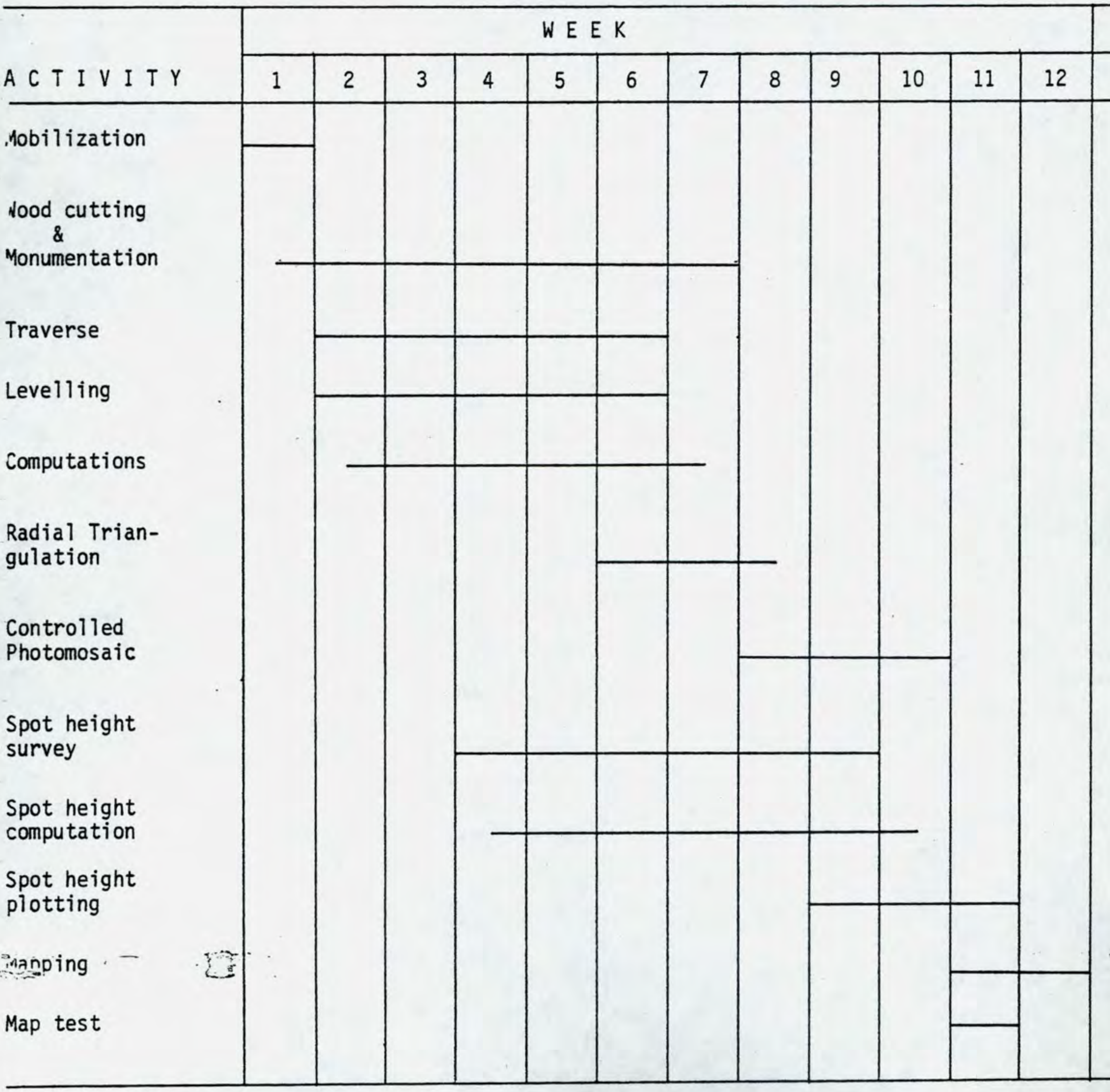
ii. Staffing 1 geodetic engineer
14 field surveyors
Cartographic/photogrammetric laboratory staff

iii. Field work is done with surveyors working in teams of two

2 teams work on horizontal control traverses

2 teams work on levelling of control traverses

3 teams work on spot height survey



APPENDIX 2.5.1

THE LEAP FROG METHOD OF BAROMETRIC LEVELLING

A 1. Generalities

A 1.1. This method consists of making simultaneous readings of 2 barometers located at an average distance of 80 meters apart, alternating their respective positions. The location of each station is determined by tape and compass survey.

A 1.2. The method requires two surveyors with two helpers. Equipment consists of 2 aneroid barometers of high sentivity, 2 compasses and a 100 meter tape or wire with metric graduations only.

A 1.3. Barometric measurements are referenced to 2 altimetric benchmarks approximately 3 kilometers apart. The general lay out of the survey is selected in advance on enlarged aerial photos at scale 1 : 10.000, on which the bench-marks have been identified, and the main drainage features plotted.

A 2. Measurement procedure

A 2.1. In order to determine the constant calibration difference (c) between the two barometers the two surveyors (A & B) make simultaneous reading of the baromenters at the first station near an altimetric bench-mark. ΔC (A - B).

A 2.2. Surveyor B remains at the first station. Surveyor A moves ahead in the general direction of the survey, with the tape in hand while Surveyor B ensures the tape unreels easily.
After walking 100 to 120 steps Surveyor A selects the best location for the barometric station and marks the station with a numbered flag on a stick.

A 2.3. While barometer A stabilizes, both surveyors measure the bearing (AB to within 30') and distance (to within 1 meter). Bends in the tape do not affect the accuracy of distance measurement to within 1 meter, provided the alignment is correct to within 10 metres.
When the barometer has stabilised both surveyors make simultaneous readings of their respective barometers.

A 2.4. Surveyor A remains at the second station and Surveyor B joins Surveyor A. They check concordance of bearing and distance measurements, and make simultaneous readings of the barometers at the second station. Then, after checking that ΔC (A - B) is the same, surveyor B goes ahead for a new measuring sequence.

APPENDIX 2.5.2

Standard Map Sheets

The existing standard map sheets for Indonesia are shown on the attached index to 1 : 250.000, 1 : 100.000 and 1 : 50.000 maps published by Bakosurtanal. The 1 : 50.000 map sheets should be sub-divided into the larger scale map sheets as shown in Figure 1.

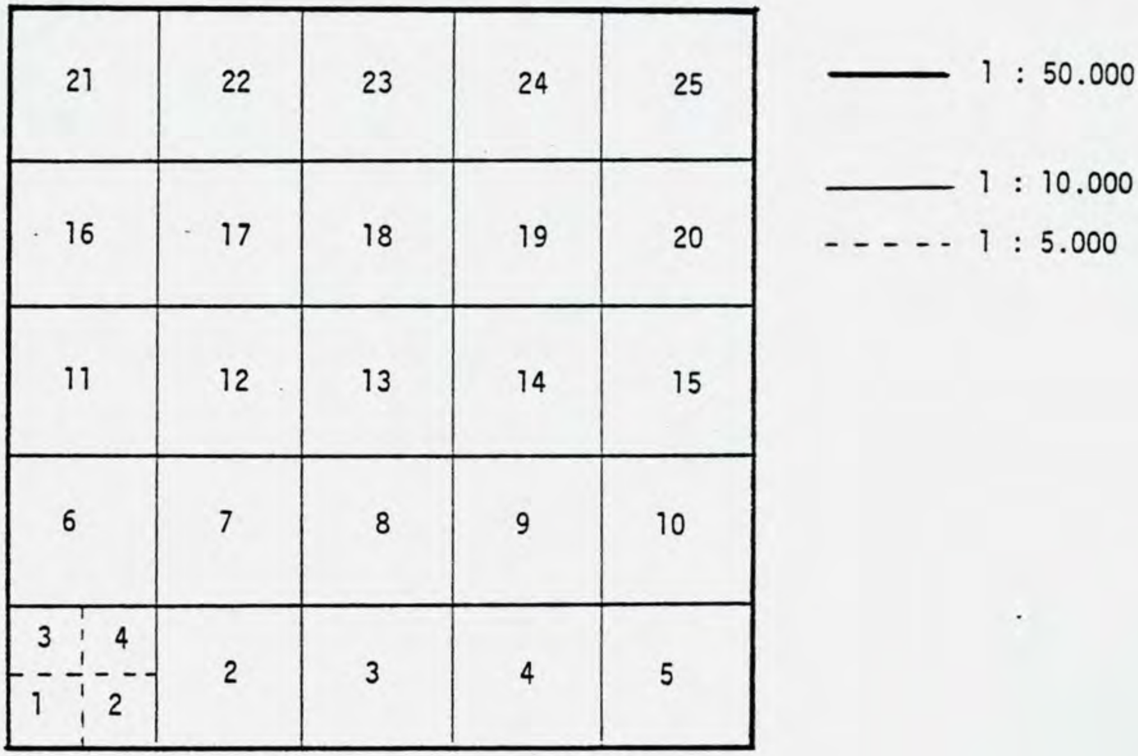
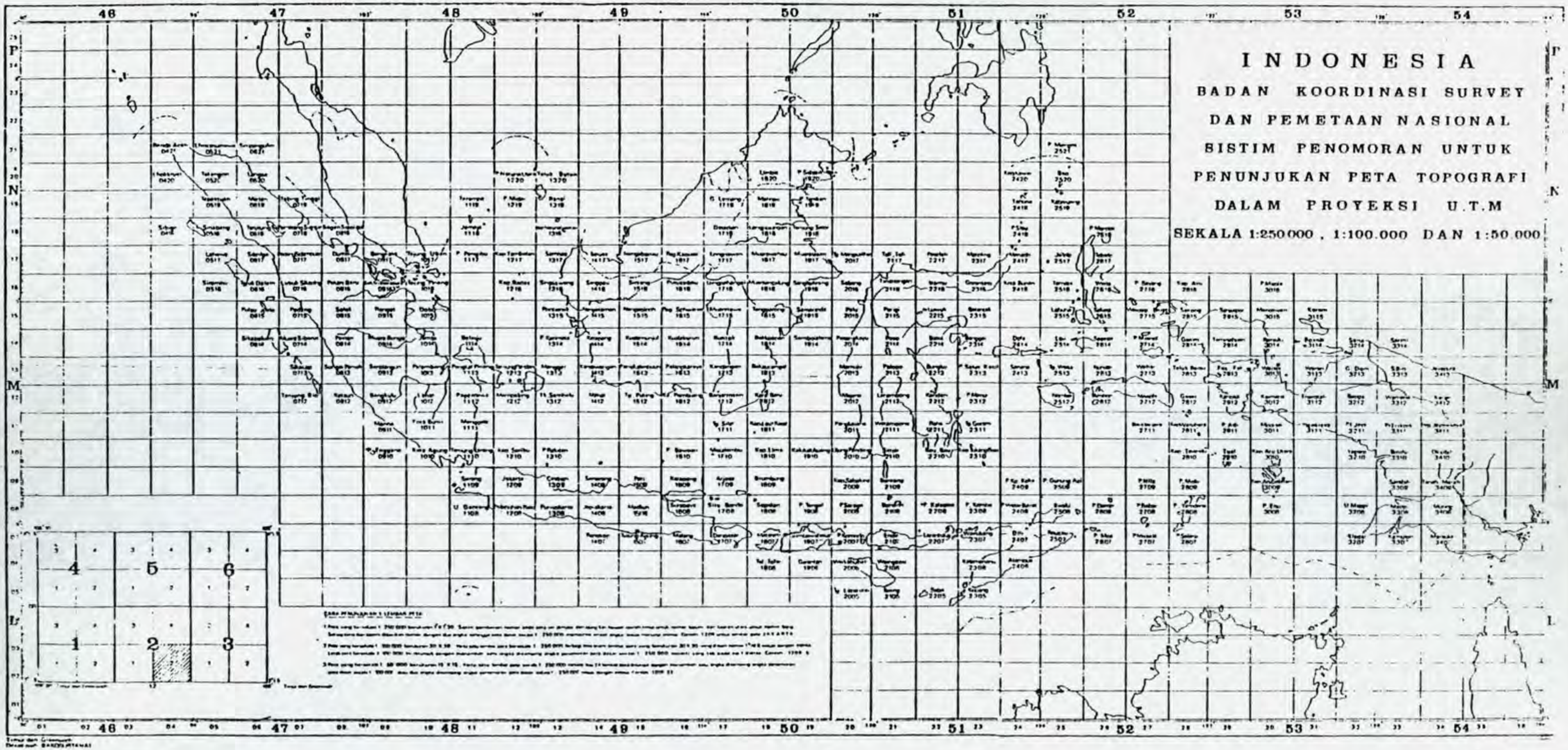


FIGURE 1. Sub-division of 1 : 50.000 map sheet.


INDONESIA
BADAN KOORDINASI SURVEY
DAN PEMETAAN NASIONAL
SISTIM PENOMORAN UNTUK
PENUNJUKAN PETA TOPOGRAFI
DALAM PROYEKSI U.T.M
SEKALA 1:250000 , 1:100.000 DAN 1:50.000

2.6 SLOPE MAPPING AT 1: 5 000 SCALE

2.6.1 General

An important element in the detailed design of village units is the distribution of land of less than 8% slope. As the distribution of holdings is to a large extent determined by slope, an accurate slope map is essential.

2.6.2 Scale

Slope maps will be prepared at a scale of 1:5 000, based on 1 : 5 000 scale contoured topographic maps.

2.6.3 Method

Four slope classes will be identified from the contour spacing. At a scale of 1 : 5 000 with a 2.5 m contour interval, the contour spacings representing the four slope classes are as follows:

Slope class	Percentage slope	Contour spacing cm
1	0 - 8	0.625
2	8 - 15	0.33
3	15 - 25	0.20
4	> 25	> 0.20

2.6.4 Map Characteristics

Boundaries will be drawn on the map delimiting areas of each slope class Map sheets will correspond to the standard map index published by Bakosurtanal and therefore to the 1 : 5 000 scale topographic map sheets (APPENDIX 2.5.2.)

2.6.5 Schedule

It is assumed that

i. Area equals 8 000 ha

ii. Staffing 1 land classifier / planner draughtsmen

iii. Topographic maps at 1 : 5 000 scale with 2.5 m contour interval are to hand

ACTIVITY	Week	
	1	2
Mapping of slope classes		
Fair drawing of slope map		

2.7 PRESENT LAND USE SURVEY AT 1 : 20 000 SCALE

2.7.1 General. The majority of transmigration settlements are to be located in areas which are largely unused, although some areas of used land may be included with the agreement of the local population. It is important therefore that maps showing present land use be prepared.

2.7.2 Scale. Present land use maps will be prepared at a scale of 1 : 20 000.

2.7.3 Methods

2.7.3.1 Air photo interpretation. The 1 : 20 000 scale present use maps will be derived from interpretation of recent 1 : 20 000 scale aerial photographs. Interpretations will be checked in the field. The land use map produced from medium scale aerial photographs for the WPP / SKP outline planning will provide a framework, but as these maps are made from aerial photographs that may be several years old, the maps may be in need of revision.

2.7.3.2 Land use categories. The main purpose of the land use maps is to distinguish used land from unused land: they will not be maps showing vegetation types. The land use categories to be used are defined in Appendix 2.7. They are essentially pragmatic units, defined to meet the specific needs of identification of transmigration sites. They may include a number of vegetation types and may therefore require sub-division before being useful for other purposes.

2.7.3.3 Field checks. Field checks will be made in every land use category identified. A minimum of five observations will be made in each category and observations will average one per 50 ha. The location of all field observations will be shown on the present land use map.

2.7.4 Map Characteristics. The present land use map will be based on a reduction of 1 : 5 000 scale topographic maps prepared for detailed design. Map sheets will correspond to the standard 1 : 50 000 map sheet index published by Bakosurtanal. (Appendix 2.5.2) Each sheet will have a legend identifying the land use categories used and a small scale index map locating the map sheet and the surrounding map sheets. The principal points and identification numbers of the aerial photographs used to prepare the map will be shown on the face of the map.

2.7.5 Schedule

It is assumed that
- i. The area is 8 000 ha
- ii. Staffing 1 land use specialist (LUS)
1 cartographer (C)
- iii. Aerial photographs and base maps at 1:20 000 scale to hand.

Activity	Week		
	1	2	3
Air photo interpretation	LUS		
Preparation of draft land use map	LUS+C		
Field checks		LUS	
Revision of draft map			LUS
Fair drawing			C

LAND USE CATEGORIES

Category	Description	Air photo identification
Dryland forest	Tropical evergreen forest occurring in areas not subject to permanent waterlogging. Includes exploited ie. logged & unexploited forest.	Continuous canopy with scattered emergents. Variable photo tone.
Swamp forest	Tropical evergreen forest occurring in areas subject to permanent waterlogging. May occur on deep peats or other wet areas. Sometimes occurs as pole forest with few large trees.	Continuous canopy often lower in height than dryland forest, smaller crawn size few emergents. Variable photo tone.
Rubber forest	A mixture of rubber trees or mature secondary growth in which rubber predominates.	Dense canopy with small crowns. Photo tone often lighter than primary forest.
Secondary growth	Trees and scrub more than 5 m high associated with shifting cultivation	Canopy variable in density, height & tone. Often scattered patchy distribution.
Shrub	Young regrowth less than 5 m high closely associated with areas of recent shifting cultivation.	Patchy distribution amongst cultivated areas. Light photo tone
Grassland	Usually Imperata cylindrica grassland commonly associated with settlements or recent cultivation.	Even photo tone.
Swamp grassland	Areas in which drainage is so poor as to restrict tree growth. Often associated with river flood plains	Irregular distribution & photo tone. Often associated with old meanders and other clearly identifiable flood plain features.

Category	Description	Air photo identification
Dryland arable cultivation	Areas presently used or used within the past two years for annual cropping	Cultivation ridges or linear pattern of crops. Clearly marked field boundaries
Wet land arable cultivation	Areas presently used for wetland rice production. Water supplied either from irrigation works or rainwater.	Clearly marked fields often with irrigation works. Even photo tone of cropped areas.
Tree crop plantations	Plantations of tree crops such as oil palm or rubber	Regular pattern of planting either in a grid or on the contour. Even photo tone.

2.8 SOILS SURVEY AT 1:50,000 SCALE

2.8.1 General

The WPP/SKP outline plans at a scale of 1:50,000 identify areas thought to be suitable for transmigration settlement and will provide an indication of the probable complexity of the soil pattern within those areas. Soil surveys are required for the detailed design of settlement units, in order to decide on the allocation of land for various purposes. The soil surveys will therefore be restricted to the areas identified during the WPP/SKP outline planning. Reference to Figure 1 shows that the soil survey is only one input to the detailed design. It should not therefore be confused with a comprehensive land capability survey: soils are merely one factor in assessing the suitability of land for the specific purposes of transmigration settlement.

2.8.2 Scale of Survey

The survey will be sufficiently detailed to justify soil maps at a scale of 1:50,000. If there is a complex pattern of soils whose distribution may influence the allocation of land, for example the distribution of shallow and deep soils, a more detailed survey may be necessary. However, this will be exceptional and the high cost of such detailed surveys must be fully justified.

2.8.3 Survey Methods

2.8.3.1 Air photo interpretation. The framework for field investigations will be provided by stereoscopic investigations of 1:20,000 scale aerial photographs. Land form units defined during WPP/SKP outline planning will be subdivided or redefined as necessary. Soil boundaries apparent on the aerial photographs will be marked prior to field checking. The location of field observation points or the lay out of rentisan will be decided on the basis of the air photo interpretation.

2.8.3.2. Field Survey. An average of one field observation per 25-30 ha will be made. In forested areas this can be conveniently done by making one observation every 250 m along rentisan 1 km apart. An observation is taken to mean a recorded description of an auger boring or soil profile pit.

2.8.3.3. Soil description and classification. Soil series will be described using the terminology given in Soil Taxonomy (USDA, 1977). A description of a typical profile will be given for each soil series identified.

Soil series will be classified according to the system of soil classification defined by Dudal and Soepraptohardjo (1957, 1961, 1978) and referred to the sub-group level of Soil Taxonomy (USDA 1977) and to the Soil Map of The World Legend (FAO 1976).

2.8.3.4. Soil analyses. Samples from at least two profiles in each of the described soil series will be analysed. The planning of transmigration settlements does not require a complete pedological study, so only the essential minimum of analyses will be done. These will be as follows:

Mechanical analysis:	Only three size fractions will be determined.
	< 2 μ (clay) 2 - 50 μ (silt) 50 - 2,000 μ (sand)

Chemical analyses:

pH	Values determined in water and KCl
Total P	Value determined using HCl extract
CEC	Values determined at pH 7 and at soil pH
TEB	
Exchangeable cations	Ca, Mg, K. If base saturation is less than 10% exchangeable cations will not be determined as it can safely be assumed that all will be at very low levels.

2.8.4 Map Characteristics

The soil map will be at a scale of 1:50,000 and map units will be associations of soil series. The map will be based on a reduction of 1:50,000 scale topographic maps prepared for detailed design, but the 1:50,000 uncontrolled base maps used during outline planning may be used as a basis for field work. Map sheets will conform to the standard index of map sheets published by Bakosurtanal (Appendix 2.5.2).

A legend giving an explanation of all the symbols used on the map and a brief description of the main soil series will be printed on each sheet. A small scale index map will be included, giving the location of the map sheet and the location of adjoining map sheets.

2.8.5 Reporting

In addition to the final report in which survey results will be presented, progress reports will be required. First a report on the preparations for the survey and a map showing the proposed lay out of rentisan will be submitted before the start offield work. Other progress reports will be submitted as required by the supervising agency. The final report will meet the standards of presentation set out by LPT Bogor.

2.8.6 Interpretation of soil survey data

The soil survey data will be used to decide the allocation of land for various uses on transmigration settlements. Generalised all purpose interpretations or land capability assessments often only confuse the planner. Soil survey data will therefore be interpreted in relation to the suitability of the land for the following land utilisation types:

1. Houselots and gardens
2. Dryland arable food crop farming
3. Wetland arable food crop farming
4. Tree crop farming

Land suitability will be assessed using the principles laid down by the FAO (A Framework for Land Evaluation FAO 1976). It should be noted that the soil survey data on its own does not enable a land suitability assessment to be made: that is dependent on other information such as slopes,which is derived from other sources. This is further discussed in Section 2.9.5.

2.8.7 Schedule

It is assumed that

i. Area equals 8,000 ha

ii. Staffing
- 1 Team leader/soil scientist (TL)
- 4 graduate assistant soil scientists (SS)
- 1 cartographer
- 10 assistants
- Analytical laboratory support (AL)

iii. Field work. Rentisan cutting starts before soil description but overlaps. Rentisan are 1 km apart and auger borings every 250 m along the rentisan. Soil survey is done by five groups of 1 soil scientist, 1 assistant and labour. Work rate for each group is 5 auger borings/day i.e. 25 borings/day for whole team or 1 profile pit/day/group i.e. 5 profile pits/day for the whole team. Rentisan cut by 5 groups of 1 assistant and labour. Work rate for each group is 2 km/day i.e. total of 10 km/day for whole team

iv. Aerial photographs at 1:20,000 scale and 1:50,000 base maps to hand

Activity	Month			
	1	2	3	4
Preparation	T			
Air photo interpretation	T			
Rentis cutting (80 km)	RCT			
Soil description				
320 auger borings	SDT	SDT		
25 soil profile pits		SDT		
Soil analyses (125 samples)		AL	AL - - -	
Map production		T	T	
Report production			T	T

T Full team. RCT Rentis cutting team.
SDT Soil Description Team

2.9 DETAILED DESIGN OF SETTLEMENT UNITS

2.9.1 Planning principles

Planning for transmigration should be based on four main principles.

1. The land should be suitable for the planned use
2. The settlement should provide an acceptable social environment
3. Provision should be made for any planned further developments.
4. The infrastructure should be efficient in terms of service provided and cost.

Although the principles are not necessarily mutually exclusive, in some cases the planning requirements of one principle may conflict with those of another. Precedence is given to the principles in the order in which they are listed above. The justification for this is discussed below.

Land suitability

The first principle adopted in planning the settlements is that the land should be suited to the planned use. This applies to all aspects of land use, such as housing or roads, but is of particular importance to agricultural use, because the settlements are primarily agricultural settlements.

The social environment

Settlement involves people and not merely statistical units. If the settlement plan does not give people an opportunity to develop an adequate social life, the chances of success are diminished. Consequently, the second principle adopted in this study is that the social environment must be acceptable. This means that the settlement should provide for communities not too dissimilar from traditional forms and ensure that distances between settlers houses, holdings and community centres are kept to a minimum.

Future development

The third principle is that suitable land for future development should be available and should be demarcated before settlement begins. It is not current policy to reserve land within settlements to accommodate the increase in the population of the settlement. Future development therefore implies only those developments which are envisaged now, for example the development of rubber land which is planned to take place during the first years after settlement.

Infrastructure

The infrastructure must adequately service the requirements of the settlement. Within the constraints imposed by the previous principles, costs should be minimised, but cost reduction should not be at the expense of efficient agriculture. For example, an unsurfaced road linking the village centre to the district road may be cheaper than a surfaced road, but if it means that vehicles carrying agricultural produce have no access to the village centre, the road is not efficient in terms of services or cost

2.9.2 Planning Scale

Detailed design of settlement units will be at a scale of 1:5,000.

2.9.3 Settlement Lay-out

It is not possible to produce a standard model or ideal lay out that is applicable to all sites. Each area will be considered individually and lay out adapted to specific local conditions of slope and soil.

2.9.3.1 Types of lay out. Most settlements can be grouped into three main types, dispersed, nucleated and linear; these can be sub-divided according to details of lay out. Each type has advantages and disadvantages discussed in Appendix 2.9.1. The preferred lay out will be the linear hamlet as it is most easily adopted to land suitability requirements and provides a reasonable basis for social life.

2.9.3.2 Subdivision of village units. Traditionally many Indonesian villages are formed of smaller hamlets or groupings (kelompoks) of 20-30 families. If settlement villages are subdivided, then the groupings will reflect this traditional arrangement.

2.9.3.3 Simplicity of lay out. For ease of implementation the lay out will be as simple as possible within the constraints of land suitability or social requirements. Boundaries of holdings will follow existing roads or natural features, such as rivers, wherever possible. Elsewhere boundaries will be straight and the use of main compass bearings (N,NE,E,SE) helps to keep the lay out simple.

2.9.3.4 Shape of village area. The village area will be approximately square or hexagonal in shape. This ideal is not easy to achieve, but the ratio of length to width will be close to one and not more than two.

2.9.4 The Planning Framework

2.9.4.1 Topographic maps. Topographic maps used as the basis for detailed design will be at a scale of 1:5,000. The reliability of the maps will be checked using aerial photographs as a guide to drainage network and slopes.

2.9.4.2 Environmental maps. Environmental maps used during detailed design will be at three scales: present land use maps will be at a scale of 1:20,000, soil maps will be at a scale of 1:50,000 and slope maps will be at a scale of 1:5,000. The reliability of these maps will be checked by random field observations and from examination of aerial photographs and existing environmental maps.

2.9.5 Agricultural Criteria

2.9.5.1 Land suitability. In agricultural settlements, planning should be principally controlled by land suitability. Land suitability will be assessed from consideration of the effects of certain land qualities on specific types of land use, given in the following sections.

2.9.5.1.1 Land qualities. Land qualities or envirnmental factors to be considered in assessing the suitability of the land for dryland arable cropping, houselots and tree crops are: climate, slopes, the physical and nutrient status of the soils, flooding hazard and present land use.

2.9.5.1.2 Land qualities in relation to development. The land qualities that present only minor limitations to the development of transmigration settlements are summarised in Table I. Land with differing qualities must be considered unsuitable for the specific uses given.

TABLE I. Land qualities required for different forms of development within transmigration settlements.

Proposed Land use	Land qualities				
	Slope %	Soils		Flooding hazard	Present land use
		Drainage	Peat		
Village sites and houselots	< 8	Well/imperfectly	None	No flooding	No existing use
Dryland arable farming	< 8	"	< 1.5 m	< 5 days continuous flooding	"
Tree crops	< 25	"	< 1.5	"	"

2.9.5.2 The farming system

2.9.5.2.1 Size of holding. The holding size will be 3.5 ha subdivided as follows:

House-lot	0.25 ha
Dryland arable area	1.75 ha
Tree crop area	1.5 ha

2.9.5.2.2 Subdivision of holdings. It must be clearly stated whether holdings are split or in a single block. Lay outs based on split holdings are more easily adapted to land suitability requirements.

2.9.5.2.3 Dryland arable areas. The criteria for assessing the suitability of an area for dryland arable crops have been given in 3.1.2. Although small areas (< 500 ha) of wetland in which settlers themselves can develop irrigation may be included in the arable areas, large areas of wetland, requiring major irrigation infrastructures will not be included.

- Village unit
- SKP centre or settlement centre
- WPP centre

2.9.6.5.2. Facilities and services. These will be listed for each order of centre and the basis for calculating the provision of centres specified. A suggested hierarchy of services is given in Appendix 2.9.2 based on populations and health and education needs.

2.9.6.5.3 Area of centre. To provide a focal point, village facilities will be grouped and not dispersed. The total area of the centre for a basic village unit will be 10-20 ha, of which 5-6 ha may be initially developed. Higher order centres may be slightly larger.

2.9.6.5.4 Location of centre. The centre will be placed to provide all members of the community with easy access to public facilities.

2.9.6.5.5 Lay out. Design will be at a scale of 1:5,000 or greater within the area of the village centre. The facilities of the village centre will be grouped, rather than dispersed. The centre will be zoned so that, for example, marketing facilities are separated from the school.

2.9.6.6 Houselots

2.9.6.6.1 Dimensions. The houselot will be 0.25 ha. The frontage will be 25 or 30 m, so that houses are close together and provide a community similar to traditional house arrangements. Houses will be set back 5 m from the access road and to allow the free circulation of air, houses will be arranged in a staggered fashion, with adjacent houses set back 10, 15 and 20 m.

2.9.6.6.2 House design. The house design will be that given by the Direktorat Persiapan Proyek Transmigrasi (1977). Wherever possible the design must be modified to allow the use of a clay tile roof.

2.9.6.6.3 House orientation. Houses will be oriented with the long axis as close to an east - west direction as possible to minimise heating due to direct sunlight.

2.9.6.6.4 Domestic water supply. Provision will be made for the collection of rain water for domestic use from the roof. Details of consumption and required storage capacities are given in ANNEX 2.9.3. If wells are provided they must be located at least 20 m from any pit latrine and be fitted with a closed cover.

2.9.6.6.5. Sanitation. Pit latrines will be constructed before the arrival of the settlers and located at least 20 m from the house and any well. A wooden shelter will be provided to the standard design provided by Direktorat Persiapan Proyek Transmigrasi.

2.9.7 The Provision of Roads

Roads are considered here in relation to the distribution of agricultural and social activities. Although for convenience, the detailed specifications for road design and alignment are given separately in Section 2.10 it is emphasized that the roads must form an integral part of the detailed design of the settlement. Road alignments cannot be decided on without reference to the detailed village plan: nor can the detailed plan be drawn up without attention to road design criteria.

2.9.7.1. Existing roads. Many transmigration sites have a network of existing logging roads. For reasons of economy, the maximum use consistent with good design must be made of these roads in settlement planning. Although many will require upgrading they will provide access during early development of the site. It is not necessary to use all the existing roads.

2.9.7.2. Road classification. The Bina Marga road classification will be used. Names for various types of road are given in Table 3 together with their proposed use.

TABLE 3. Names and proposed use of various road classes in transmigration schemes.

Road class	Proposed use
Access road	Provides all weather access to the settlement
Main village road	Joins village centres to each other or to the access roads. May also join hamlets to the village centre.
Farm or collection road	Joins individual holdings of arable or tree crops to main village road.

2.9.7.3. Road specifications. Full details of road specifications are given in Section 2.10.

2.9.7.4. Road network. All roads will be shown on the detailed design, including access roads, village roads and farm roads.

2.9.7.4.1 Network pattern. The network of roads will be defined as radial rectangular or iregular. The radial network of roads, centred on the village or settlement centre has many social advantages of allowing rapid access to the centre for all members of the community.

2.9.7.4.2 Length of roads. The length of all the different types of road will be given.

2.9.7.5. Road links to holdings. Holdings will be serviced by some form of road to allow the delivery of fertiliser and the transport of produce. The maximum distance from a road to an arable or tree crop holding will be not more than 2.0 km, and should preferrably be less than 0.5 km.

2.9.8 Land Clearing

2.9.8.1 Methods. Land clearing methods should ensure that soil disturbance is kept to a minimum. If mechanised, then only specialised land clearing equipment should be used. Ideally land clearing should be done by hand, using chain saws as necessary.

2.9.8.2 Areas to be cleared.

2.9.8.2.1 Land clearing map. The land to be cleared will be shown on a separate topographic map at the same scale as the detailed plan. Areas and dimensions of the blocks to be cleared will be shown on the map.

2.9.8.2.2 Areas of individual blocks. Individual blocks must be as large as possible and not less than 50 ha. The clearing of blocks of less than 50 ha is difficult from the point of view of organisation and supervision.

2.9.8.2.3 Dimensions of blocks. The length of any side of a block must be greater than 100 m.

2.9.8.2.4 Nature of boundaries. The boundaries of the blocks to be cleared must either follow natural features or roads, or be straight and easily identifiable in the field.

2.9.9 Field Checks

A preliminary detailed design at 1:5,000 scale will be prepared and checked in the field.

2.9.9.1 Road alignments. The proposed road alignments will be surveyed in the field and any modification of the alignments incorporated in the final design. Details of the necessary surveys are given in Section .

2.9.9.2 Slopes. Slope classes derived from 1:5,000 contoured topographic maps will be checked in the field using an Abney level. At least one observation must be made in each arable holding. Holdings found to be located on land with slopes of more than 8% must be relocated and the modification incorporated in the final design.

2.9.10 Presentation

2.9.10.1 Maps. Designs will be prepared on stable base material. One original and twenty paper copies of the detailed design and separate land clearing map will be presented. Design will be on standard 50 x 50 cm map sheets corresponding to the standard topographic map sheets (Section).

2.9.10.2 Reports. A report will be prepared summarising the main characteristics of each village unit.

2.9.10.3 Tender documents. Tender documents will be prepared for each village unit or group of village units as agreed with TKTD.

2.9.11 Evaluation.

The detailed design will be judged as to how well it meets the design criteria given above. The standard evaluation form is given in Appendix 2.9.4

2.9.12 Schedule

It is assumed that

i. Area is 8,000 ha

ii. Staffing
   1 physical planner (PP)
   1 highway engineer (HE)
   8 surveyors (S)
   Draughtsmen (D)
   Assistants

iii. Topographic maps at 1:5,000 scale, slope maps at 1:5,000 scale, land use maps at 1:20,000 scale and soil maps at 1:50,000 scale are to hand.

Activity	Month 1	Month 2	Month 3	Month 4
Prepare land suitability map	PP			
Draft preliminary design		PP + HE		
Road survey and design		HE	+ S	
Field checks of slopes & design		PP		
Modify preliminary design			PP +	HE
Draft final detailed design				D
Contract document and report preparation			PP	+ HE

A more detailed schedule for road survey and design is given in Section 2.10 but it must be regarded as an integral part of the design of settlement units.

APPENDIX 2.9.1

SETTLEMENT LAY OUT

1. Types of settlement lay out. Most villages can be grouped into three main types of lay out; dispersed, nucleated and linear which can be subdivided according to details of lay out. Examples of all these types exist in settlements in Sumatra and the advantages and disadvantages of each type are discussed below with reference to specific examples. Two other theoretical models are also discussed.

Each type of settlement is discussed in relation to four main principles of settlement planning that is in relation to land suitability, the social environment, the provision of infrastructure and future development.

2. Dispersed Settlements. These are settlements in which the houses are widely separated, usually along service roads which in Sumatra have been arranged in a grid pattern. Houses are located on individual holdings and the larger the holding, the more widely dispersed the settlement. This type of lay out is illustrated on Text Map 5 showing the Singkut Unit 3 settlement. A similar lay out has been used in Singkut Units 1 and 2 and in the Rimbo Bujang shceme.

2.1 Advantages of dispersed settlements. Such schemes are simple to plan and lay out on the ground. They enable the settler to live on his own holding and development can take place at the speed the settler wishes.

2.2 Disadvantages of dispersed settlements. It is difficult to adapt this type of lay out to land suitability requirements. The southern part of Singkut 2 provides a striking example of this, where houses are located in permanently flooded peat swamps. In Rimbo Bujang roads cut straight across steep valley sides and land of more than 8% slope designated for food crop production has suffered severe erosion after only three years.

Dispersed settlements provide little in the way of community living as the settlers houses are usually separated by up to 100 m. Individuals houses may be a long way from the village centre, for example, some houses are more than 4 km from the mosque.

If all houses are to be serviced by roads, construction costs are high, or road specifications low. If road maintenance is to be done by the settlers, the long road frontage of each holding means that individual settlers or small groups of settlers have to do a lot of maintenance.

Development of rubber areas which is most effectively done by block planting, is more difficult when divided amongst separate holdings. Settlers on adjacent holdings may have cleared different amounts of land for rubber development.

3. Nucleated Settlements. Houses are grouped together, usually on quarter or half hectare houselots which may be separated from the remainder of the holding by distances of up to 3 km, occasionally greater. The lay out

is commonly a regular grid pattern, illustrated by Penumangan village in Way Abung, shown on Text Map 6.

A similar lay out has been used in the Hardjomulyo, Margoyoso, part of Singkut Unit 2, and Sungai Tambangan sites. A less rigid pattern is that used in Sitiung Block A, illustrated on Text Map 7.

3.1 Advantages of nucleated settlements. Nucleated settlements can provide more flexibility in matching land use to land suitability. Such settlements may also provide a better sense of community than dispersed settlements as the housing is grouped around communal facilities.

The provision of infrastructure, particularly roads is commonly more cost effective as the road frontage of individual houses is short and roads can be designed to suit specific agricultural needs.

Nucleated settlements allow land to be allocated for future development, or for specific uses, though this is not always done.

3.2 Disadvantages of nucleated settlements. With settlements of 500 families, each having 0.25 ha for a houselot, there may be difficulty in identifying a large enough area of level land for the housing area.

Centralised housing may mean that house to farm distances are quite large, for example, some holdings in Sitiung are more than 2 km from the house. A village of 500 families may also prove to be too large a social unit for people used to hamlet living.

4. Linear Settlements. Houses usually on quarter hectare homelots are arranged in a linear pattern on either side of a service road. Two main sub types have been used.

4.1 Linear grid. A linear housing area arranged as an elongated grid on either side of a main road is illustrated on Text Map 8 showing the lay out of Tirta Kencana village, Way Abung. The houselots are separated from the remainder of the holdings.

4.1.1 Advantages of linear grid settlements. The advantages of the linear grid pattern are similar to other grid patterns, in that they are simple to lay out and provide easy access to a road.

4.1.2 Disadvantages of linear grid settlements. As with dispersed grid patterns linear grid settlements are more difficult to adapt to land suitability requirements. For example in Tirta Kencana a river valley cuts across part of the housing area.

The elongated shape of such settlements does not lend itself to the provision of a natural village centre and some houses may be a long way from any centre that is provided. Nor does the settlement provide natural centres for smaller community groupings.

Linear grid settlements require the main village road to pass through the centre of the housing area. This has disadvantages in terms of both safety and maintenance.

4.2 Linear hamlets. Houses on quarter hectare houselots are arranged in linear groups of 15 to 30, occasionally larger, on either side of a service road. Land designated for the cultivation of food crops is adjacent to the houselots whilst the remainder of the holding may be located elsewhere. Two arrangements of these hamlets have been used, a rigid grid pattern, as shown on Text Map 9 illustrating the lay out of Unit 6 Pematang Panggang and a less rigid lay out shown on Text Mao, illustrating the proposed lay out for part of Kuamang Kuning.

4.2.1 Advantages of linear hamlets. Such a lay out can be adapted to land suitability requirements. In Pematang Panggang, there was little attempt to meet these requirements, largely because the information was not available. In Kuamang Kuning the lay out is entirely determined by land suitability.

The linear hamlets provide community units that approximate in size to traditional hamlets. They have also been found in Pematang Panggang to provide workable units for extension advice. The food crop area often adjoins the houselot and in no case is the distance more than 500 m.

Such a lay out can be cost effective in the provision of roads, because a single village road may service a number of hamlets. The hamlet road is short and can be easily maintained by the members of the community.

4.2.2 Disadvantages of linear hamlets. On existing schemes some hamlets may be 3 to 4 km from the village centre but the lay out can be adapted to minimize this distance.

As settlers tend to be grouped according to their area of origin, all the settlers in any one hamlet are likely to come from the same area. The hamlet life will tend to reinforce the community feeling, so integration of settlers from several different areas may be difficult.

5. Settlements Based On Polygonal Holding Shapes. Groupings of 12 and 24 houses arranged at the center of regular polygons are shown in Figure 1. This arrangement has not been used in Sumatra but is theoretically feasible.

5.1 Advantages of polygonal units. Polygonal shapes, in particular hexagonal shapes provide the most efficient theoretical use of available space, that is to say more holdings can be fitted into an area using polygonal shapes than with other lay outs.

These groupings have all the advantages of linear hamlets in being adaptable to land suitability needs, in providing a social unit and in keeping house to food crop land distances to a minimum.

5.2 Disadvantages of polygonal units. The main disadvantage of such polygonal units is the difficultyof laying out such irregular shapes in the field. They also require a greater length of access road to each hamlet than with the linear hamlet lay out.

6. Rectangular Lay Out. A rectangular lay out has been suggested for part of the Rimbo Bujang scheme by Team Institute Pertanian Bogor (1978). The lay out in Figure 2 is based on that concept, adapted for the size and subdivision of holding recommended in the IUTP reports.

6.1 Advantages of the rectangular lay out. The lay out provides for hamlet grouping of 10 families. House to food crop land distances are less than 500 m. The arrangement of the houses on the outer margins of the rectangle should also help to keep pests away from the cultivated land in the centre.

6.2 Disadvantages of the rectangular lay out. The lay out is not very easy to adapt to land suitability requirements. If for example a steep sided valley occurs in part of the rectangular area the rectangular shape cannot be maintained and many of the advantages disappear.

APPENDIX 2.9.2

FACILITIES AND SERVICES REQUIRED IN CENTRES OF VARIOUS RANKS

1. The Basis for Provision of Services. The services provided in centres of various ranks are dependent on regional planning considerations and population, within the overall framework of government policy and finance.

1.1. Regional planing considerations. Transmigration settlements are planned in relation to WPP and SKP. The SKP usually consists of 2 000 families and is divided into four village units of 500 families each.

1.2. Population. The projected population structure in a village of 500 families is given in table A 1 for a twenty year period.

TABLE A1. Projected number of families, size of labour force and school population in a settlement of 500 families.

Category	Year			
	1	5	10	20
Population	2 185	2 511	2 927	3 892
Number of families	500	544	601	760
Labour force	682	807	950	1 233
School population:				
Primary	321	347	402	671
Junior secondary	72	110	134	165
Senior secondary	47	60	90	100

Soures. Hunting Technical Services & Husjar Brammah Associates (1977) South East Sulawesi Project

1.3. Policy considerations. Government policy is to provide services within transmigration settlements that are not too dissimilar from the services available to the existing population, though the development should result in an improvement in the overall level of services.

2. HEALTH SERVICES

2.1. Existing Services. In Jambi Province there is one hospital bed for every 4 000 people and one Puskesmas for every 48 000 people. (Nathan Associates 1977).

2.2. Health services to be provided in new settlements. To provide easy access to health services for all the population, a health centre should be established in each village. A Sub-Puskesmas should be established in the SKP centre, as the projected population for four village units is 10 000 in the fifth year after development.

Theoretically, one small hospital should be established for every 8 SKP, but this will be dependent on the distribution of the SKP, and their relationship to the existing population centres.

3. EDUCATION

3.1. Existing Services. The attendance rates in junior secondary schools in Jambi Province is 14% of the school age population and only 8% for senior secondary. The national averages are 14% and 9% respectively.

3.2. Schools to be provided in new settlements. A primary school should be provided in each village unit. Secondary schools may have to serve more than one village unit and the theoretical number of villages that can be served by various types of school is given in Table A 2. This is based on assumptions about the size of the school age population and attendance rates.

TABLE A2. The number of villages served by schools of different types.

Type of school	School age population per village	Attendance rate %	No. of pupils per village	No. of village served by each school
Primary *	347	100	347	1
Junior highschool **	110	30	33	5 - 6
Senior highschool **	60	20	12	12 - 16

* Assumes 300 - 400 pupils a class size of 25 - 35.6 classes and two streams of teaching

** Assumes 150 - 200 pupils a class size of 25 - 30 and 6 classes

These figures show that in theory one junior high school should service five to six village units, that is more than one SKP.
In practise, because the SKP may be widely separated, one junior high school should be established in every SKP centre.
Similarly theoretical figures for the provision of senior secondary school should be modified if necessary, to take account of the distribution of the SKP in relation to existing centres of population.

4. SERVICES IN CENTRES OF DIFFERENT RANKS

The services that should be provided in centres of different rank are given in Table A 3. The services provided in the SKP centres are dependent to some extent on the distance from the WPP centre. An SKP centre located a long way from a WPP centre should be given higher level services than usual, for example a senior high school.

TABLE A3. Services provided at centres of various rank.

Type of service	Rank of centre		
	WPP centre	SKP centre	Village unit centre
Agricultural			
Project office	(P)	P	-
Machinery servie unit	(P)	P	-
Central stores	(P)	P	-
Village unit office		-	P
Village store		-	P
Tree crop nursery		-	P
Educational			
Senior high school	P	(P)	-
Junior high school	P	P	-
Primary school	P	P	P
Health			
Hospital or Puskesmas	P	(P)	-
Sub-Puskesmas	-	P	-
Village health centre	-	-	P
Staff housing	P	P	P
Market and shops	P	P	P
Social and religious			
Place of workshop	P	P	P
Community centre	P	P	P
P Service provided	( ) Indicates		Alternative

APPENDIX

2.9.3. Domestic water requirements. Estimates of the amount of domestic water required are given in Table A3.1. Such estimates are tentative as they involve a considerable number of assumptions as to how many people will use buildings and how frequently.

Staff houses are not included in this table, as the large roof catchment of staff houses will ensure an adequate domestic water supply.

TABLE A3.1 Domestic water requirements.

Type of building	Consumers		Consumption			
	Type	No.	l/hd/day*	l/day	Days/month	Total m3/month
Office and store	Project staff	5	10	50	27	1.4
Market	Settlers	250	5	1 250	5	6.3
Primary school	Teachers Children	7 350	5	1 785	27	48.2
Community centre	Settlers	50	5	250	5	1.3
Health centre	Nurse Patients	1 30	10	310	27	8.4
Place of workship	Settlers and staff	200	5	1 000	5	5.0
Transmigrant house		5	20	100	31	3.1

* litres per head per day

A5.3 Water available from roof catchment
The amount of water that could be collected from the roofs of buildings in the village centre is dependent on both the monthly rainfall and the roof area. Estimates of the total amount of water available from roofs in the village centre are given in Table A3.2

A5.4 Water storage required
A comparison of data from Tables A3.1 and A3.2 enables those months to be identified in which supplies of rainwater do not meet water requirements. The deficiency is shown in Table A3.3 together with an estimate of the required storage capacity.

2.10 DETAILED SURVEY AND DESIGN FOR ROADS IN TRANSMIGRATION SETTLEMENTS

2.10.1. General

The survey of road alignments and design for access and villages roads in transmigration settlements is considered an integral part of the detailed design of village units. The WPP/SKP outline plan does not provide an adequate basis for road alignment surveys. These must be based on the preliminary detailed village unit design at 1 : 5,000 scale.

2.10.2 Road classification

Three main types of road are considered; the names used by Bina Marga and the purpose of the various types of road are given below.

2.10.2.1 Access roads - jalan penghubung. These roads provide the main access to a settlement or group of settlements in all weathers.

2.10.2.2. Main village roads - jalan poros. These roads join village centres either to the access roads or to other main roads; they may also link village centres directly or provide access to hamlets or dukuh. They are also all weather roads but as traffic density is less, pavement thickness is less than for access roads.

2.10.2.3 Farm or collection roads - jalan setapak. These are tracks joining individual holdings to the village roads. They are of simple construction but provide access either on foot or possibly for tractors.

2.10.3 Road and bridge specifications

The specifications for roads, bridges and culverts will conform to Bina Marga standards. Specifications for access roads and main village roads are summarised in Table ; no specifications are given for the collection roads as they are cleared 5m wide rights of way, with drainage ditches as necessary.

TABLE Specifications for roads in transmigration schemes

Road classification	Access road	Main village road
Design speed (kph)	40	30
Minimum width of right of way (m)	20	15
Travelway width (m)	4.5	3.0
Shoulder width (m)	1.5	1.5
Pavement cross slope %	4	4
Shoulder cross slope %	6	6
Max.gradient %	7	8
Nominal max sixe (mm) of crushed stone or gravel for: surfacing	20	75
sub base	75	-
Thickness (mm) of: surfacing	100	125
sub base	150	-
Sub grade depth (mm) of compaction to min. 95%. Proctor at critical moisture	150	150
Minimum CBR %	7	7

2.10.4 Surveys of existing roads

To keep costs at a minimum the village plan will make the maximum use of existing roads, which in many sites will be logging roads. A survey will therefore be made of the alignment and condition of existing roads to be used in village development.

2.10.4.1 Inventory of present condition. The survey will inventory:
(i) Present alignment and the need for realignment
(ii) Present pavement conditions and the residual serviceability of the existing pavement and cross drainage structures.
(iii) Structural sufficiency of existing bridges and culverts and the foundation conditions for bridges in need of replacement or upgrading.

2.10.4.2 Soil surveys. These will include:
(i) Measurements of pavement thickness and sampling of pavement and sub-grade for testing. Samples will be taken every 2 km or more frequently at a change in soil type.
(ii) In site measurement of moisture content of the sub-grade.
(iii) Benkleman Beam tests where appropriate
(iv) Calculation of the residual strength of the existing pavement
(v) Penetrometer tests to assess site conditions where bridge replacement or upgrading is needed.
(vi) Identification of possible sources of material for running surfaces.

2.10.4.3 Bridge surveys. These will include:
(i) Confirmation of bridge design class
(ii) Visual inspection of structural damage, flood levels and scour problems
(iii) Calculation of the present load carrying capacity.

2.10.5 Surveys for new roads

The alignment of new roads will be as indicated on the preliminary detailed village design at a scale of 1:5,000 with modifications as found necessary in the light of survey data. Such modifications will then be incorporated in the final detailed village design.

2.10.5.1 Preliminary engineering. This includes the surveys necessary prior to design work. These are discussed below.

2.10.5.1.1 Topographical survey. This will be linked to the 1:5,000 scale topographical survey done prior to village design. The maximum use will be made of existing bench marks and reference points. The same local coordinates will be used. The survey will determine the most suitable alignment and bridge locations and establish an approximate centre line: a strip of interest 200 m wide within which the centre line is to be located will be surveyed with sufficient accuracy to plot - contours with a 1m interval.

2.10.5.1.2 Soil Survey. A surface geological survey will be undertaken along new alignments.

2.10.5.1.3 Hydrological Survey. On the basis of available maps supplemented by local enquiry the hydrological characteristic of the drainage areas concerned will be examined. Available rainfall records and the run-off co-efficients obtained during the study will provide data for the design of bridge openings and other drainage works.

2.10.5.1.4 Preliminary Design Quantities. A preliminary design for all necessary works will be made to the standards specified and quantities calculated to an accuracy of ± 20%

2.10.5.2 Final Engineering

2.10.5.2.1 Topographical Surveys. Where re-alignment is proposed and for new roads topographical surveys will be refined from those carried out during preliminary engineering or if the re-alignment has not been covered by preliminary engineering.

2.10.5.2.2 Soils and Materials Investigation. All information regarding soils and materials previously obtained will be refined as needed.

(i) Sources of construction materials will be surveyed in detail and shown in engineering plans.
(ii) Analysis and testing will be carried out as required on the disturbed and undisturbed soil samples and on the construction materials, in accordance with the AASHO and ASTM standards.
(iii) Tests on soil samples shall include classification, liquid limit, plastic limit, CBR and suitability for soil stabilisation. Undisturbed samples will be tested for the determination of the main mechanical characteristics (classification, shear strength compressibility etc).

2.10.5.2.3 Drainage and Bridge Site Investigation. To the extent not covered by previous investigation, hydrological studies will be carried out at all drainage structures, with careful analysis of all available data, including rainfall and flood records and detailed field inspections.

2.10.5.2.4 Horizontal and Vertical Alignments of Road. The horizontal and vertical alignments will be established by locating intersection points and such other critical points as may be required, to a baseline or to survey monuments.

2.10.5.2.5 Earth Work. Engineering analyses will be undertaken using the results of the soil and material testing, and the field investigations, to determine cut and fill, batter slopes, and compaction requirements.

2.10.5.2.6 Engineering Plans. The preparation of plans and contract documents for major alignment will include the items described below:

(i) Location plan

(ii) Road plans, to a scale of 1 : 2000, showing Road centre-line-the location of change of cross-section and horizontal curves. Location, description and references to all drainage and bridge works.
Right of way areas showing land utilisation. Other relevant information.

(iii) Longitudinal profile, to a horizontal scale of 1 : 2000 and vertical scale of 1 : 100 showing:

Natural ground and design profile where applicable. Location, description and references to all drainage and bridge works.

(iv) Cross-sections to a scale of 1 : 100
Running chanage, including all cross-sections.

(v) For all bridges with span 20 meters or greater, detailed engineering design plans will be produced at appropriate scales, including contoured site plans, subsurface investigations, information and all super-structure, sub-structure and foundation details.

(vi) For all drainage structures and bridges with spans of less than 20 meters standard drawing and bill of quantities and related road cross-sections,(specifying cut and fill batters, drains, pavements etc).

(vii) Information plan showing characteristics of the soils along the route.

(viii) Plans of other protective and ancillary works including retaining walls.

(ix) Road marks and signs

2.10.6 Schedule

It is assumed that (i) length of roads to be designed is 200 km
(ii) Staffing 2 Highway engineers
2 surveyors
1 bridge engineer
1 soils engineer
(iii) Detailed 1:5000 maps & village designs to hand.

Activity	Month				
	1	2	3	4	5
Mobilisation	—				
Appraisal of Existing Roads	—	—			
Road Location	—	—	—	—	
Road Survey	—	—	—	—	
Bridge, Drainage and Ferry Investigations		—	—	—	—
Soil Investigations	—	—	—	—	—
Preliminary Engineering		—	—	—	—
Final Engineering				—	—

The World Bank / RESIDENT STAFF IN INDONESIA: P.O. Box 324 JKT, Jakarta, Indonesia
Telephone—587871; 587874 • Cable Address—INTBAFRAD JAKARTA • Telex—IBRD JKT 4456

November 8, 1979

Mr. M. Walden
Chief, Transmigration and Land Settlement Div.
Room F 402
World Bank, Washington D.C.

Dear Mike,

Subject: Transmigration Review Mission

I sincerely apologize for delaying the letter of Gloria to Martono (Attachment 1). It was very thoughtful of her to leave it to my discretion whether to send the letter. Much that I wanted to stay out of any active part in this study for more than one reason, Gloria's kind gesture of routing the letter through me introduced my involvement - hopefully not interference.

Gloria's letter has been reviewed by Mr. Beenhakker with the help of Messrs. Hill and Cazaux. They raised the following three basic issues:

i) The letter offers Bank staff assistance in site screening which may be beyond our resources to meet. A package of three SKPs requires 8 MM for screening, if no delays occur as encountered in Trans II. That gives you the magnitude of manpower need. Please consider if you really mean to give that much assistance and continue with the current initiative all with us. We advise against it.

ii) Development of several sites at the same time was mentioned by Mr. Golan in many meetings with GOI and now it is formally being recommended in this letter. Before making a formal recommendation, its economics, manpower limitation of GOI and its perceived advantages be carefully weighed. We are advising caution and not a disagreement on this issue.

iii) The causes of current delays in implementation of our project are essentially screening, designing, mapping, and detailed design of settlement units. This needs to be clearly spelled out and flagged. It is on these activities that we are falling behind our time targets. A modified letter from headquarters might be sent to Minister Martono after considering above points, but if you decide on no change I will faithfully transmit it as soon as advised.

President Soeharto has decided a day after the mission departed from Jakarta to concentrate transmigration schemes in non-primary forest areas. His statement is enclosed (Attachment 2). The sites identified by the Review Mission and mentioned in the letter include some of those which have primary forest. As such the recommendation on proposed sites contradicts with GOI approach. You may wish to reconsider this part of the letter.

With warm regards,

Yours sincerely,

M. Altaf Hussain
M. Altaf Hussain
Chief, Agriculture Division - RSI

cc: Mr. A. Golan
Mr. H. Beenhakker

Encl.

Attachment 1

October 30, 1979

Mr. Martono
Junior Minister for Transmigration
Ministry for Manpower and
Transmigration
Jl. H. Agus Salim 58
Jakarta

Dear Mr. Martono,

As we discussed earlier, the Transmigration Program Review Team has identified the lack of correspondence between Government procedures for project preparation and Bank standards for project appraisal and approval as a major constraint to large-scale Bank participation in the REPELITA III Transmigration Program. In the past the Bank has envisioned its participation in terms of large projects of adjacent sites which would facilitate project co-ordination and supervision. Government, on the other hand, has been pressed to initiate mapping and preparation throughout the entire country and to begin implementation in all areas where physical plans have been completed. One possible way to circumvent this constraint would be for the Bank to consider financing "start-up" sites in dispersed regions while at the same time providing technical assistance to a) prepare additional sites in nearby areas and b) develop feasibility studies which provide plans for integrating these sites into a more comprehensive regional development plan. This would help provide the speed required by Government and the quality required by the Bank.

This proposal was discussed with you when Mr. Golan and Mr. Saddington were in Indonesia and it was agreed that it should be explored further. The Transmigration Program Review Mission was then asked to identify areas which might be suitable for such start-up sites, and to provide a list of such areas to Government. It was proposed that Government would then compile all available data on these areas and that when this was completed (presumably in early 1980) that Government and Bank would send a reconnaisance team into the field to determine which areas had the most potential for settlement, and to initiate the project preparation required for early appraisal of these sites.

The first stage in this process has been completed. The Transmigration Review team has identified eight areas for possible consideration by the reconnaissance team and four areas with the potential for further study. These areas have been preselected on the basis of a) sizeable potential for settlement; b) data available for screening; and c)inclusion within the list of WPPs sites already earmarked for development within REPELITA III. Inclusion does not imply that the areas are suitable for settlement, only that they are appropriate for review.

The eight areas given priority for review by the reconnaissance team are as follows: (those with asterisks are alang-alang areas which are given highest priority by the TPR team because they simplify planning and do not entail problems in the use of forest products).

Tentative list: Sites proposed for review

WPP	Location	Comments
Riau		
*XII	Pasir Pangarauan	Alangalang and light forest
XI	Teluk Kuantan	Probable heavy forest cover
VII	Rengat	Probable heavy forest
South Sumatra		
*V	Lahat-Tebingtinggi (earmarked for foreign assistance)	Mainly alangalang 60,000 ha
XIX-XVI	Sekayu/Betung	Secondary forest
I/IV	Lembah Liam	Light forest (?)
South Kalimantan		
*V/VI	Batu Licin/Sebamban	Sodetec feasibility study underway
West Kalimantan		
XVI-XVIII	Singgau/Sintang (Present land use, soil quality and state of information in question)	Mixed land use

In addition it is recommended that the reconnaissance team visit the following areas to determine whether they are suit-

WPP	Location	Comments
West Kalimantan		
X,XII	Ketapang/Sukadana (Low population densities, regional priority, little information)	Coastal forest and freshwater swamp
Central Kalimantan		
	Sites to be proposed by Government	Large land areas, questionable soils, limited data. French team in field.
South Sulawesi		
VII,VIII,IX	Mamuju	84,000 ha studied by Agraria
Halmahera		
XIV,XVI	Kao Bay	May be suitable for a regional development study

The Second Stage of this process entails immediate data collection by Government on all the areas specified above. The data to be collected are itemized in a memorandum which has been prepared by Jean-Paul Malengreau, the land use planner attached to our mission, which is included as an appendix to this letter. Not all the required information will be available on all sites but the more information which can be compiled prior to the arrival of the reconnaissance team the more effective it will be.

Once data compilation is complete the Bank is prepared to send a reconnaissance team to work with Government staff to determine those areas appropriate for start up sites and to work out the means of doing further project preparation. To facilitate this process it would be extremely useful if Government could clarify for us what agency has responsibility for overall co-ordination of feasibility studies and to which agencies technical assistance for this activity might eventually be provided. We understand, of course, that Cipta Karya is responsible for physical planning, but the eventual co-ordination of information on farm models, input supply, labor requirements, village infrastructure and economic analysis among otherthings seems outside both its area of competence and its present capacity. Therefore if you anticipate the help of technical assitance in these activities roles must be clarified and recommendations formulated as soon as possible.

To recapitulate. The Transmigration Program Review Team has identified eight areas with apparent transmigration potential and four areas appropriate for further consideration. If you wish to request Bank financing for start-up sites in these areas should begin immediately:

a) data collection on these areas, and

b) clarification of roles in the co-ordination of project preparation.

The Bank, in turn, is tentatively prepared to send a reconnaissance team to Indonesia in early 1980 to assist in determining the suitability of these areas for settlement and the procedures for further project preparation. If this is agreeable to you, it would be useful to have the earliest possible notification of the time when data compilation will be complete and the mission would be expected.

Let me conclude by thanking you for the time which you and your staff have given to our mission. Mr Joko Hartono was indispensible in facilitating our work as were our contacts in DGT, Agraria, Agriculture and Public Works. We do not pretend to fully understand the complexity of your work but we have a growing appreciation of both problems and potential of the transmigration program, and we wish you the best in your work.
Thank you again.

Respectfully,

Gloria Davis

Gloria Davis, IBRD

Information to be collected for IBRD Screening Team

In order to speed the identification of sites which might have the potential for financing by the World Bank, a proposal has been made to have a joint GOI-IBRD Screening Team visit these areas to assess their settlement potential. Should this proposal be accepted by Government and the Bank the team would be likely to arrive in early 1980. In order to make the visit of the screening team more effective a series of pre-selected areas has been made of widely distributed WPP's which are thought to have a realistic potential for transmigration and for which project preparation could be expected by 1980/81. If the proposal is accepted, it is suggested that information be assembled on these proposed areas before the screening team arrives. The types of information required is described below.

Data Required

The following list is as comprehensive as possible and should be used as a check list to ensure that all relevant information is included in this preparation process or that the existence of this information is confirmed or denied. It is suggested that a wide range of agencies and institutions be contacted during this data gathering phase.

A. Maps and Reports

1. Topographic maps
   - 1/100,000 good quality copies of topo maps firm Dutch Period (Jantop), US Army Map Service and/or UK Topographical Service .
   - 1/50,000 new topographic maps if available firm BAKOSURTANAL.
2. Soils Maps
3. Land use Maps
4. Geological Maps
5. Land Evaluation Maps and Reports
6. Forestry Maps

   Should be collected from Bina Program Kehutanan; maps showing the distribution of production forests and natural reserves should revive special attention.
   Requests could be sent to the Provincial Forestry Services or BAPPEDA for the latest information in this field.

7. Irrigation Maps: P.U.Directorate General Pengairan

   The maps showing the areas identified as representing a potential for irrigation should be attached to the file of each preselected area. If possible additional information regarding existing irrigation projects should be added.

8. Road Map: P.U. DirectorateBina Program

   Copies of the relevant portions of the 5 and 20 years Bina Program plans for road development should be produced.

9. SKP and Site location maps

   It is requested that the 1/100,000 maps (or 1/250,000) showing boundaries of the proposed SKP; as well as the precise location of sites already identified,be prepared. The following sites should be plotted on the maps:

   Trans II sites where PTPT is currently involved in land clearing.

   Proposed Rep. III sites if identified.

   Other proposed (but not approved by BAKOPTRANS) sites identified by DGT in the DGT's Rencana Rep. III

B. <u>Air Photography and other imagery</u>

1. Air photography

   In order to speed up the screening work it is important that the complete index maps of the air photos covering the proposed areas be compiled and that these maps show the location of the flight lines and photonumbers. This index should be prepared with the assistance of BAKOSURTANAL, LPT, TKTD, and if necessary be supplemented by visits to KLM, EXSA, PENAS and AURI Air-photo Division. Although it would be unrealistic to acquire at once allthe available photos, they should be located with enough accuracy so that their retrieval does not represent any major problem.

   For Sumatra, it would be of assistance if the 1/100,000 photographs covering the proposed areas can be separated from the whole collection and be readily available.

2. Satellite Imagery

   Landsat imagery will be very useful for screening purposes as far as it gives information on the physiography

and the type of land cover of the area. In addition it will be used for devising a most effective ground, sampling strategy for field visits.
In order to make this exercise useful it is requested that the best landsat images covering the proposed area be selected with the assistance of LAPAN and BAKOSURTANAL. Negatives of band 5 and 7 can be blown up to 1/250,000 scale and printed in ogalid or regular photographic pages. The necessary assistance for making such an inventory and process the negatives could also be obtained from the above mentioned agencies.

3. Radar Imagery

A complete index of radar imagery is available at BAKOSURTANAL and should be consulted to select the relevant images. In addition, appropriate enquries should be made with PERTAMINA to obtain an index of the SLAR coverage in their hands.

4. Since this part of the data gathering may add an excessive burden on the people involved in planning, it is suggested that the part dealing with air photography and satellite/ radar imagery be contracted (as "short study") to one of the agency actually involved in such work. The faculty of Geography. (Center for Training in Remote Sensing) at U. Gadjah Mada or the Fakultas Pertanian at IPB should be able to carry out this inventory task in a short time.

D. Regional Studies

A copy of the available regional studies covering the areas of investigation should be attached to the file.

E. Contact Persons

A list of persons, in Jakarta or in the Provinces, familiar with the pre-selected areas could be of much use to the screening team to get first hand information before undertaking the field visits. The contact persons could be looked for in TKTD, PTPT, DGT, Agraria and Pertanian. They should be contacted before-hand to make sure that they will be available for consultation. The same list should also include the names of the mapping consultants involved in the SKP preparation.

Check List of data required
in preparation for IBRD screening mission

WPP No. ______

SKP No. ______ Name ______________________

Maps Reports	Source
1. Topographic maps 1/250,000. 1/100,000 or 1/50,000	Jantop, Bakosurtanal
2. Soil maps: reconnaissance, exploration detailed reports for selected sites	LPT
3. Land use maps: 1/200,000 and 1/100,000 detailed land use studies	Agraria, LPT, Bakos. Agraria
4. Geological maps	Direk. Geologi Band.
5. Land Evaluation Maps, Reports	Consultant, LPT
6. Forestry Maps	Bina Program Kehutanan Agraria
7. Irrigation Maps	P.U. Pengairan
8. Road Map	P.U. Bina Program
9. SKP, Site location Map	TKTD, PTPT
Air Photography	
1. Index for selected Area	Bakosurtanal, Contractors, LPT.
2. Satellite Imagery (ID numbers and prints)	Bakosurtanal, LAPAN, UGM.
3. Radar Imagery	Bakosurtanal, Pertamina.
Regional Studies	
1. Reports, maps	Bappenas, PU.

Contact Persons

List and affiliation (per area selected)

The World Bank / 1818 H Street, N.W., Washington, D.C. 20433, U.S.A. • Telephone: (202) 477-1234 • Cables: INTBAFRAD

November 28, 1979

Mr. Martono
Junior Minister for Transmigration
Ministry for Manpower and Transmigration
Jl. H. Agus Salim 58
Jakarta
Indonesia

Dear Mr. Martono:

As we discussed earlier, the Transmigration Program Review Team has identified the lack of correspondence between Government procedures for project preparation and Bank standards for project appraisal and approval as a major constraint to large-scale Bank participation in the Repelita III Transmigration Program. In the past the Bank has envisioned its participation in terms of large projects consisting of adjacent sites to facilitate project coordination and supervision. Government, on the other hand, has been pressed to initiate mapping and preparation throughout the entire country and to begin implementation in all areas where physical plans have been completed. Obviously these two approaches are not compatible. One possible way to circumvent this constraint would be for the Bank to consider the financing of "start-up" sites in dispersed regions while providing technical assistance to (a) prepare additional sites in nearby areas and (b) develop feasibility studies which provide plans for integrating these sites into a more comprehensive regional development plan. This would help provide the speed required by Government and the quality required by the Bank.

This proposal was discussed with you when Mr. Golan and Mr. Saddington were in Indonesia and it was agreed that it should be explored further. The Transmigration Program Review Mission was then asked to identify areas which might be suitable for such start-up sites, and to provide a list of such areas to Government. It was proposed that Government would then compile all available data on these areas and that when this was completed (presumably in early 1980) that Government and Bank would send a reconnaissance team into the field to determine which areas had the most potential for settlement, and to initiate the project preparation required for early appraisal of these sites.

The first stage in this process has been completed. The Transmigration Review team has identified eight areas for possible consideration by the reconnaissance team and four areas with the potential for further study. These areas have been preselected on the basis of (a) sizeable potential for settlement; (b) data available for screening; and (c) inclusion within the list of WPPs or sites already earmarked for development within Repelita III. Inclusion does not imply that the areas are suitable for settlement, only that they are appropriate for review.

The eight areas given priority for review by the reconnaissance team are given below. Those with asterisks are alang-alang areas which are given highest priority by the TPR team because they simplify planning and do not entail problems in the use of forest products.

Tentative list: Sites proposed for review

WPP	Location	Comments
Riau		
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*V	Lahat-Tebingtinggi	Mainly alangalang 60,000 ha. (Earmarked for foreign assistance)
XIX-XVI	Sekayu/Betung	Secondary forest
I/IV	Lembah Liam	Light forest (?)
South Kalimantan		
*V/VI	Batu Licin/Sebamban	Sodetec feasibility study already proposed.
West Kalimantan		
XVI-XVIII	Singgau/Sintang	Mixed land use. (Present land use, soil quality and state of information in question)

In addition it is recommended that the reconnaissance team visit the following areas to determine whether they are suitable for further study:

West Kalimantan		
X,XII	Ketapang/Sukadana	Coastal forest and freshwater swamp. (Low population densities, regional priority, little information)
Central Kalimantan		
	Sites to be proposed by Government	Large land areas, questionable soils, limited data. French team in field
South Sulawesi		
VII, VIII, IX	Mamuju	84,000 ha studied by Agraria
Halmahera		
XIV, XVI	Kao Bay	May be suitable for a regional development study

The second stage of this process entails immediate data collection by Government on the areas specified above. The types of data which might be collected are itemized in a memorandum which has been prepared by

Jean-Paul Malengreau, the land use planner attached to our mission. This memorandum is included as an appendix to this letter. Not all the required information will be available on all sites but the more information which can be compiled prior to the arrival of the reconnaissance team the more effective it will be.

Once data compilation is complete the Bank is prepared to send a reconnaissance team to work with Government staff to determine those areas appropriate for start up sites and to work out the means of doing further project preparation. To facilitate this process it would be extremely useful if Government could clarify for us what agency has responsibility for overall coordination of feasibility studies and to which agencies technical assistance for this activity might eventually be provided. We understand, of course, that Cipta Karya is responsible for physical planning, but the eventual coordination of information on farm models, input supply, labor requirements, village infrastructure and economic analysis among other things seems outside both its area of competence and its present capacity. Therefore if you anticipate the help of technical assistance in these activities roles must be clarified and recommendations formulated as soon as possible.

To recapitulate: the Transmigration Program Review Team has identified eight areas with apparent transmigration potential and four areas appropriate for further consideration. If you wish to request Bank financing for start-up sites in these areas it will be critical to:

(a) begin data collection on these areas, and
(b) clarify roles in the coordination of project preparation.

The Bank, in turn, is tentatively prepared to send a reconnaissance team to Indonesia in early 1980 to assist in determining the suitability of these areas for settlement and the procedures for further project preparation. If these arrangements are agreeable to you, it would be useful to have the earliest possible notification of the time when data compilation will be complete and the mission would be expected. Let me conclude by thanking you for the time which you and your staff have given to our mission. Mr. Joko Hartono was indispensible in facilitating our work as were our contacts in DGT, Agraria, Agriculture and Public Works. We do not pretend to fully understand the complexity of all the issues but we have a growing appreciation of both problems and potential of the transmigration program, and we wish you the best in all your work.

Thank you again.

Sincerely yours,

Gloria Davis
Indonesia Transmigration and Land Settlement Unit
Projects Department
East Asia and Pacific Regional Office

Information to be Collected for IBRD Reconnaissance

In order to speed the identification of sites which might have the potential for financing by the World Bank, a proposal has been made to have a joint GOI-IBRD reconnaissance team visit these areas to assess their settlement potential. Should this proposal be accepted by Government and the Bank, the team would be likely to arrive in early 1980. In order to make the visit of the reconnaissance team more effective a series of widely distributed WPP's has been pre-selected; areas which are thought to have a realistic potential for transmigration and for which project preparation could be expected by 1981. If this proposal is accepted, it is suggested that information be assembled on these areas before the reconnaissance team arrives. The types of information required are described below.

Data Required

The following list is as comprehensive as possible and should be used as a check list to ensure that all relevant information is included in this preparation process or that the existence of this information is confirmed or denied. It is suggested that a wide range of agencies and institutions be contacted during this data gathering phase.

A. Maps and Reports

1. Topographic maps

1/100,000 good quality copies of topo maps from Dutch period (Jantop), US Army Map Service and/or UK should be procured. Topographic maps, if available from BAKOSURTANAL, should also be obtained.

2. Soils maps· LPT (Soils Research Institute - Bogor)

Only exploration or reconnaissance soil maps are likely to be available for most of the preselected areas. However, detailed or semi detailed soil surveys in adjacent areas should also be collected since they might give useful indication on the general nature of the terrain in the region.

3. Land use maps: Agraria, LPT, BAKOSURTANAL

1/200,000 and 1/100,000 land use maps should be collected from Agraria. The publications giving the description and areal extent of the classes (like, "Sumatra Selatan dalam Angka") should be attached to the maps if available.

Agraria has undertaken detailed land use studies of some transmigration areas; the one falling into the area under screening should be collected ("Analisa Tata Guna Tanah dan design Tata Ruang").

4. <u>Geological maps:</u> Directorate Geologi, Bandung

A copy of the relevant portion of Van Bemunclen's Geology of Indonesia should be made and the more recent maps collected from the Geological Services in Bandung.

5. <u>Land evaluation maps</u>: LPT (Consultants)

Consultants are presently engaged into the preparation of 1/250,000 land capability maps. These are based on a general land and water resources analysis and are presented inthe "Laporan pra-akhir". Aceh and North Sumatra Provinces are finished, the rest of Sumatra and the whole of Kalimantan should be available soon. The maps and attached reports should be collected.

6. <u>Forestry maps</u>: Bina Program, Agraria

Should be collected from Bina Program Kehutanan; maps showing the distribution of production forests and natural reserves should receive special attention. Requests could be sent to the Provincial Forestry Servies or BAPPENDA for the latest information in this field.

7. <u>Irrigation maps</u> P.U., Directorate General Pengairan

The maps showing the areas identified as representing a potential for irrigation should be attached to the file of each preselected area. If possible additional information regarding existing irrigation projects should be added.

8. <u>Road maps</u>: P.U., Directorate Bina Program

Copies of the relevant portions of the 5 and 20 year Bina Program plans for road development should be produced.

9. <u>SKP and Site location maps</u>

It is requested that the 1/100,000 maps (or 1/250,000 maps) showing boundaries of the proposed SKP; as well as the precise location of sites already identified, be prepared. The following sites should be plotted on the maps: Trans II sites where PTPT is currently involved in land clearing; proposed Repelita III sites if identified; other proposed (but not approved by BAKOPTRANS) sites identified by in the DGT's Rencana Repelita III.

B. Air Photography and other Imagery

1. Air photography

In order to speed up the reconnaissance work it is important that complete index maps of the air photos covering the proposed areas be compiled and that these maps show the location of the flight lines and photo numbers. This index should be prepared with the assistance of BAKOSURTANAL, LPT, TKTD, and if necessary be supplemented by visits to KLM, EXSA, PENAS and AURI Air-photo Division. Although it would be unrealistic to acquire at once all the available photos, they should be located with enough accuracy so that their retrieval does not represent any major problems. For Sumatra, it would be of assistance if the 1/100,000 photographs covering the proposed areas can be separated from the whole collection and be readily available.

2. Satellite Imagery

Landsat imagery will be very useful for screening purposes as far as it gives information on the physiography and the type of land cover of the area. In addition, it will be used for devising a most effective ground, sampling strategy for field visits.

In order to make this exercise useful it is requested that the best landsat images covering the proposed area be selected with the assistance of LAPAN and BAKOSURTANAL. Negatives of band 5 and 7 can be blown up to 1/250,000 scale and printed in ogalid or regular photographic pages. The necessary assistance for making such an inventory and process the negatives could also be obtained from the above mentioned agencies.

3. Radar Imagery

A complete index of radar imagery is available at BAKOSURTANAL and should be consulted to select the relevant images. In addition, appropriate enquiries should be made to PERTAMINA to obtain an index of the SLAR coverage in their hands.

Since this part of the data gathering may be an additional burden for those involved in planning, it is suggested that the part dealing with air photography and satellite/ radar imagery be contracted (as "short study") to one of the agencies actually involved in such work. The faculty of Geography (Center for Training in Remote Sensing) at U. Gadjah Mada or the Fakultas Pertanian at IPB should be able to carry out this inventory task in a short time.

D. Regional Studies

A copy of the available regional studies covering the areas of investigation should be attached to the file.

E. Contact Persons

A list of persons, in Jakarta or in the Provinces, familiar with the pre-selected areas could be of much use to the screening team to get firsthand information before undertaking the field visits. The contact persons could be looked for in TKTD, PTPT, DGT, Agraria and Pertanian. They should be contacted beforehand to make sure that they will be available for consultation. The same list should also include the names of the mapping consultants involved in the SKP preparation.

Check list of data required in preparation for IBRD reconnaissance mission

WPP No. ________

SKP No. ________ Name ______________________________

Maps Reports	Source
1. Topographic maps 1/250,000. 1/100,000 or 1/50,000	Jantop, Bakosurtanal
2. Soils maps: reconnaissance, exploration detailed reports for selected sites	LPT
3. Land use maps: 1/200,000 and 1/100,000 Detailed land use studies	Agraria, LPT, Bakosurtanal Agraria
4. Geological maps	Directorate Geologi Bandung
5. Land evaluation maps and reports	Consultants, LPT
6. Forestry maps	Bina Program Kehutanan Agraria
7. Irrigation maps	P.U.-Pengairan
8. Road map	P.U.-Bina Program
9. SKP, site location map	P.U.-TKTD, PTPT
Air Photography	
1. Index for selected area	Bakosurtanal, Contractors, LPT
2. Satellite imagery (ID numbers and prints)	Bakosurtanal, LAPAN, UGM.
3. Radar imagery	Bakosurtanal, Pertamina
Regional Studies	
1. Reports, maps	Bappenas, PU
Contact Persons	
1. List and affiliation (per area selected)	

[ca. 1978]

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INDONESIA

TRANSMIGRATION II

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Base Data and Assumptions for Farm Model Analysis

1. This annex discusses the basic assumptions used in the farm model analysis such as farm family labor supply and demand, prices, inputs, yields, etc.

2. Family labor supply and demand. In most instances, land settlement schemes are located in areas without a large local population, thus giving rise to both limited off-farm employment opportunities and limited casual labor for hire for on-farm work. The models therefore have been designed to maximize the use of family labor on-farm.

3. Estimates of farm family labor supply have been derived from Bank, FAO and GOI studies, as well as extensive field surveys. The assumptions concerning labor supply are presented in Table 1.

Table 1: ESTIMATED FARM FAMILY LABOR SUPPLY

Family labor units	Age	Year 1	2	3	4	5	6	7	8	9
Husband	32	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Wife	26	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Child	8	-	0.1	0.2	0.2	0.2	0.3	0.4	0.5	
Child	6	-	-	-	0.1	0.2	0.2	0.2	0.3	
Child	4	-	-	-	-	-	0.1	0.2	0.2	
Total FLU		1.5	1.6	1.7	1.8	1.9	2.1	2.3	2.5	2.5
Available family labor days per year (1 FLU = 240 family labor days)		360	384	408	432	456	504	552	600	600
per month		30	32	34	36	38	42	46	50	50

Table 2: ESTIMATED CROP LABOR REQUIREMENTS IN MAN-DAYS/HA

Crop	Land preparation	Planting	Weeding	Fertilizer applications	Harvesting	Total
Rice	30	20	40	6	32	128
Corn	30	10	30	8	30	100
Cassava	20	20	30	8	30	108
Rice bean	20	10	24	6	40	100
Mung bean	20	10	20	6	40	134
Groundnut	20	12	56	6	40	96
Coconut	15	10	32	6	60	128
Pineapples	-	40	10	10	40	100
Coffee	-	23	15	9	30	87
Pepper	-	40	40	20	50	150
Chillies	-	10	10	5	20	45
Ginger	-	25	25	5	50	105
Tobacco	-	30	25	5	25	85
Bananas	-	50	35	10	13	108
Citrus	-	10	28	6	60	104

Crop labor requirements have been derived from various Bank, FAO and GOI reports, as well as extensive field surveys.

5. Any labor deficit months would be met by hiring settlers recently arrived on site who are not fully occupied in farming their own plots, or by hiring local casual laborers. The cost per man-day for hired labor has been estimated at Rp 600. Labor requirements for clean-felling reserve land are estimated to be 240 man-days/ha.

6. Labor requirements for smallholder block planted rubber are based on the NES II smallholder rubber replanting data (Annex 1, Section A3). Thw analysis assumes that rubber will be provided to the settlers through a nucleus estate type of operation; therefore, allowances have been made for use of estate labor in establishing rubber. Labor requirements are presented in Table 3. The est. column shows labor to be supplied by the nucleus estate and the fam. column shows labor to be supplied by the farm family. Estate labor has been valued at Rp 1,000/day for the foreman, and rp 650/day for hired labor.

Table 3: RUBBER LABOR REQUIREMENTS IN MAN-DAYS/HA

Year	Foreman		Land clearing		Land preparation		Crop Management					Total	
							Planting	Fert.	Weed.		Tapping		
	est.	fam.	est.	fam.	est.	fam.	fam.	fam.	est.	fam.	fam.	est.	fam.
1	16		58	40	12	21	11	18		162		86	252
2	6								6	111		12	111
3	3								6	56		9	56
4	3								6	40		9	40
[illegible]	3								6	40		9	40
6	2								2	38		4	38
7	2									26	85	2	111
8	2									26	85	2	111
9 and on	2									20	113	2	139

Estimated Yields

7. Estimated crop yields for field and tree crops (except rubber) are based on results of the Tani Makmur and CRIA research projects in Lampung, and on field surveys of farmers currently farming red-yellow podzolic soils in Indonesia. It is assumed that maximum yields per crop will not be obtained until several years after cropping has begun; therefore, yield estimates have been adjusted accordingly as shown in Table 4.

Table 4: INCREMENTAL CROP YIELDS IN KG/HA

Crop	Annual Production			
	First Year	Second Year	Third Year	Full Development
Rice	800	950	1,250	1,500
Corn	600	750	900	1,000
Cassava	8,000	10,000	11,000	12,000
Rice Bean	600	750	850	1,000
Mung Bean	350	400	500	600
Groundnut	600	750	900	1,000
Tobacco	800	1,000	1,250	1,500
Ginger	4,500	6,000	8,000	10,000
Chillies	1,000	1,250	1,550	1,800
Pineapples /a	4,000	4,800	5,600	6,200
Pepper /b	600	750	900	1,000
Citrus /c	100	140	175	200
Coconut /d	45	58	68	80
Bananas /e	1	1	1	1
Coffee /f	800	1,000	1,250	1,500

/a Assumes one fruit per plant, and 6,200 plants per ha.

/b Assumes 500 vines/ha, at a yield of 2 kg/vine.

/c Assumes yield of 200 fruits/tree, and 160 trees/ha. Total per ha yield would be 32,000 fruits.

/d Yield of nuts per tree. Assumes 220 trees/ha, with total yield of 17,600 nuts/ha.

/e Assumes yield of one bunch of fruit per tree, with 1,100 trees/ha.

/f Assumes 2,500 plants/ha.

8. Rubber yields for smallholder rubber models are derived from the NES II report (Annex 1, Section A5, Table 1.2) and are shown in Table 5.

Table 5: ESTIMATED RUBBER YIELDS IN KG/HA

Planting year	Tapping year	Density (No. trees/ha)	Tapping days (No. days/annum)	Grams per tree per tapping	Yield (kg/ha)	Cumulative yield (kg/ha)
8	1	350	85	10	300	300
9	2	400	85	15	500	800
10	3	410	113	17	800	1,600
11	4	400	113	20	900	2,500
12	5	390	113	21	950	3,450
13	6	380	113	23	1,000	4,450
14	7	370	113	26	1,100	5,550
15	8	360	113	28	1,150	6,700
16	9	350	113	30	1.200	7,900
17	10	340	113	33	1,275	9,175
18	11	330	113	36	1,350	10,525
19	12	320	113	39	1,400	11,925
20	13	310	113	40	1,400	13,325
21	14	300	113	41	1,400	14,725
22	15	290	113	43	1,400	16,125
23	16	285	113	44	1,400	17,525
24	17	280	113	41	1,300	18,825
25	18	275	113	35	1,100	19,925

Estimated Physical Input Use

9. Estimated physical input requirements for food and perennial crops are based on current recommendations in existing Bank reports and the results of field surveys, and take account of current technological practices. Table 6 shows physical input assumptions for food and perennial crops. Physical input requirements for rubber are derived from the NES II report (Annex 1, Section A3), and are shown in Table 7.

Table 6: PHYSICAL INPUTS FOR FOOD AND PERENNIAL CROPS PER HA

	Estimated Input uses					
	Fertilizer (kg)					
Crop	Urea	TSP	Rock/b phosphate	Muriate /c of potash	Insecti- cides (lt)	Seed
Rice	100	100	200	-	1	60 kg
Corn	100	100	200	-	1	40 kg
Cassava	50	50	200	-	1	1,250 kg (approx wt of cuttings)
Rice bean	- /a	100	200	-	1	40 kg
Mung bean	- /a	100	200	-	1	15 kg
Groundnut	- /a	100	200	-	-	70 kg
Coconut	210	210	200	-	-	220 seedlings
Coffee	100	100	200	-	1	2,500 seedlings
Tobacco	100	100	200	-	1	50 gms
Ginger	60	60	200	-	-	250 kg
Chillies	100	50	200	-	1	8 kg
Pineapplies	100	100	200	-	1	6,200 tops
Citrus	60	60	200	-	1	160 seedlings
Bananas	60	60	200	-	1	1,100 seedlings
Pepper	100	100	200	-	1	20 kg cuttings

/a Urea will not be provided assuming leguminous crops are modulating or have been modulated.

/b Ploughed into soil on final mechanical harrow run prior to settler's arrival.

/c A supply of Potash has been budgeted, if needed.

Table 7: PHYSICAL INPUTS AND PRICES FOR RUBBER DEVELPMENT PER HA/a
(Rp)

Year	Chain saw hrs/b	Lining pegs/b	Budded stumps	Polybag stumps	Kerosene/d	Insecticide/e	Sprayer/f
1	160	250	500	50	25	39	1
2						124	1
3						62	1
4						62	1
5						62	1
6						62	1
7 and on						31	1

Year	Rock phosphate	P.J.	C:P.	C.M.	Urea	Muriate of potash	Kieserite /g
	Fertilizer (kg)						
1	420	6	6	6			
2	150				75	50	50
3	168				96	60	48
4	188				118	71	47
5	180				124	68	45
6	129				129	86	43
7 and on	154				154	103	52

/a Additional costs

Year	Tools	Transport
1	2,500	2,875
2-3	2,500	750
4-6	2,500	900
7 and on	1,800	1,000

/b At Rp 200/hr.
/c At Rp 2/peg.
/d At Rp 25/lt.
/e Insecticides required per year are as follows (in liters per year):

Insecticide	Unit Cost (Rp/Lt)	Year 1	2	3	4	5	6	7 and on
Dalapon	1,350	8						
Alang 2 Oil	255	1	4	2	2	2	2	1
Solar	25	30	120	60	60	60	60	30
2.4.5 Butyl Ester	6,000	5						

/f At Rp 450 per year.
/g Fertilizer prices are as follows:

Fertilizer	Price (Rp/kg)
P.J.	1,250
C.P.	800
C.M.	700
Kieserite	57

Prices

10. In estimating the economic prices of commodities, current IBRD commodity price forecasts have been utilized for those commodities that will provide either import substitution savings or potential export earnings (coffee, rice, cassava, rubber, corn, copra (coconuts)) or that must be imported (TSP, chemical insecticides)./1 As other commodities are expected

/1 These prices have been estimated using a shadow foreign exchange rate of US$1.00 = Rp 488 (see para. 17).

to be consumed in local markets or to be produced domestically, current local market and domestic prices have been utilized. In estimating financial prices, current local market and domestic prices have been utilized. Commodity prices are shown in Table 11 and are expressed in terms of constant 1978 US$ and Rupees.

Table 8: COMMODITY PRICE SUMMARY
(Rp/kg)

	1978		1985	
	Financial	Economic	Financial	Economic
Final Product				
Rice	70	74.8	70	101.5
Corn	45	70.3	45	88.3
Cassava	4.33	6.44	4.33	11.13
Chillies	300	300	300	300
Ginger	200	200	200	200
Coconut	15	40.7	15	47.2
Mung bean	200	200	200	200
Rice bean	200	200	200	200
Groundnut	120	120	120	120
Pineapples	35	35	35	35
Citrus	15	15	15	15
Tobacco	800	800	800	800
Pepper	300	300	300	300
Coffee	350	1,691.9	350	1,049.7
Bananas /a	110	110	110	110
Rubber	424	499	463	545
Inputs				
Fertilizer				
Urea	70	106.3	70	127.9
TSP	70	99.5	70	119.1
Rock phosphate	32.5	32.5	32.5	32.5
Muriate of potash	48	48	48	48
Chemical insecticides (Rp/1g)	1,000	4,100	1,000	4,100
Seed				
Rice	150	300	150	300
Corn	45	70.3	45	88.3
Cassava /b	2.2	2.2	2.2	2.2
Chillies	175	175	175	175
Ginger	200	200	200	200
Coconut /c	150	150	150	150
Mung bean	200	200	200	200
Rice bean	200	200	200	200
Groundnut	120	120	120	120
Pineapples /d	35	35	35	35
Citrus /c	15	15	15	15
Tobacco /c	216	216	216	216
Pepper	175	175	175	175
Coffee /c	70	70	70	70
Bananas /c	15	15	15	15
Rubber - Budded stump	110	110	110	110
Polybag seedling	126	126	126	126

/a Price per bunch.
/b Per kg of cuttings.
/c Price for seedlings.
/d Price for tops.

Table 9: COMMODITY PRICE STRUCTURE: RICE /a

	1978 US$/ton	1985 US$/ton
Export price, Thai 5%-42% brokens, f.o.b. Bangkok /b	256	341
Ocean freight and insurance	17	14
Import price, c.i.f. Sumatra port /c	273	355
Port handling	8	6
Handling, transport, storage to wholesale point /d	4	3
Wholesale price imported rice	285	363
Transport and handling mill to wholesale /e	-22	-20
Ex-mill rice price, project area	263	343
Paddy equivalent price (63%)	166	216
Milling charge less value of byproduct /f	-6	-4
Drying and cleaning cost /g	-4	-2
Transport cost, farm to mill /h	-4	-2
Economic farm-gate paddy price	152	208
Rp/kg	74.8	101.5
(Financial farm-gate price)	(135)	(135)
(Rp/kg)/i	(70)	(70)

/a Economic prices adjusted to mid-1978 constant values. Shadow foreign exchange rate of US$1.00 = Rp 488 has been utilized. Financial prices converted at official exchange rate of US$1.00 = Rp 415.

/b Based on IBRD November 1977 commodity price projections for Thai rice and assumes 10% of 5% brokens, 60% of 25-30% brokens, and 30% of 42% brokens.

/c Sumatra ports are Jambi and Padang.

/d Main wholesale markets in port cities.

/e Transport by truck. Future transport costs are assumed to decrease as road system improvement is completed.

/f At present, milling costs are high due to scarcity of mills in project area. Future milling costs are expected to decease due to increase in number of mills as a result of the project.

/g Drying and cleaning costs are assumed to decrease in the future as a result of provision of more efficient technologies by the project.

/h Assumed to decrease in the future as roads are constructed in the project area as provided for by the project.

/i Government official floor price of Rp 75/kg at BUUD/KUUD cooperative center, less Rp 1.5/kg for drying and cleaning, Rp 2.5/kg for quality imperfections, and Rp 1.0/kg for transport, farm to BUUD.

Table 10: COMMODITY PRICE PRICE STRUCTURE: CORN /a

	1978 US$/ton	1985 US$/ton
Export price, f.o.b. US Gulf ports	115	149
Ocean freight and insurance	35	35
Port handling at Sumatra port /b	6	6
Corn price on trucks, Sumatra port /b	156	190
Transport, wholesalers to wharf /c	-8	-6
Transport, farm to wholesalers /c	-4	-3
Economic farm-gate price	144	181
Rp/kg	70.3	88.3
(Financial farm-gate price)	(108)	(108)
(Rp/kg)/d	(45.0)	(45.0)

/a Economic price adjusted to mid-1978 constant values and converted at shadow foreign exchange rate of US$1.00 = Rp 488.

/b Sumatra ports are Padang and Jambi.

/c Expected to decrease in future as roads in project area are improved.

/d Converted at official exchange rate of US$1.00 = Rp 415.

Table 11: COMMODITY PRICE STRUCTURE: CASSAVA /a

	1978 US$/ton	1985 US$/ton
C.i.f. price, Europe	89	115
Ocean freight and insurance	-35	-35
F.o.b. price, Sumatra ports /b	54	80
Port handling at Sumatra port /b	-4	-4
Transport, wholesalers to wharf /c	-7	-5
Transport, farm to wholesalers /c	-3	-2
Economic farm-gate price, dry root	40	69
Economic farm-gate price, wet tuber /d	13.2	22.8
Rp/kg	6.44	11.13
(Financial farm-gate price)	(10)	(10)
(Rp/kg)/e	(4.33)	(4.33)

/a Economic price adjusted to mid-1978 constant values and converted at shadow foreign exchange rate of US$1.00 = Rp 488.

/b Sumatra ports are Padang and Jambi.

/c Expected to decrease in future as roads in project area are improved.

/d Conversion factor between dry root and wet tuber is estimated at 0.33.

/e Converted at official exchange rate of US$1.00 = Rp 415.

Table 12: COMMODITY PRICE STRUCTURE: COPRA/COCONUTS /a

	1978 US$/ton	1985 US$/ton
C.i.f. price, Europe	410	462
Ocean freight and insurance	-30	-30
F.o.b. price, Sumatra ports /b	380	432
Port handling at Sumatra port /b	-6	-6
Transport, wholesalers to wharf /c	-6	-4
Drying, sacking and others by wholesalers /d	-4	-3
Transport, farm to wholesalers /c	-8	-6
Economic farm-gate price, copra	356	413
Economic farm-gate price/ton coconuts /e /f	66.8	77.3
Rp/nut	40.7	47.2
(Financial farm-gate price/ton coconuts) /g	(29)	(29)
(Rp/nut)/h	(15.0)	(15.0)

/a Economic price adjusted to mid-1978 constant values and converted at shadow foreign exchange rate of US$1.00 = Rp 488.

/b Sumatra ports are Padang and Jambi.

/c Expected to decrease in future as the roads in the project area are improved.

/d Expected to decrease in future due to improved processing facilities to be provided by the project.

/e Converted from copra to coconuts by the following factors:
(1) 800 coconuts = 1 MT.
(2) Conversion coconuts to copra is 18.74%.
(3) 1 MT coconuts yields 149.9 kg copra.
(4) 1 MT copra = 5.34 MT coconuts.
(5) Price per ton coconuts = US$356/ton copra ÷ 5.34 tons coconuts = US$66.8/ton coconuts.

/f Price per nut = US$66.8/ton ÷ 800 nuts = US$0.083/nut (Rp 43/nut) for 1978 prices; US$77.3/ton ÷ 800 nuts = US$0.097/nut (Rp 50/nut) for 1985 prices.

/g Converted at official exchange rate US$1.00 = Rp 415.

/h Price per nut = US$29/ton ÷ 800 nuts = US$0.036/nut (Rp 15/nut).

Table 13: COMMODITY PRICE STRUCTURE: COFFEE /a

	1978 US$/ton	1985 US$/ton
C.i.f. price, spot New York	3,575	2,251
Ocean freight and insurance	-60	-60
F.o.b. price, Sumatra ports /b	3,515	2,191
Port handling, Sumatra port /b	-8	-8
Transport, wholesalers to wharf /c	-12	-10
Drying, sacking and other by wholesalers /d	-20	-16
Transport, farm to wholesalers /c	-8	-6
Economic farm-gate price	3,467	2,151
Rp/kg	1,691.9	1,049.7
(Financial farm-gate price)	(843)	(843)
(Rp/kg)/e	(350.0)	(350.0)

/a Economic price adjusted to mid-1978 constant values and converted at shadow foreign exchange rate of US$1.00 = Rp 488.

/b Sumatra ports are Padang and Jambi.

/c Expected to decrease in future as roads in project area improve.

/d Expected to decrease in future due to improved processing facilities are provided by the project.

/e Converted at official exchange rate US$1.00 = Rp 415.

Table 14: COMMODITY PRICE STRUCTURE: FERTILIZERS

	1978 US$/ton	1985 US$/ton
Urea /a		
Ex-PUSRI plant, bagged /b	165	220
Transport to project area /c	35	28
Storage and handling /d	14	10
Transport to farm /e	4	2
Economic farm-gate price	218	262
Rp/kg	106.3	127.9
(Financial farm-gate price)	(169)	(169)
(Rp/kg)/f	(70.0)	(70.0)
TSP /a		
Export price, f.o.b. US Gulf /g	113	166
Freight and insurance	19	19
Import price, c.i.f. Sumatra ports /h	132	185
Handling and bagging	19	19
Transport to project area /c	35	28
Storage and handing /d	14	10
Transport to farm /c	4	2
Economic farm-gate price	204	244
Rp/kg	99.5	119.1
(Financial farm-gate price)	(169)	(169)
(Rp/kg)/f	(70.0)	(70.0)

/a Economic prices; converted at shadow foreign exchange rate of US$1.00 = Rp 520 and adjusted to mid-1978 constant values.
/b Based on IBRD world market price projections (November 1977) for bagged urea, f.o.b. Europe, adjusted to Southeast Asia markets.
/c Expected to decrease in future due to improvement of roads in the project area.
/d Expected to decrase in future due to improvement in kiosk storage facilities in project area.
/e Expected to decrease in future due to improvement of roads in the project area.
/f Financial prices; converted at official exchange rate of US$1.00 = Rp 415.
/g Based on IBRD world market price projections.
/h Sumatra ports are Jambi and Padang.

11. Rubber prices, and quality the of smallholder rubber, are assumed to be the same as the NES II project. It is estimated that the rubber price will be US$0.46/lb in 1978, rising to US$0.51/lb in 1985, in constant 1978 prices. Rp/kg equivalent prices are shown in Table 8. For further discussion of rubber prices, see NES II green cover appraisal report, Chapter 5, para. 5.04.

Off-Farm Employment

12. For all farm models it has been assumed that there is limited off-farm employment opportunities available within project areas. For this reason, the cost of labor has not been estimated in farm budget analysis, nor has it been shadow priced for the simulated economic analysis. Instead, a basic nutritional package for a family of five has been estimated and costed on a daily and annual basis. The various components of this package are shown in Table 15. The costs of this subsistence package are approximately equal to the annual off-farm income a farmer receives on Java for casual labor employment, and serve as a reasonable measure of the opportunity cost to a farm family leaving the inner islands to participate in a land settlement project.

Table 15: COST OF SUBSISTENCE

	Daily consumption (grams)	Price /a (Rp/kg)	Total cost/ person/day (Rp)	Total cost/family of five/day (Rp)
Rice /b	317	74.80	23.7	118.5
Yellow maize	233	70.30	16.4	82.0
Cassava /c	503	6.44	3.2	16.0
Dried fish				
Small	17	495.36	8.4	42.0
Large	17	495.36	8.4	42.0
Cooking oil	16	248.01	4.0	20.0
Sugar	20	213.18	4.3	21.5
Mung bean sprouts	66	200.00	13.2	66.0
Soya sauce	4	201.75	0.8	4.0
Total			82.4	412.0
(Financial cost)/d			(74.0)	(370.0)

/a Economic prices using shadow foreign exchange rate of US$1.00 = Rp 488, and adjusted to mid-1978 constant values.

/b Converted from 200 grams milled rice to 14% moisture content dried gabah ready for milling by conversion factor of 0.63, i.e., 200 grams milled rice divided by 0.63 = 317 grams dried gabah.

/c Converted from 166 grams dry root to wet root by using conversion factor of 0.33, i.e., 166 grams dry root : 0.33 = 503 grams wet root.

/d Financial prices using official exchange rate of Rp 415 = US$1.00. See Table 8.

13. For the farmers receiving block planted rubber, there will be some off-farm employment in the year that the rubber is block planted. This is assumed to be 4 weeks, 5 days per week at Rp 625/day, taken from NES II.

Investment Costs

14. Investment costs have been estimated on a per family basis for the simulated economic rate of return, and include all items such as roads, infrastructure, land clearing, and housing, with a foreign exchange component

of 50%. All costs for agricultural inputs have been priced separately. Investment costs for all theoretical farm models are based on infrastructure requirements and associated costs as prepared for the Transmigration II project, and are shown in Table 13.

Table 16: INVESTMENT COSTS PER FAMILY

Item	Cost in 1978 US$
Land clearing	837
Roads	338
Supporting services	
Subtotal	1,255
Water supply	50
Houses	400
Infrastructure	50
Tools, processing facilities	185
Subtotal	685
Overhead facilities	200
Recruitment, etc.	750
Subtotal	950
Total	2,890
Physical contingencies (10%)	289
Total	3,179

15. In addition to the base costs per family presented in Table 16, the following additional investment costs are required for rubber development, as shown in Table 17. It is assumed that processing facility costs are included in the allottment for the same in Table 16, and that the cost of field nurseries is contained in the price charged farmers for budded stumps (see Table 7).

Table 17: ADDITIONAL RUBBER DEVELOPMENT COSTS IN US$ PER HA

Item	Cost/family
Rubber Management	300
Power/Water workshop	60
Transport/Equipment	150
Buildings/Housing (Staff)	350
Office Equipment	30
Miscellaneous	65
Total	925
Physical Contingencies - 10%	93
Total Cost	1,018

16. The above costs do not account for technical assistance, nor take account of residual value of equipment. Overhead facilities costs include necessary staff salary estimations and other recurrent costs. Foreign exchange components of additional rubber development per family costs are estimated to be 45%.

17. Due to the existence of import and export taxes, quantitative restrictions and export subsidies, the official exchange rate of Rp 415 = US$1.00 is not an accurate representation of the economic value to the economy of foreign exchange used in implementing projects and from savings through increased food production. Using the Squire-van der Tak approach, /1 the

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/1 L. Squire and H.G. van der Tak, Economic Analysis of Projects, Baltimore and London, the John Hopkins University Press, 1975.

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estimated standard conversion factor for Indonesia is 0.85. This conversion factor is equivalent to a shadow foreign exchange rate of US$1.00 = Rp 488. This shadow exchange rate was used in pricing the foreign exchange component of all investment costs, and in estimating economic prices.

Inflation Adjustment for Existing Farm Models

18. Cost and benefits for the existing Farm Models have been adjusted from constant 1976 and 1977 US$ and Rps to constant 1978 US$ and Rps by the following inflation factors:

Table 18: INFLATION FACTORS FOR ADJUSTMENT TO CONSTANT 1978 US$ AND RPs

Year	Index	
	Local	Foreign Exchange
1976	100.0	100.0
1977	111.9	108.0
1978	123.3	116.0

INDONESIA

TRANSMIGRATION II

A COMPARISON OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Results of Analysis for Theoretical Farm Models

INTRODUCTION

1. The three theoretical models developed for the analysis (see Table 2) were formulated after extensive review of previous Bank, FAO and GOI projects, and of farming practices currently being utilized in Sumatra. The models have been designed to maximize the use of available family labor and land-use on farm. They also contrast well alternative cropping strategies that can be utilized for land settlement.

2. Because land settlement projects generally provide a settler with cleared land for immediate cropping at arrival on site and reserve land for future farm development, the analysis of the theoretical farm models is done in a two-step manner, as outlined below:

(a) Step 1 - A comparison of initial cropping strategies, i.e., what type of cropping system a project provides for settlers in their initial years on a project site, and;

(b) Step 2 - Possible options for full farm development cropping strategies, with coconuts and rubber examined as crops a settler can develop on his reserve land.

3. The comparison of the models is done utilizing the following variables:

(a) Farm Family Labor Supply and Demand - Given a fixed supply of family labor, the analysis will examine labor availability and utilization, and the incremental return to labor at the margin, from land settlement projects using either food or perenial crops as the appropriate base cropping strategy;

(b) Farm Budget Analysis - A financial comparison of expected income flows;

(c) Simulated Economic Rate of Return - Because estimating a full project economic rate of return is not feasible at this stage, a simulation has been done by estimating investment costs per family and relating such costs to the benefits resulting from the various farm models using economic prices to approximate the return to Indonesia from different approaches to land settlement.

Theoretical Farm Models and Cropping Strategies

4. Three theoretical farm models have been analyzed /1. Model 1 is a food crop model, Model 2 is a perennial crop model with coconuts as the cash crop and Model 3 is a perennial crop model with rubber as the cash crop. All of the models have a high degree of crop diversification and inter- and double-cropping in the family garden and food crop areas. It was assumed that the farm family would provide most of the on-farm labor, and that there would be limited off-farm employment in the project areas. The farm models have therefore been designed to employ available family labor as fully as possible. The different "blocks" in each model are simply land areas that are separated by the provision of contour lines to help prevent soil erosion. The models are shown in Table 1.

5. The food crop model assumes that the settler, on arrival, would receive 2.0 ha of clean-cleared land./2 Of this land area, 1.3 ha would be

/1 These models are assumed to be five ha in size with two ha cleared by the time of the settler's arrival on site.

/2 The land would be cleared by techniques and equipment which would have the soil in good condition for cropping (Annex ___).

for food crops, 0.45 ha for the family garden, and 0.25 ha for the houselot. The cropping strategy involves a high degree of crop diversification and inter- and double-cropping. In Block A, a wet season crop of intercropped rice and mung bean is followed by a dry season groundnut crop. In Blocks B and C, rice and cassava are intercropped in the wet season, with corn being planted in the dry season in the rice area. The family garden is a mix of seven crops intercropped together.

6. Model 2, the perennial crop model with coconuts as the cash crop, assumes that a settler receives one clean cleared ha for food crops, family garden, and houselot, and one hectare of clean felled land for coconuts. The family food and garden crop area have a high degree of crop diversification as well as inter- and double-cropping much as the food crop model, and are designed to provide the family with a nutritionally balanced diet. For the 1.00 ha of coconuts, it is assumed that the settler would receive planting material and extension advice from the project, but he would be responsible for planting the coconuts himself. The same assumptions are utilized for Model 3, the rubber model, with respect to land clearing and the food and garden crop areas. It is assumed that the settler's one ha of rubber would be block planted in his second year on site through a nucleus estate operation, as this is the least cost method of providing rubber and emphasizes good management.

Table 1: INITIAL FARM DEVELOPMENT

Block	Model 1 Area (Ha)	Model 1 Food Crops			Model 2 Area (Ha)	Model 2 Perennial Crop (Coconuts)			Model 3 Area (Ha)	Model 3 Perennial Crop (Rubber)		
A	0.3	Mung bean	0.15	W	1.00	Coconuts	1.00		1.00	Rubber	1.00	
		Rice Bean	0.15	W								
		Groundnut	0.30	D								
B	0.5	Cassava	0.25	W	0.60	Rice	0.40	W	0.50	Rice	0.25	W
		Rice	0.25	W		Cassava	0.20	W		Cassava	0.25	W
		Corn	0.25	D		Corn	0.20	D		Corn	0.10	D
						Mung Bean	0.10	D		Mung Bean	0.05	D
						Rice Bean	0.10	D		Groundnut	0.05	D
										Rice Bean	0.05	D
C	0.5	Cassava	0.25	W	0.15	Chillies	0.03		0.25	Tobacco	0.03	
		Rice	0.25	W		Tobacco	0.03			Chillies	0.03	
		Corn	0.25	D		Ginger	0.03			Ginger	0.03	
						Pineapples	0.03			Pepper	0.03	
						Citrus	0.03			Coconuts	0.05	
										Citrus	0.05	
										Pineapples	0.03	
D	0.45	Tobacco	0.05									
		Coconuts	0.10									
		Ginger	0.05									
		Chillies	0.05									
		Pepper	0.05									
		Citrus	0.10									
		Pineapples	0.05									
Houselot	0.25				0.25				0.25			
Total Farm	2.00				2.00				2.00			

W - Wet Season
D - Dry Season

7. The following variations have been analyzed as possible full farm development cropping patterns beyond a farmer's initially developed two ha block:

(a) The farmer clean fells and plants an additional ha of coconuts;

(b) The farmer clean fells and plants two additional ha of coconuts;

(c) The farmer clean fells and plants an additional ha of rubber;

(d) The farmer clean fells and plants two additional ha of rubber;

(e) The farmer clean fells and plants an additional ha each of coconuts and of rubber.

Land clearing and development for the above variations is as follows:

(a) For variations (a) and (c), the farmer clears 0.4 ha in year 3, and 0.3 ha each in years 4 and 5;

(b) For variations (b) and (d), the first ha of land is cleared and developed as above, and the second ha is developed during years 6-8, with 0.4, 0.3, and 0.3 ha of land developed, respectively, each year.

(c) For variation (e), the farmer clears 0.4 ha of land each in years 3-7, and plants 0.2 ha each of coconuts and rubber in each year until the two full ha are developed.

8. The food crop model, with its high degree of crop diversification, offers a farmer a good 'safety net' in that if one of his staple crops fails (rice, corn or cassava), there are still two other crops that can provide his family with food. Crop diversification also offers a nutritionally balanced diet. With 0.5 ha each of rice, corn and cassava, the farmer should be able to have some surplus crop available for sale at local markets. Since there is not as long a development period before harvest as there would be with perennial crops, the lapsed time before the farmer would realize maximum on-farm income from his 2.0 ha plot would be shortened. The success of this model depends on adequate and timely deliveries of fertilizers, insecticides, and other agricultural inputs. Without these, crops will not receive adequate nutrients nor protection against pests, disease, etc.

9. The 'safety net' feature of the two perennial crop models is that both rubber and coconuts have grown well in red-yellow podzolic soils, and assure the farmer of a reliable source of cash farm income. The risk factor with this strategy is that there is a long maturation period before the farmer realizes a return from the perennial cash crops (coconuts yield after about four years from planting, and rubber after about seven). Thus, there is an extended period of time when the farmer is dependent for subsistence on his small food crop area and limited off-farm employment opportunities. Should the problems discussed in para. 8 with respect to food crops arise, the settlers would face a difficult situation.

Results of Analysis

10. Farm Labor Analysis (Appendix 1). Available farm family labor is a major constraint for any proposed cropping strategy for a land settlement project. Therefore, the results of the farm labor analysis for the three farm models are expressed in terms of man-day labor deficits per year (see Table 2).

11. The mixed food crop model (Model 1) and the rubber model (Model 2) both have minor labor deficits in the early years on site for the initial 2.0 ha farming strategies. However, in neither of these models is the deficit more than five man-days per month, a figure which does not imply a serious labor constraint. The coconut model (Model 2) does not have any labor deficit for the 2.0 ha farm plot.

12. For future farm development, the mixed food crop model has labor shortages when rubber (both 1.0 and 2.0 ha) is developed on reserve land, and a rather severe labor shortage when 2.0 ha of coconuts are developed on reserve land (the latter labor shortage also occurs in the coconut model). The labor deficit for rubber development in the mixed food crop model is caused primarily by land clearing and land preparation for the planting of rubber. Again, the per month labor deficits are not severe and the overall labor deficit can be somewhat offset by the hiring of settlers newly arrived on site or available local casual labor. The labor shortage when 2.0 ha of coconuts are developed

Table 2: SUMMARY RESULTS OF LABOR ANALYSIS - FARM FAMILY LABOR DEFICITS PER YEAR (man-days)

	Model 1: Mixed Food Crops	Model 2: Coconuts	Model 3: Rubber
Base 2.0 ha			
Year 1	5.9	5.8	5.0
2	5.0	-	2.0
3	2.4	-	-
4	0.4	-	-
With 1 ha coconuts			
Year 1	5.9	5.8	5.0
2	5.0	-	2.0
3	2.4	-	-
4	0.4	-	-
With 2 ha coconuts			
Year 1	5.9	5.8	5.0
2	5.0	-	2.0
3	2.4	-	-
4	0.4	-	-
5	-	-	-
6	-	-	-
7	-	-	-
8	-	2.9	-
9	-	12.5	-
10	-	12.5	-
11	4.6	12.5	-
12 & onward	7.6	12.5	-
With 1 ha rubber			
Year 1	5.9	5.8	5.0
2	5.0	-	2.0
3	16.3	-	-
4	13.7	-	-
5	11.1	-	-
With 2 ha rubber			
Year 1	5.9	5.8	5.0
2	5.0	-	2.0
3	16.3	-	-
4	13.7	-	-
5	11.1	-	-
6	9.0	-	-
With 1 ha coconut & 1 ha rubber			
Year 1	5.9	5.8	5.0
2	5.0	-	2.0
3	7.9	-	-
4	5.9	-	-
5	3.3	-	-

on reserved land land for both Models 1 and 2 occur after full development yields are realized. When this labor shortage can be offset in the same manner as described above within the context of this analysis, it also raises questions as to the viability of developing reserve land with coconuts.

13. Farm Budget Analysis (Appendix 3). The results of the farm budget analysis for the three farm models are shown in Table 3. The results from the base 2.0 ha development are presented first, with the various projected farm development cropping plans (see para. 7) shown in sequence afterwards.

14. For the 2.0 ha initial cropping strategy models, both the mixed food crop model, and the coconut Model 2 have high per capita incomes during a settler's early years on site (years 1-5), while the rubber model has a negative per capita income during this time. Bearing in mind that these income figures are net of basic nutritional subsistence, the rubber model's income deficit raises the issue of whether the farmers have enough working capital to finance further farm development while at the same time providing for his family's basic human needs. This issue becomes more apparent when development of a farmer's reserve land is considered. In all cases, development of reserve land for the rubber model results in an income deficit during the early years of settlement after provision of nutritional subsistence to the farm family. It would thus appear that the farmer would be faced with either a trade-off between provision of subsistence for his family or developing his reserve land within a few years of arrival on site, or delaying development of reserve land until after his first ha or rubber begins to yield and provide surplus working capital. If faced with the latter choice, this would greatly decrease a farmer's expected income flow and could potentially make it difficult for a farmer to rise above a basic subsistence level.

Table 3: RESULTS OF FARM BUDGET ANALYSIS

	Model 1: Mixed Food Crops					Model 2: Perennial Crop (Coconut)					Model 3: Perennial Crop (Rubber)				
Years:	5	10	15	20	25	5	10	15	20	25	5	10	15	20	25
Base 2.0 ha															
Net per capita income Rp'000	45.9	60.0	60.0	60.0	60.0	60.3	113.5	113.5	113.5	113.5	(5.0)	69.9	100.7	122.7	96.3
US$	111	145	145	145	145	145	274	274	274	274	(12)	168	243	296	232
With 1.0 ha coconut															
Net per capita income Rp'000	38.5	93.5	133.2	133.2	133.2	60.3	147.3	161.0	161.0	161.0	(10.4)	101.3	196.3	168.3	141.9
US$	92	225	321	321	321	145	355	388	388	388	(25)	245	353	405	342
With 2.0 ha coconut															
Net per capita income Rp'000	38.5	93.0	226.5	230.5	230.5	54.9	144.6	209.8	207.0	207.0	(10.4)	101.3	193.7	216.2	191.6
US$	92	224	546	555	555	132	349	493	499	499	(25)	245	467	521	462
With 1.0 ha rubber															
Net per capita income Rp'000	25.3	66.1	137.2	166.0	176.3	43.2	118.4	191.7	220.5	230.0	(22.1)	74.0	178.6	229.4	213.3
US$	62	159	331	400	425	105	285	462	531	554	(53)	178	430	533	514
With 2.0 ha rubber															
Net per capita income Rp'000	25.7	50.6	173.9	249.4	285.7	43.5	112.6	235.6	311.1	347.4	(22.1)	65.2	221.2	318.7	328.5
US$	62	122	419	601	688	106	271	568	750	837	(53)	157	533	768	791
With 1.0 ha rubber & 1.0 ha coconut															
Net per capita income Rp'000	30.1	84.9	157.1	180.4	191.4	46.0	130.6	208.5	231.8	292.8	(20.3)	84.1	192.7	238.0	222.7
US$	72	205	578	935	462	111	315	502	559	585	(49)	203	464	574	537

14. With respect to full development farms income (approximately 15 years after arrival on site), the coconut and rubber models yield the highest per capita incomes both for the base 2.0 ha model and the various alternatives for possible full farm development cropping plans. However, all three farm models have net per capita incomes significantly above the absolute poverty level for Indonesia even after basic nutritional subsistence has been costed out of the income figures. This fact raises the question of additional crop production costs necessary for the coconut and rubber models to gain incremental income increases above per capita incomes for the food crop model. Table 4 shows an index number comparison of the above for the three models with all data for Model 1 used as the base for comparison (i.e., = 100)/1.

/1 With Model 1 data = 100, the following equation shows how the index numbers for the other models are derived:

$$\frac{\text{Model 2 (2.0 ha) income in year 5}}{\text{Model 1 (2.0 ha) income in year 5}} = \frac{60.3 \text{ '000 Rp}}{45.9 \text{ '000 Rp}} = 131$$

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15. The results of the index number analysis are most interesting. For the base 2.0 ha development, the incremental income gains from coconuts and rubber once the rubber model has developed past the first five years of a settler's time on a project site, are both higher than Model 1 (mixed food crops) relative to the incremental increases in crop production costs. The same is true for all phases of future farm development for the coconut model when compared to the food crop model; in all situations, incremental income gains more than offset incremental costs. In several cases, the production coss for the coconut model are actually less than the same for the food crop model.

Table 4: INDEX NUMBER COMPARISONS OF CROP PRODUCTION COSTS AND NET PER CAPITA FARM INCOMES

	Crop Production Costs			Net Per Capita Incomes		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Base 2.0 ha						
Year 5	100	102	101	100	131	(11)
15	100	119	143	100	189	168
25	100	119	131	100	189	160
With 1.0 ha coconut						
Year 5	100	100	99	100	158	(27)
15	100	103	128	100	121	110
25	100	103	121	100	121	107
With 2.0 ha coconut						
Year 5	100	100	99	100	143	(27)
15	100	97	99	100	90	86
25	100	97	96	100	90	83
With 1.0 ha rubber						
Year 5	100	90	90	100	169	(85)
15	100	105	117	100	140	130
25	100	108	112	100	130	121
With 2.0 ha rubber						
Year 5	100	90	90	100	169	(85)
15	100	86	96	100	136	127
25	100	87	93	100	122	115
With 1.0 ha rubber & 1.0 ha coconut						
Year 5	100	95	98	100	154	(68)
15	100	117	139	100	133	123
25	100	116	133	100	127	116

16. The comparison between the rubber and mixed food crop models is fairly even. Once the rubber model has passed the early years of settlement and is approaching full development, the cost/per capita income trade-off goes in favor of the rubber model for development of reserve land with rubber rather than coconuts and the mixed food crop model for development of coconuts and the coconut/rubber mix on reserve land rather than rubber.

17. An additional consideration for rubber models is the amount of estate labor required for successful farm development, particularly with rubber developed on the farmer's reserve land (see Table 5). The cost of the labor is naturally much higher than the same when rubber is developed on the food crop and coconut models, but the more important consideration is the skilled labor resource tied up in a rubber-oriented land settlement project. Considering that all of the farm models have projected incomes for above the absolute poverty at full development, it would appear that a land settlement project with either food crops or coconuts as the basic cropping strategy would still be able to provide farmers with rubber as a possible crop for reserve land. Both would still yield high incomes for farmers and free a fair amount of estate labor for other work that would yield high returns, especially in consideration of the scarcity of skilled labor in Indonesia.

Table 5: ADDITIONAL CROP PRODUCTION COSTS - HIRED ESTATE LABOR
(man-days)

	Model 1: Mixed Food Crops Model 2: Perennial Crop (Coconut)			Model 3: Perennial Crop /b (Rubber)		
	Foreman	Casual	Cost /a Rp'000	Foreman	Casual	Cost/a Rp'000
Base 2.0 ha						
Year 1	-	-	-	5.3	23.2	19.8
2	-	-	-	12.6	48.4	42.9
3	-	-	-	5.0	6.0	8.8
4	-	-	-	3.0	6.0	6.8
5	-	-	-	3.0	6.0	6.5
6	-	-	-	2.7	4.7	5.6
7	-	-	-	2.2	1.4	3.1
With 1.0 ha rubber						
Year 1	-	-	-	5.3	23.2	19.8
2	-	-	-	12.6	48.4	42.9
3	2.1	9.3	7.9	7.1	15.3	16.7
4	6.7	26.3	23.1	9.7	32.3	29.9
5	7.4	23.9	22.3	10.4	29.9	29.7
6	6.5	18.7	18.2	9.2	23.4	23.8
7	3.6	6.0	7.4	5.8	7.4	10.4
8	2.9	5.5	6.3	5.0	5.5	8.4
With 2.0 ha rubber						
Year 1	-	-	-	5.3	23.2	19.8
2	-	-	-	12.6	48.4	42.9
3	2.1	9.3	7.9	7.1	15.3	16.7
4	6.7	26.3	23.1	9.6	32.3	29.9
5	7.4	23.9	22.3	10.4	29.9	29.1
6	8.6	28.0	26.1	11.3	32.7	31.7
7	10.3	32.3	30.5	12.4	33.8	33.5
8	10.3	29.4	28.7	12.4	29.4	30.8
9	9.1	22.5	23.2	11.2	22.5	19.0
10	5.9	7.8	10.8	8.1	7.8	13.0
With 1.0 ha rubber & 1.0 ha coconut						
Year 1	-	-	-	5.3	23.2	19.8
2	-	-	-	12.6	48.4	42.9
3	1.1	4.6	4.0	6.1	10.6	12.7
4	3.6	14.3	12.5	6.6	20.3	19.3
5	4.6	15.5	14.3	7.6	21.5	21.0
6	5.2	16.7	15.6	7.9	21.4	21.3
7	5.8	17.9	17.0	8.0	19.4	20.1
8	5.3	14.2	14.2	7.4	14.2	16.3
9	3.2	4.8	6.2	5.3	4.8	8.3

/a Foreman a Rp 1,000/day, casual at Rp 625/day.
/b For the two future farm development coconut models, the estate labor requirements are the same as the base 2.0 model.

18. Results of Economic Analysis (Appendix 3). The results of the economic analysis are presented in Table 6. The base 2.0 ha models for food crops and coconuts (Models 1 and 2) both have satisfactory rates of return (16% and 21%, respectively), while the rate of return for the rubber model is a marginal 11%, reflecting the higher investment costs needed to establish rubber.

19. The rates of return and net present values for the future farm development options are all higher when coconuts or the rubber/coconut mix rather than rubber alone are developed on a farmer's reserve land. However, all of the farm models have rates of return that at the minimum are within the range considered as the acceptable cut-off rate for project in Indonesia.

Additional Considerations

20. The analysis recognized that there are an infinite number of cropping strategies that can be adopted for a land settlement project. The three farm models developed for this analysis have hopefully examined returns from three main cropping strategies, i.e. (i) food crops; (ii) rubber; (iii) other perennial crops (coffee, tea, coconuts, etc.) represented within the analysis by coconuts. Prior to presenting the conclusions of this annex, it would be useful to briefly discuss several aspects of the above theoretical models not previously examined in detail.

Table 6: RESULTS OF SIMULATED ECONOMIC ANALYSIS

	Rate of Return (%)									RP				
	Best Estimate	Benefits				Costs				Net Present Value				
		-20	-10	+10	+20	-20	-10	+10	+20	10%	12%	15%	17%	20%
Model 1: (Mixed Food Crops):														
Base 2.0 ha	16	11	14	18	21	22	19	14	12	1,035	600	123	(113)	(389)
1.0 ha coconuts	24	19	21	26	28	29	26	22	20	4,000	2,891	1,707	1,140	512
2.0 ha coconuts	26	22	24	28	30	31	28	24	22	6,013	4,384	2,677	1,874	1,002
1.0 ha rubber	17	13	15	19	21	21	19	15	14	2,012	1,207	370	(21)	(422)
2.0 ha rubber	18	14	16	19	21	22	20	16	15	2,760	1,705	633	146	(367)
1.0 ha rubber and 1.0 ha coconuts	21	17	19	23	25	26	23	20	18	4,400	3,027	1,606	947	240
Model 2: (Perennial Crop Coconut):														
Base 2.0 ha	21	17	20	23	25	26	24	20	18	3,138	2,222	1,232	750	208
1.0 ha coconuts	26	22	24	28	29	30	28	24	23	6,092	4,502	2,806	1,994	1,074
2.0 ha coconuts	28	24	26	29	31	32	29	26	24	3,109	5,998	3,778	2,730	1,586
1.0 ha rubber	21	17	19	23	24	25	23	18	18	4,112	2,828	1,479	843	150
2.0 ha rubber	21	18	19	23	24	25	23	20	18	4,869	3,333	1,748	1,014	230
1.0 ha rubber and 1.0 ha coconuts	24	20	22	26	27	28	26	22	21	6,528	4,672	2,735	1,827	346
Model 3: (Perennial Crop Rubber)														
Base 2.0 ha	11	8	9	12	13	14	12	10	8	265	(309)	(900)	(1,173)	(1,463)
1.0 ha coconuts	17	14	16	19	20	20	19	16	15	233	1,984	683	81	(568)
2.0 ha coconuts	20	22	21	18	17	23	21	18	17	5,246	3,477	165	815	(77)
1.0 ha rubber	14	11	12	15	16	16	15	12	11	1,507	555	(410)	(845)	(1,098)
2.0 ha rubber	15	12	13	16	17	17	16	13	12	2,253	1,050	(148)	(630)	(1,224)
1.0 ha rubber and 1.0 ha coconuts	17	15	16	18	20	20	19	16	15	3,921	2,397	845	139	(602)

21. Food Crops. Food crops can be described as a "low-cost" approach to land settlement. Food crops do not require as heavy an investment in establishment costs, planting materials, or physical inputs as do perennial crops, particularly rubber. However, food crops do require adequate and timely delivery of inputs to grow well in podzolic soils. Without these inputs (particularly fertilizer) food crops will have little or no return.

22. Rubber. Rubber can be described as a "low-risk, high cost" approach to land settlement. There is ample evidence that rubber grows well in podzolic soils. The constraint to using rubber as a base cropping strategy for land settlement is that it is very expensive, and can require a project to subsidize a farmer during his early years on a project site so that he is able to provide his family with minimum subsistence until his rubber begins to yield.

23. Other Perennial Crops. While the coconut model developed for this analysis yielded very good results with respect to the farm labor analysis, farm budget analysis, etc., there are several important additional considerations to be aware of in adopting other perennial crops as a base for a land settlement project. World Market demand projections, as presented in the most recent IBRD Commodity Forecast, are not as favorable for other perennial crops (tea, coffee, coconuts, etc.) as they are for rubber. The world demand for natural rubber is expected to increase in the future as the amount of oil available for production of synthetic rubbers decreases, and rubber thus has a rising projected world market price. It also does not compete with other

perennial crops in the manner coconut oil and palm oil do for a share of the world market, and thus is relatively more price inelastic. The same is not true of other perennial crops; world market price projections for them as of the latest commodity forecast show them decreasing in the future. In addition to the above, marketing of other perennial crops poses a problem. While they generally do not require as much processing as does rubber, there would not be much of a local market for them in the way these would be for food crops, and a reasonably sophisticated marketing arrangement would be needed very early in project to ensure transport to export markets.

Conclusions

24. The following conclusions have been drawn from the results of the theoretical farm model analysis with respect to the variables of comparison (see para 3):

(a) Farm Family Labor Analysis. None of the farm models have a severe labor shortage that would prevent the farmer from developing his land with respect to the initial cropping strategies developed. The food crop model does have a labor shortage in the early years on site when a farmer begins to develop his reserve land. This could delay on-farm development of reserve land, but is not a prohibitive problem for full farm development;

(b) Farm Budget Analysis. The results of the farm budget analysis appear to indicate the tradeoff of growing food crops or a perennial tree crop such as coconuts with the intent of having the farmer financing future farm development himself, or of subsidizing a farmer to grow rubber;

(c) Simulated Economic Analysis. The 2.0 ha rubber model is the only "base cropping strategy" model to have a marginal rate of return (11%). When future farm development is examined, all the farm models yield a reasonable rate of return. The low rate of return for rubber reflects the project investment costs necessary for establishing rubber; and

(d) Additional Considerations. Food crops are a "low cost" approach to land settlement; however they require efficient project management in order to ensure appropriate input distribution. If this is developed early in a project, when a farmer does develop his reserve land with perennial crops, efficient project management will greatly aid the marketing of perennial crops once they yield, countering the problems discussed in para. 23. In addition, because food crops are low cost, more settlers can benefit per project dollar, thus countering the problems discussed in para. 22.

25. Within the analysis of the theoretical models, it is difficult to choose which of the cropping strategies represented by the three models would be the most "suitable" cropping strategy to adopt for a land settlement project. While the rubber model required high per family investment costs, rubber is a valuable source of foreign exchange earnings for the Indonesian economy. Perennial crops such as coconuts have the same benefit; however, they are much more sensible to world market fluctuations than is rubber. Food crops, while being a high risk, are also very important when considering a major goal of GOI; that of achieving self-sufficiency in food production./1

/1 Indonesia, in 1977, imported approximately 3 million tons of food grains.

26. It is for the latter reason that this analysis favors the theoretical food crop model as a "base cropping strategy" for land settlement, considering that most farmers who are potential transmigrants are from the "bottom 40%", providing these people with an opportunity to become self-sufficient in food production as well as alleviating the current food deficit in Sumatra, would potentially help to alleviate the amount of food Indonesia presently imported, a significant savings for foreign exchange. In addition, if, as this analysis show, these farmers are able to develop reserve land through self-financing with perennial tree crops, these crops represent a potential low cost source of foreign exchange earnings.

27. The analysis recognizes in favor of that the same arguments made the food crop model could also be made for perennial tree crops such as coconuts. However, the combined effects of better than subsistence food production (as compared to subsistence food production for the coconuts model) to a significant segment of the botton 40% (directly reaching one of GOI's major goals) and the potential world market problems discussed in para. 23 have led to the food crop model approach being chosen rather than the "other perennial tree crop" model approach to land settlement cropping strategies.

28. For full farm development, the results indicate the farmer would probably be best off if reserve land was developed with the rubber/coconut mix. Developing two ha of coconuts puts some strain on family labor, and is also subject to the world market considerations of para. 23. Developing one ha of rubber raises farm incomes significantly and yields a good economic return, but developing a second ha of rubber on reserve land (as the results of the economic analysis shows - see Table 6) has almost no economic return at the margin. The rubber/coconut mix counters the above issues reasonably well, and is a reasonable cost means of developing a farmer's reserve land.

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INDONESIA

TRANSMIGRATION II

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Appendix 1: Farm Labor Analysis

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IA--FOODCROP, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	7.1	1.0	.9	.9	2.8	2.8	2.8	2.8	2.8
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	21.4	21.6	21.6	22.1	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	28.8	29.4	29.3	30.5	32.5	32.5	32.5	32.5	32.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	17.8	18.0	18.0	18.5	18.5	18.5	18.5	18.5	18.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.8	21.4	21.4	21.4	23.4	23.4	23.4	23.4	23.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	18.3	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	.0	19.9	22.4	18.4	18.4	20.4	20.4	20.4	20.4	20.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.3	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	25.0	26.1	25.5	25.5	27.5	27.5	27.5	27.5	27.5	27.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	35.8	36.1	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	4.1	2.4	.4	.0	.0	.0	.0	.0	.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	30.1	33.0	33.1	33.1	35.1	35.1	35.1	35.1	35.1	35.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.1	.9	.0	.0	.0	.0	.0	.0	.0	.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	21.1	18.4	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IA--FOODCROP, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	112.0	267.7	266.0	261.9	268.1	276.1	276.1	276.1	276.1	276.1
FAMILY LABOR CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	5.9	5.0	2.4	.4	.0	.0	.0	.0	.0	.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IA--FOODCROP, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4	23.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9	19.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IA--FOODCROP, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS									
	11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	276.1	276.1	276.1	276.1	276.1	276.1	276.1	276.1	276.1	276.1
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IA--FOODCROP, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	2.8	2.8	2.8	2.8	2.8
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	32.5	32.5	32.5	32.5	32.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	18.5	18.5	18.5	18.5	18.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	23.4	23.4	23.4	23.4	23.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	20.4	20.4	20.4	20.4	20.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	19.9	19.9	19.9	19.9	19.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	27.5	27.5	27.5	27.5	27.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	35.1	35.1	35.1	35.1	35.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	18.6	18.6	18.6	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IA--FOODCROP, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	276.1	276.1	276.1	276.1	276.1
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IB--FOODCROP, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	7.1	1.0	.9	.9	2.8	2.8	6.9	9.9	12.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	21.4	21.6	21.6	22.1	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	28.8	29.4	29.3	30.5	32.5	32.5	36.5	39.5	42.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	17.8	18.0	24.4	29.7	34.5	34.5	34.5	34.5	34.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.8	21.4	21.4	21.4	23.4	23.4	27.4	30.4	33.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	18.3	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	.0	19.9	22.4	18.4	18.4	20.4	20.4	24.4	27.4	30.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.3	19.9	26.3	31.1	35.9	35.9	35.9	35.9	35.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	25.0	26.1	25.5	25.5	27.5	27.5	31.5	34.5	37.5	37.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	35.8	36.1	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	4.1	2.4	.4	.0	.0	.0	.0	.0	.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	30.1	33.0	33.1	33.1	35.1	35.1	39.1	42.1	45.1	45.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.1	.9	.0	.0	.0	.0	.0	.0	.0	.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	21.1	18.4	31.0	27.9	27.9	18.6	18.6	18.6	18.6	18.6

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IB--FOODCROP, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	112.0	267.7	278.4	284.0	299.8	308.1	316.1	338.1	356.1	368.1
FAMILY LABOR CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	5.9	5.0	2.4	.4	.0	.0	.0	.0	.0	.0

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IB--FOODCROP, 1HA COCO
(IN MANDAY)

		CALENDAR YEARS								
	11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	33.4	33.4	33.4	33.4	33.4	33.4	33.4	33.4	33.4	33.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4	30.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9	35.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IB--FOODCROP, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS									
	11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	368.1	368.1	368.1	368.1	368.1	368.1	368.1	368.1	368.1	368.1
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IB--FOODCROP, 1HA COCO
(IN MANDAY)

		CALENDAR YEARS			
	21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	42.5	42.5	42.5	42.5	42.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	34.5	34.5	34.5	34.5	34.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	33.4	33.4	33.4	33.4	33.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	30.4	30.4	30.4	30.4	30.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	35.9	35.9	35.9	35.9	35.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	37.5	37.5	37.5	37.5	37.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	45.1	45.1	45.1	45.1	45.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	18.6	18.6	18.6	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IB--FOODCROP, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	368.1	368.1	368.1	368.1	368.1
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IC--FOODCROP, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	7.1	1.0	.9	.9	2.8	2.8	6.9	9.9	12.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	21.4	21.6	21.6	22.1	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	28.8	29.4	29.3	30.5	32.5	32.5	36.5	39.5	42.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	17.8	18.0	24.4	29.7	34.5	40.9	45.7	50.5	50.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	.0	.0	.0	.0	.0	.0	.0	.5	.5
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.8	21.4	21.4	21.4	23.4	23.4	27.4	30.4	33.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	18.3	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	.0	19.9	22.4	18.4	18.4	20.4	20.4	24.4	27.4	30.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.3	19.9	26.3	31.1	35.9	42.3	47.1	51.9	51.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	.0	.0	.0	.0	.0	.0	.0	1.9	1.9
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	25.0	26.1	25.5	25.5	27.5	27.5	31.5	34.5	37.5	41.5
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	35.8	36.1	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	4.1	2.4	.4	.0	.0	.0	.0	.0	.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	30.1	33.0	33.1	33.1	35.1	35.1	39.1	42.1	45.1	49.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.1	.9	.0	.0	.0	.0	.0	.0	.0	.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IC--FOODCROP, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	21.1	18.4	31.0	27.9	27.9	31.0	27.9	27.9	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	112.0	267.7	278.4	284.0	299.8	320.5	338.2	369.8	388.1	408.1
FAMILY LABOR CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	5.9	5.0	2.4	.4	.0	.0	.0	.0	2.4	2.4

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IC--FOODCROP, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	16.9	19.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	46.5	49.5	52.6	52.6	52.6	52.6	52.6	52.6	52.6	52.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
APR. REQUIRED LAB CASUAL/FAMILY LABOR	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5	50.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	37.4	40.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	34.4	37.4	40.4	40.4	40.4	40.4	40.4	40.4	40.4	40.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	51.9	51.9	51.9	51.9	51.9	51.9	51.9	51.9	51.9	51.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	44.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	52.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2	55.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	2.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IC--FOODCROP, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	430.1	448.1	460.1	460.1	460.1	460.1	460.1	460.1	460.1	460.1
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	4.6	7.6	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.1

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IC--FOODCROP, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	22.9	22.9	22.9	22.9	22.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	52.6	52.6	52.6	52.6	52.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	2.5	2.5	2.5	2.5	2.5
APR. REQUIRED LAB CASUAL/FAMILY LABOR	50.5	50.5	50.5	50.5	50.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.5	.5	.5	.5	.5
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	43.4	43.4	43.4	43.4	43.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	18.9	18.9	18.9	18.9	18.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	40.4	40.4	40.4	40.4	40.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	51.9	51.9	51.9	51.9	51.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	1.9	1.9	1.9	1.9	1.9
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	47.5	47.5	47.5	47.5	47.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	36.4	36.4	36.4	36.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	55.2	55.2	55.2	55.2	55.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.1	5.1	5.1	5.1	5.1

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IC--FOODCROP, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	18.6	18.6	18.6	18.6	18.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	460.1	460.1	460.1	460.1	460.1
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	10.1	10.1	10.1	10.1	10.1

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	7.1	1.0	9.3	10.8	13.7	8.2	6.5	6.1	5.7
ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	21.4	21.6	30.0	32.0	32.9	27.4	25.7	25.3	24.9
ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	28.8	29.4	37.7	40.5	43.4	37.9	36.2	35.8	35.4
ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	.0	.0	1.7	2.4	1.3	.0	.0	.0	.0
ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	17.8	18.0	26.4	28.4	29.3	23.9	22.2	21.8	21.3
ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.8	21.4	29.8	31.3	34.2	28.7	27.0	26.6	26.2
ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	18.3	18.9	27.3	28.8	29.7	24.2	22.5	22.1	21.7
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	19.9	22.4	26.8	28.3	31.2	25.8	24.1	23.7	23.2
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	20.3	19.9	28.3	29.8	30.7	25.3	23.6	23.2	22.7
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	25.0	26.1	34.0	35.5	38.4	32.9	31.2	30.8	30.4	30.0
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
		FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
		FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	35.8	36.1	44.8	46.3	47.2	41.7	40.0	39.6	39.2	38.8
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
		FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	5.8	4.1	10.8	10.3	9.2	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
		FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	30.1	33.0	41.5	43.0	46.0	40.5	38.8	38.4	38.0	37.6

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	.1	.9	7.5	7.0	8.0	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	21.1	18.4	27.0	28.5	29.4	24.0	22.3	21.9	21.4	21.1
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	112.0	267.7	299.6	368.7	390.5	384.0	333.7	318.4	313.5	308.6
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	18.7	6.0	5.5	3.8	1.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	6.5	3.6	2.9	2.6	2.3
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.9	5.0	18.3	19.0	19.9	1.3	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	18.7	6.0	5.5	3.8	1.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	6.5	3.6	2.9	2.6	2.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
TOTAL CROPPED AREA ; IN HECTARE		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	5.3	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	24.5	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2
	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	35.0	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	21.0	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7
	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	25.8	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5	25.5
	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	21.3	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	22.9	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6	22.6
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	22.4	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1	22.1
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7	29.7
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	304.7	302.3	302.3	302.3	302.3	302.3	302.3	302.3	302.3	302.3
	ESTATE LABOR	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	5.0	5.0	5.0	5.0	5.0
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	24.2	24.2	24.2	24.2	24.2
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	34.7	34.7	34.7	34.7	34.7
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	20.7	20.7	20.7	20.7	20.7
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	25.5	25.5	25.5	25.5	25.5
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	21.0	21.0	21.0	21.0	21.0
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	22.6	22.6	22.6	22.6	22.6
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	22.1	22.1	22.1	22.1	22.1

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
ID--FOODCROP, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS				
			21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	29.7	29.7	29.7	29.7	29.7
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	38.5	38.5	38.5	38.5	38.5
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	37.3	37.3	37.3	37.3	37.3
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	20.8	20.8	20.8	20.8	20.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	302.3	302.3	302.3	302.3	302.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS									
			01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	7.1	1.0	9.3	10.8	13.7	16.6	16.4	16.9	11.0
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	21.4	21.6	30.0	32.0	32.9	35.8	35.6	36.1	30.2
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	28.8	29.4	37.7	40.5	43.4	46.3	46.1	46.6	40.7
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	.0	.0	1.7	2.4	1.3	.3	.0	.0	.0
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	17.8	18.0	26.4	28.4	29.3	32.3	32.1	32.6	26.7
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	20.8	21.4	29.8	31.3	34.2	37.1	36.9	37.4	31.5
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	18.3	18.9	27.3	28.8	29.7	32.6	32.4	32.9	27.0
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	19.9	22.4	26.8	28.3	31.2	34.2	34.0	34.5	28.6
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	20.3	19.9	28.3	29.8	30.7	33.7	33.5	34.0	28.1
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	25.0	26.1	34.0	35.5	38.4	41.3	41.1	41.6	35.7	33.7
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	35.8	36.1	44.8	46.3	47.2	50.1	49.9	50.4	44.5	42.5
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	5.8	4.1	10.8	10.3	9.2	8.1	3.9	.4	.0	.0
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	30.1	33.0	41.5	43.0	46.0	48.9	48.7	49.2	43.3	41.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

		01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	.1	.9	7.5	7.0	8.0	6.9	2.7	.0	.0	.0
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	21.1	18.4	27.0	28.5	29.4	32.4	32.2	32.7	26.8	24.7
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	112.0	267.7	299.6	368.7	390.5	417.6	440.5	440.8	421.3	366.2
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	28.0	32.3	29.4	22.5	7.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	8.6	10.3	10.3	9.1	5.9
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.9	5.0	18.3	19.0	19.9	16.4	6.9	.4	.0	.0
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	28.0	32.3	29.4	22.5	7.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	8.6	10.3	10.3	9.1	5.9

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS								
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	9.0	8.3	7.9	7.5	7.2	7.2	7.2	7.2	7.2	7.2
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	28.2	27.5	27.1	26.7	26.4	26.4	26.4	26.4	26.4	26.4
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	38.7	38.0	37.6	37.2	36.9	36.9	36.9	36.9	36.9	36.9
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	24.6	23.9	23.5	23.2	22.9	22.9	22.9	22.9	22.9	22.9
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	29.5	28.8	28.4	28.0	27.7	27.7	27.7	27.7	27.7	27.7
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	25.0	24.3	23.9	23.5	23.2	23.2	23.2	23.2	23.2	23.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	26.5	25.8	25.4	25.1	24.8	24.8	24.8	24.8	24.8	24.8
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	26.0	25.3	24.9	24.6	24.3	24.3	24.3	24.3	24.3	24.3
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	33.0	32.6	32.2	31.9	31.9	31.9	31.9	31.9	31.9	31.9
		ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	41.8	41.4	41.0	40.7	40.7	40.7	40.7	40.7	40.7	40.7
		ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	40.6	40.2	39.8	39.5	39.5	39.5	39.5	39.5	39.5	39.5
		ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	24.0	23.6	23.3	23.0	23.0	23.0	23.0	23.0	23.0	23.0
	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	347.0	339.6	334.8	330.9	328.4	328.4	328.4	328.4	328.4	328.4
	ESTATE LABOR	5.9	3.8	1.8	.4	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	5.0	4.7	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.3
FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR	5.9	3.8	1.8	.4	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	5.0	4.7	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS		
	21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	7.2	7.2	7.2	7.2	7.2
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	26.4	26.4	26.4	26.4	26.4
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	36.9	36.9	36.9	36.9	36.9
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
APR. REQUIRED LAB CASUAL/FAMILY LABOR	22.9	22.9	22.9	22.9	22.9
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	27.7	27.7	27.7	27.7	27.7
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	23.2	23.2	23.2	23.2	23.2
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	24.8	24.8	24.8	24.8	24.8
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	24.3	24.3	24.3	24.3	24.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IE--FOODCROP, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS				
			21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	31.9	31.9	31.9	31.9	31.9
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	40.7	40.7	40.7	40.7	40.7
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	39.5	39.5	39.5	39.5	39.5
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	23.0	23.0	23.0	23.0	23.0
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	328.4	328.4	328.4	328.4	328.4
		FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.8	3.2	3.6	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	7.1	1.0	5.1	6.9	9.8	10.4	13.1	11.5	12.1
ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	21.4	21.6	25.8	28.1	29.0	29.6	30.3	26.7	25.3
ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	28.8	29.4	33.5	36.5	39.5	40.1	42.8	41.2	41.8
ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	17.8	18.0	25.4	30.9	35.0	38.9	42.7	39.2	37.8
ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	20.8	21.4	25.6	27.4	30.3	30.9	33.6	32.0	32.6
ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	18.3	18.9	23.1	24.9	25.8	26.4	27.1	23.5	22.1

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

WITH PROJECT

		01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	19.9	22.4	22.6	24.4	27.3	28.0	30.6	29.1	29.7
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	20.3	19.9	27.3	32.3	36.4	40.3	44.1	40.6	39.2
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	25.0	26.1	29.8	31.5	34.5	35.1	37.8	36.2	36.8	38.4
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	35.8	36.1	40.6	42.4	43.3	43.9	44.6	41.0	39.6	39.2
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	4.1	6.6	6.4	5.3	1.9	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	30.1	33.0	37.4	39.1	42.0	42.7	45.4	43.8	44.4	46.0
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	.1	.9	3.3	3.1	4.0	.7	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	21.1	18.4	29.0	30.8	31.7	32.4	33.0	23.3	21.9	21.4
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	112.0	267.7	289.0	332.1	362.7	386.9	405.3	408.5	386.6	385.8
	ESTATE LABOR	.0	.0	4.6	14.3	15.5	16.7	17.9	14.2	4.8	3.6
	FOREMAN LABOR	.0	.0	1.1	3.6	4.6	5.2	5.8	5.3	3.2	2.6
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.9	5.0	9.9	9.5	9.3	2.6	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	4.6	14.3	15.5	16.7	17.9	14.2	4.8	3.6
	FOREMAN LABOR	.0	.0	1.1	3.6	4.6	5.2	5.8	5.3	3.2	2.6

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS								
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	13.7	15.5	15.2	15.0	15.0	15.0	15.0	15.0	15.0	15.0
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	24.9	24.7	24.4	24.2	24.2	24.2	24.2	24.2	24.2	24.2
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	43.4	45.2	44.9	44.7	44.7	44.7	44.7	44.7	44.7	44.7
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	37.3	37.1	36.9	36.7	36.7	36.7	36.7	36.7	36.7	36.7
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	34.2	36.0	35.7	35.5	35.5	35.5	35.5	35.5	35.5	35.5
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	21.7	21.5	21.2	21.0	21.0	21.0	21.0	21.0	21.0	21.0

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

			11	12	13	14	15	16	17	18	19	20
			CALENDAR YEARS									
WITH PROJECT												
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	31.2	33.0	32.8	32.6	32.6	32.6	32.6	32.6	32.6	32.6
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	38.7	38.5	38.3	38.1	38.1	38.1	38.1	38.1	38.1	38.1
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	40.2	39.9	39.7	39.7	39.7	39.7	39.7	39.7	39.7	39.7
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	39.0	38.7	38.5	38.5	38.5	38.5	38.5	38.5	38.5	38.5
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	47.8	47.5	47.3	47.3	47.3	47.3	47.3	47.3	47.3	47.3
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS								
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	21.2	21.0	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	393.2	398.5	395.9	394.3	394.3	394.3	394.3	394.3	394.3	394.3
		ESTATE LABOR	2.4	1.2	.3	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	ESTATE LABOR	2.4	1.2	.3	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

				CALENDAR YEARS				
				21	22	23	24	25
WITH PROJECT								
TOTAL CROPPED AREA ; IN HECTARE				4.0	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR		15.0	15.0	15.0	15.0	15.0
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR		24.2	24.2	24.2	24.2	24.2
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR		44.7	44.7	44.7	44.7	44.7
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR		36.7	36.7	36.7	36.7	36.7
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR		35.5	35.5	35.5	35.5	35.5
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR		21.0	21.0	21.0	21.0	21.0
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR		32.6	32.6	32.6	32.6	32.6
		FOREMAN LABOR		.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR		.2	.2	.2	.2	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR		38.1	38.1	38.1	38.1	38.1

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IF--FOODCROP, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	39.7	39.7	39.7	39.7	39.7
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	38.5	38.5	38.5	38.5	38.5
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	47.3	47.3	47.3	47.3	47.3
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	20.8	20.8	20.8	20.8	20.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	394.3	394.3	394.3	394.3	394.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIA--COCONUT, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	2.3	.7	.6	.6	10.9	10.9	10.9	10.9	10.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	15.1	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	16.3	16.7	16.7	16.7	27.0	27.0	27.0	27.0	27.0
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	24.7	24.8	24.9	24.9	24.9	24.9	24.9	24.9	24.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	11.7	12.1	12.1	12.1	22.4	22.4	22.4	22.4	22.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	3.7	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	.0	5.5	6.8	4.4	4.4	14.7	14.7	14.7	14.7	14.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	.0	23.9	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	16.0	16.8	16.4	16.4	26.7	26.7	26.7	26.7	26.7	26.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.4	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	15.5	17.0	17.1	17.1	27.4	27.4	27.4	27.4	27.4	27.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	35.8	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIA--COCONUT, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS									
	01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	82.5	157.2	158.4	155.9	176.5	217.7	217.7	217.7	217.7	217.7
FAMILY LABOR CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIA--COCONUT, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS									
	11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9	10.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9	24.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7	14.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7	26.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4	27.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIA--COCONUT, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS									
	11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	217.7	217.7	217.7	217.7	217.7	217.7	217.7	217.7	217.7	217.7
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIA--COCONUT, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	10.9	10.9	10.9	10.9	10.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	27.0	27.0	27.0	27.0	27.0
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	24.9	24.9	24.9	24.9	24.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	22.4	22.4	22.4	22.4	22.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	14.7	14.7	14.7	14.7	14.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	23.6	23.6	23.6	23.6	23.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	26.7	26.7	26.7	26.7	26.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	27.4	27.4	27.4	27.4	27.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.2	5.2	5.2	5.2	5.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIA--COCONUT, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS				
	21	22	23	24	25
WITH PROJECT					
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	217.7	217.7	217.7	217.7	217.7
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIB--COCONUT, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	2.3	.7	.6	.6	10.9	10.9	14.9	17.9	20.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	15.1	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	16.3	16.7	16.7	16.7	27.0	27.0	31.0	34.0	37.0
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	24.7	24.8	31.3	36.1	40.9	40.9	40.9	40.9	40.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	11.7	12.1	12.1	12.1	22.4	22.4	26.4	29.4	32.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	3.7	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	.0	5.5	6.8	4.4	4.4	14.7	14.7	18.7	21.7	24.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	.0	23.9	23.6	30.0	34.8	39.6	39.6	39.6	39.6	39.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	16.0	16.8	16.4	16.4	26.7	26.7	30.7	33.7	36.7	36.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.4	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	15.5	17.0	17.1	17.1	27.4	27.4	31.4	34.4	37.4	37.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	35.8	5.1	17.6	14.5	14.5	5.2	5.2	5.2	5.2	5.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIB--COCONUT, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	82.5	157.2	170.8	178.0	208.2	249.7	257.7	279.7	297.7	309.7
FAMILY LABOR CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIB--COCONUT, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9	20.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9	40.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIB--COCONUT, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	309.7	309.7	309.7	309.7	309.7	309.7	309.7	309.7	309.7	309.7
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIB--COCONUT, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	20.9	20.9	20.9	20.9	20.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	37.0	37.0	37.0	37.0	37.0
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	40.9	40.9	40.9	40.9	40.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	32.4	32.4	32.4	32.4	32.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	24.7	24.7	24.7	24.7	24.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	39.6	39.6	39.6	39.6	39.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	36.7	36.7	36.7	36.7	36.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	37.4	37.4	37.4	37.4	37.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.2	5.2	5.2	5.2	5.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIB--COCONUT, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS				
	21	22	23	24	25
WITH PROJECT					
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	309.7	309.7	309.7	309.7	309.7
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIC--COCONUT, 2HA COCO
(IN MANDAY)

		CALENDAR YEARS								
	01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	2.3	.7	.6	.6	10.9	10.9	14.9	17.9	20.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	15.1	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	16.3	16.7	16.7	16.7	27.0	27.0	31.0	34.0	37.0
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	24.7	24.8	31.3	36.1	40.9	47.3	52.1	56.9	56.9
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	.0	.0	.0	.0	.0	1.3	2.1	6.9	6.9
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	11.7	12.1	12.1	12.1	22.4	22.4	26.4	29.4	32.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	3.7	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	.0	5.5	6.8	4.4	4.4	14.7	14.7	18.7	21.7	24.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	.0	23.9	23.6	30.0	34.8	39.6	46.0	50.8	55.6	55.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	.0	.0	.0	.0	.0	.0	.8	5.6	5.6
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	16.0	16.8	16.4	16.4	26.7	26.7	30.7	33.7	36.7	40.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.4	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	15.5	17.0	17.1	17.1	27.4	27.4	31.4	34.4	37.4	41.4
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	35.8	5.1	17.6	14.5	14.5	17.6	14.5	14.5	5.2	5.2

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIC--COCONUT, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	82.5	157.2	170.8	178.0	208.2	262.1	279.8	311.4	329.7	349.7
FAMILY LABOR CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	1.3	2.9	12.5	12.5

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIC--COCONUT, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	24.9	27.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9	30.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	41.0	44.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	56.9	56.9	56.9	56.9	56.9	56.9	56.9	56.9	56.9	56.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	36.4	39.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4	42.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	28.7	31.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7	34.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	55.6	55.6	55.6	55.6	55.6	55.6	55.6	55.6	55.6	55.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	43.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	44.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIC--COCONUT, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS									
	11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	371.7	389.7	401.7	401.7	401.7	401.7	401.7	401.7	401.7	401.7
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIC--COCONUT, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	30.9	30.9	30.9	30.9	30.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.2	15.2	15.2	15.2	15.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	47.0	47.0	47.0	47.0	47.0
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
APR. REQUIRED LAB CASUAL/FAMILY LABOR	56.9	56.9	56.9	56.9	56.9
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	6.9	6.9	6.9	6.9	6.9
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	42.4	42.4	42.4	42.4	42.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	4.1	4.1	4.1	4.1	4.1
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	34.7	34.7	34.7	34.7	34.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	55.6	55.6	55.6	55.6	55.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	5.6	5.6	5.6	5.6	5.6
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	46.7	46.7	46.7	46.7	46.7
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	15.6	15.6	15.6	15.6	15.6
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	47.4	47.4	47.4	47.4	47.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.2	5.2	5.2	5.2	5.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIC--COCONUT, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	401.7	401.7	401.7	401.7	401.7
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
HIRED LABOR CASUAL/FAMILY LABOR	12.5	12.5	12.5	12.5	12.5

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS								
			01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.4	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	2.3	.7	9.0	10.5	21.7	16.3	14.6	14.2	13.7
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	15.1	15.2	23.6	25.1	26.0	20.6	18.9	18.5	18.0
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	16.3	16.7	25.1	26.6	37.8	32.3	30.6	30.2	29.8
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	24.7	24.8	33.3	34.8	35.7	30.2	28.5	28.1	27.7
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	11.7	12.1	20.5	22.0	33.2	27.8	26.1	25.7	25.2
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	3.7	4.1	12.5	14.0	14.9	9.5	7.8	7.4	6.9

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
	FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
	FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	5.5	6.8	12.8	14.3	25.5	20.1	18.4	18.0	17.6
	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
	FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
	FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	23.9	23.6	32.0	33.5	34.4	29.0	27.3	26.9	26.5
	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
	FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2
	FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.3	.3	.2	.2
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	16.0	16.8	24.8	26.3	37.5	32.1	30.4	30.0	29.5	29.2
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	15.2	15.4	24.0	25.5	26.4	21.0	19.3	18.9	18.4	18.1
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	15.5	17.0	25.5	27.0	38.2	32.8	31.1	30.7	30.2	29.9
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
HIRED LABOR	CASUAL/FAMILY LABOR	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	35.8	5.1	13.6	15.1	16.0	10.6	8.9	8.5	8.0	7.7
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	.5	.5	.4	.2	.1
	FOREMAN LABOR	.0	.0	.5	.6	.6	.3	.3	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	82.5	157.2	192.0	262.7	298.9	325.6	275.3	260.0	255.1	250.2
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	18.7	6.0	5.5	3.8	1.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	6.5	3.6	2.9	2.6	2.3
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.2	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	18.7	6.0	5.5	3.8	1.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	6.5	3.6	2.9	2.6	2.3

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	13.4	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1	13.1
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	17.7	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4	17.4
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	29.4	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.1
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	27.3	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	24.9	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6	24.6
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	6.6	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.2	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9	16.9
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	26.1	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.8	25.8
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6	29.6
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS									
		11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	246.3	243.9	243.9	243.9	243.9	243.9	243.9	243.9	243.9	243.9
	ESTATE LABOR	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
TOTAL CROPPED AREA ; IN HECTARE		3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	13.1	13.1	13.1	13.1	13.1
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	17.4	17.4	17.4	17.4	17.4
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	29.1	29.1	29.1	29.1	29.1
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	27.0	27.0	27.0	27.0	27.0
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	24.6	24.6	24.6	24.6	24.6
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	6.3	6.3	6.3	6.3	6.3
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	16.9	16.9	16.9	16.9	16.9
	FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	25.8	25.8	25.8	25.8	25.8

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IID--COCONUT, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS				
			21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	28.9	28.9	28.9	28.9	28.9
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.8	17.8	17.8	17.8	17.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	29.6	29.6	29.6	29.6	29.6
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.4	7.4	7.4	7.4	7.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	243.9	243.9	243.9	243.9	243.9
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	2.3	.7	9.0	10.5	21.7	24.7	24.5	25.0	19.1
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	15.1	15.2	23.6	25.1	26.0	29.0	28.8	29.3	23.4
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	16.3	16.7	25.1	26.6	37.8	40.7	40.5	41.0	35.2
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	24.7	24.8	33.3	34.8	35.7	38.6	38.4	38.9	33.1
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	11.7	12.1	20.5	22.0	33.2	36.2	36.0	36.5	30.6
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	3.7	4.1	12.5	14.0	14.9	17.9	17.6	18.2	12.3

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS									
			01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	5.5	6.8	12.8	14.3	25.5	28.5	28.3	28.8	22.9
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	23.9	23.6	32.0	33.5	34.4	37.4	37.2	37.7	31.8
		ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7
		FOREMAN LABOR	.0	.0	.0	.5	.6	.6	.9	.8	.9	.5
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	16.0	16.8	24.8	26.3	37.5	40.5	40.3	40.8	34.9	32.9
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	15.2	15.4	24.0	25.5	26.4	29.4	29.2	29.7	23.8	21.7
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	15.5	17.0	25.5	27.0	38.2	41.2	41.0	41.5	35.6	33.6
		ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
		FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS									
		01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
HIRED LABOR	CASUAL/FAMILY LABOR	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	35.8	5.1	13.6	15.1	16.0	19.0	18.8	19.3	13.4	11.4
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	2.3	1.9	2.1	2.8	2.4	2.5	.7	.6
	FOREMAN LABOR	.0	.0	.5	.6	.6	.9	.8	.9	.5	.4
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	82.5	157.2	192.0	262.7	298.9	359.2	382.1	382.4	362.9	307.8
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	28.0	32.3	29.4	22.5	7.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	8.6	10.3	10.3	9.1	5.9
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.2	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	9.3	26.3	23.9	28.0	32.3	29.4	22.5	7.8
	FOREMAN LABOR	.0	.0	2.1	6.7	7.4	8.6	10.3	10.3	9.1	5.9

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	17.0	16.3	15.9	15.6	15.3	15.3	15.3	15.3	15.3	15.3
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	21.3	20.6	20.2	19.9	19.6	19.6	19.6	19.6	19.6	19.6
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	33.1	32.4	32.0	31.6	31.3	31.3	31.3	31.3	31.3	31.3
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
APR. REQUIRED LAB CASUAL/FAMILY LABOR	31.0	30.3	29.9	29.5	29.2	29.2	29.2	29.2	29.2	29.2
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	28.5	27.8	27.4	27.1	26.8	26.8	26.8	26.8	26.8	26.8
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	10.2	9.5	9.1	8.8	8.5	8.5	8.5	8.5	8.5	8.5

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	20.9	20.2	19.7	19.4	19.1	19.1	19.1	19.1	19.1	19.1
	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	29.8	29.1	28.6	28.3	28.0	28.0	28.0	28.0	28.0	28.0
	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	32.2	31.7	31.4	31.1	31.1	31.1	31.1	31.1	31.1	31.1
	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	21.0	20.6	20.3	20.0	20.0	20.0	20.0	20.0	20.0	20.0
	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	32.9	32.4	32.1	31.8	31.8	31.8	31.8	31.8	31.8	31.8
	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS								
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
HIRED LABOR	ESTATE LABOR		.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR		.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR		10.7	10.2	9.9	9.6	9.6	9.6	9.6	9.6	9.6	9.6
	ESTATE LABOR		.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR		.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR		50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR		.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR		.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR		288.6	281.2	276.4	272.5	270.0	270.0	270.0	270.0	270.0	270.0
	ESTATE LABOR		5.9	3.8	1.8	.4	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR		5.0	4.7	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.3
FAMILY LABOR	CASUAL/FAMILY LABOR		600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR		5.9	3.8	1.8	.4	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR		5.0	4.7	4.5	4.3	4.3	4.3	4.3	4.3	4.3	4.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	15.3	15.3	15.3	15.3	15.3
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	19.6	19.6	19.6	19.6	19.6
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	31.3	31.3	31.3	31.3	31.3
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
APR. REQUIRED LAB CASUAL/FAMILY LABOR	29.2	29.2	29.2	29.2	29.2
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	26.8	26.8	26.8	26.8	26.8
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	8.5	8.5	8.5	8.5	8.5
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	19.1	19.1	19.1	19.1	19.1
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	28.0	28.0	28.0	28.0	28.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIE--COCONUT, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS				
			21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	31.1	31.1	31.1	31.1	31.1
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	20.0	20.0	20.0	20.0	20.0
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	31.8	31.8	31.8	31.8	31.8
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	9.6	9.6	9.6	9.6	9.6
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	270.0	270.0	270.0	270.0	270.0
		FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS								
		01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
TOTAL CROPPED AREA ; IN HECTARE		2.0	2.4	2.8	3.2	3.6	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	2.3	.7	4.8	6.6	17.8	18.5	21.1	19.6	20.2
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	15.1	15.2	19.4	21.2	22.1	22.8	23.4	19.9	18.5
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	16.3	16.7	20.9	22.7	33.9	34.5	37.2	35.6	36.3
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	24.7	24.8	32.3	37.3	41.4	45.2	49.1	45.5	44.2
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	11.7	12.1	16.3	18.1	29.3	30.0	32.6	31.1	31.7
	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
	FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	3.7	4.1	8.3	10.1	11.0	11.7	12.3	8.8	7.4

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
		ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
		FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
		FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	5.5	6.8	8.6	10.4	21.6	22.3	25.0	23.4	24.0
		ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
		FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
		FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	23.9	23.6	31.0	36.0	40.1	44.0	47.9	44.3	42.9
		ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
		FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3
		FOREMAN LABOR	.0	.0	.0	.3	.4	.4	.5	.5	.3	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	16.0	16.8	20.6	22.4	33.6	34.3	36.9	35.4	36.0	37.5
		ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
		FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
		FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	15.2	15.4	19.8	21.6	22.5	23.2	23.8	20.3	18.9	18.4
		ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
		FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
		FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	15.5	17.0	21.3	23.1	34.3	35.0	37.6	36.1	36.7	38.2
		ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
		FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
HIRED LABOR	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	35.8	5.1	15.6	17.4	18.3	19.0	19.6	9.9	8.5	8.1
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	1.2	1.3	1.4	1.5	1.6	.4	.3	.2
	FOREMAN LABOR	.0	.0	.3	.4	.4	.5	.5	.3	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	82.5	157.2	181.4	226.1	271.1	328.5	346.9	350.1	328.2	327.4
	ESTATE LABOR	.0	.0	4.6	14.3	15.5	16.7	17.9	14.2	4.8	3.6
	FOREMAN LABOR	.0	.0	1.1	3.6	4.6	5.2	5.8	5.3	3.2	2.6
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	5.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	.0	4.6	14.3	15.5	16.7	17.9	14.2	4.8	3.6
	FOREMAN LABOR	.0	.0	1.1	3.6	4.6	5.2	5.8	5.3	3.2	2.6

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS									
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	21.7	23.5	23.3	23.1	23.1	23.1	23.1	23.1	23.1	23.1
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	18.0	17.8	17.6	17.4	17.4	17.4	17.4	17.4	17.4	17.4
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	37.8	39.6	39.3	39.1	39.1	39.1	39.1	39.1	39.1	39.1
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	43.7	43.5	43.2	43.0	43.0	43.0	43.0	43.0	43.0	43.0
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	33.2	35.0	34.8	34.6	34.6	34.6	34.6	34.6	34.6	34.6
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	6.9	6.7	6.5	6.3	6.3	6.3	6.3	6.3	6.3	6.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	25.6	27.3	27.1	26.9	26.9	26.9	26.9	26.9	26.9	26.9
ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	42.5	42.2	42.0	41.8	41.8	41.8	41.8	41.8	41.8	41.8
ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	39.3	39.1	38.9	38.9	38.9	38.9	38.9	38.9	38.9	38.9
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	18.2	18.0	17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	40.0	39.8	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

		CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	7.8	7.6	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	334.8	340.1	337.5	335.9	335.9	335.9	335.9	335.9	335.9	335.9
	ESTATE LABOR	2.4	1.2	.3	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR	2.4	1.2	.3	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	23.1	23.1	23.1	23.1	23.1
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	17.4	17.4	17.4	17.4	17.4
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	39.1	39.1	39.1	39.1	39.1
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	43.0	43.0	43.0	43.0	43.0
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	34.6	34.6	34.6	34.6	34.6
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	6.3	6.3	6.3	6.3	6.3
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	26.9	26.9	26.9	26.9	26.9
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	41.8	41.8	41.8	41.8	41.8

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIF--COCONUT, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	38.9	38.9	38.9	38.9	38.9
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.8	17.8	17.8	17.8	17.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	39.6	39.6	39.6	39.6	39.6
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.4	7.4	7.4	7.4	7.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	335.9	335.9	335.9	335.9	335.9
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

			CALENDAR YEARS								
			01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	22.3	9.2	4.7	3.5	4.1	4.0	3.0	3.0	3.0
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.6	19.6	15.1	14.0	14.0	13.9	12.9	12.9	12.9
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	34.0	22.2	17.7	16.7	17.3	17.2	16.2	16.2	16.2
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	27.8	15.9	11.4	10.3	10.3	10.2	9.1	9.1	9.1
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.4	19.5	15.0	13.8	14.4	14.3	13.3	13.3	13.3
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.3	14.4	9.9	8.7	8.7	8.6	7.6	7.6	7.6
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.0	14.5	9.2	8.0	8.6	8.5	7.5	7.5	7.5
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	30.9	18.8	14.3	13.1	13.1	13.0	12.0	12.0	12.0
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.7	17.1	15.9	16.5	16.4	15.4	15.4	15.4	15.4
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.6	17.1	15.9	15.9	15.8	14.8	14.8	14.8	14.8
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	32.0	20.6	16.1	14.9	15.5	15.4	14.4	14.4	14.4	14.4

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	25.6	12.1	7.6	6.4	6.4	6.3	5.3	5.3	5.3	5.3
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	124.6	306.1	192.0	150.3	142.4	144.4	139.5	131.3	131.3	131.3
	ESTATE LABOR	23.2	48.4	6.0	6.0	6.0	4.7	1.4	.0	.0	.0
	FOREMAN LABOR	5.3	12.6	5.0	3.0	3.0	2.7	2.2	2.2	2.2	2.2
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	9.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	23.2	48.4	6.0	6.0	6.0	4.7	1.4	.0	.0	.0
	FOREMAN LABOR	5.3	12.6	5.0	3.0	3.0	2.7	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP. REQUIRED LAB CASUAL/FAMILY LABOR	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT. REQUIRED LAB CASUAL/FAMILY LABOR	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV. REQUIRED LAB CASUAL/FAMILY LABOR	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC. REQUIRED LAB CASUAL/FAMILY LABOR	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR REQUIRED LAB CASUAL/FAMILY LABOR	131.3	131.3	131.3	131.3	131.3	131.3	131.3	131.3	131.3	131.3
FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
FAMILY LABOR CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.0	2.0	2.0	2.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	3.0	3.0	3.0	3.0	3.0
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	16.2	16.2	16.2	16.2	16.2
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	9.1	9.1	9.1	9.1	9.1
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	13.3	13.3	13.3	13.3	13.3
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	7.6	7.6	7.6	7.6	7.6
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	7.5	7.5	7.5	7.5	7.5
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	12.0	12.0	12.0	12.0	12.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIA--RUBBER, BASIC 2HA
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	15.4	15.4	15.4	15.4	15.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.8	14.8	14.8	14.8	14.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.4	14.4	14.4	14.4	14.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	5.3	5.3	5.3	5.3	5.3
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	131.3	131.3	131.3	131.3	131.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

			CALENDAR YEARS									
			01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.4	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	22.3	9.2	4.7	3.5	4.1	4.0	7.0	10.0	13.0
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.6	19.6	15.1	14.0	14.0	13.9	12.9	12.9	12.9
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	34.0	22.2	17.7	16.7	17.3	17.2	20.2	23.2	26.2
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	27.8	15.9	17.8	21.5	26.3	26.2	25.1	25.1	25.1
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.4	19.5	15.0	13.8	14.4	14.3	17.3	20.3	23.3
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.3	14.4	9.9	8.7	8.7	8.6	7.6	7.6	7.6
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.0	14.5	9.2	8.0	8.6	8.5	11.5	14.5	17.5
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	30.9	18.8	20.7	24.3	29.1	29.0	28.0	28.0	28.0
		ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
		FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.7	17.1	15.9	16.5	16.4	19.4	22.4	25.4	25.4
		ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
		FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
		FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.6	17.1	15.9	15.9	15.8	14.8	14.8	14.8	14.8
		ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
		FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
		FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	32.0	20.6	16.1	14.9	15.5	15.4	18.4	21.4	24.4	24.4

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	25.6	12.1	20.0	15.7	15.7	6.3	5.3	5.3	5.3	5.3
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	124.6	306.1	204.4	172.4	174.1	176.4	179.5	193.3	211.3	223.3
	ESTATE LABOR	23.2	48.4	6.0	6.0	6.0	4.7	1.4	.0	.0	.0
	FOREMAN LABOR	5.3	12.6	5.0	3.0	3.0	2.7	2.2	2.2	2.2	2.2
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	9.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	23.2	48.4	6.0	6.0	6.0	4.7	1.4	.0	.0	.0
	FOREMAN LABOR	5.3	12.6	5.0	3.0	3.0	2.7	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

		CALENDAR YEARS									
		11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
TOTAL CROPPED AREA ; IN HECTARE		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1	25.1
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3	23.3
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

			CALENDAR YEARS									
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	223.3	223.3	223.3	223.3	223.3	223.3	223.3	223.3	223.3	223.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	13.0	13.0	13.0	13.0	13.0
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	26.2	26.2	26.2	26.2	26.2
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	25.1	25.1	25.1	25.1	25.1
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	23.3	23.3	23.3	23.3	23.3
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	7.6	7.6	7.6	7.6	7.6
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	17.5	17.5	17.5	17.5	17.5
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	28.0	28.0	28.0	28.0	28.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIB--RUBBER, 1HA COCO
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	25.4	25.4	25.4	25.4	25.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.8	14.8	14.8	14.8	14.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	24.4	24.4	24.4	24.4	24.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	5.3	5.3	5.3	5.3	5.3
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	223.3	223.3	223.3	223.3	223.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

		CALENDAR YEARS									
		01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
TOTAL CROPPED AREA ; IN HECTARE		2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	22.3	9.2	4.7	3.5	4.1	4.0	7.0	10.0	13.0
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.6	19.6	15.1	14.0	14.0	13.9	12.9	12.9	12.9
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	34.0	22.2	17.7	16.7	17.3	17.2	20.2	23.2	26.2
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	27.8	15.9	17.8	21.5	26.3	32.6	36.3	41.1	41.1
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.4	19.5	15.0	13.8	14.4	14.3	17.3	20.3	23.3
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.3	14.4	9.9	8.7	8.7	8.6	7.6	7.6	7.6
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.0	14.5	9.2	8.0	8.6	8.5	11.5	14.5	17.5
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	30.9	18.8	20.7	24.3	29.1	35.4	39.2	44.0	44.0
	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	.5	.5	.5	.2	.0	.0	.0
	FOREMAN LABOR	.0	1.3	.5	.3	.3	.3	.2	.2	.2	.2
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.7	17.1	15.9	16.5	16.4	19.4	22.4	25.4	29.4
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.6	17.1	15.9	15.9	15.8	14.8	14.8	14.8	14.8
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	32.0	20.6	16.1	14.9	15.5	15.4	18.4	21.4	24.4	28.4

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	25.6	12.1	20.0	15.7	15.7	18.7	14.6	14.6	5.3	5.3
	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	5.8	.5	.5	.5	.5	.2	.0	.0	.0	.0
	FOREMAN LABOR	1.3	.5	.3	.3	.3	.2	.2	.2	.2	.2
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	124.6	306.1	204.4	172.4	174.1	188.8	201.6	225.0	243.3	263.3
	ESTATE LABOR	23.2	48.4	6.0	6.0	6.0	4.7	1.4	.0	.0	.0
	FOREMAN LABOR	5.3	12.6	5.0	3.0	3.0	2.7	2.2	2.2	2.2	2.2
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	9.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	23.2	48.4	6.0	6.0	6.0	4.7	1.4	.0	.0	.0
	FOREMAN LABOR	5.3	12.6	5.0	3.0	3.0	2.7	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	17.0	20.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	30.2	33.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2	36.2
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	41.1	41.1	41.1	41.1	41.1	41.1	41.1	41.1	41.1	41.1
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	27.3	30.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3	33.3
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	21.5	24.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5
FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

			CALENDAR YEARS									
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	32.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	31.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
		FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	285.3	303.3	315.3	315.3	315.3	315.3	315.3	315.3	315.3	315.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	23.0	23.0	23.0	23.0	23.0
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	12.9	12.9	12.9	12.9	12.9
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	36.2	36.2	36.2	36.2	36.2
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
APR. REQUIRED LAB CASUAL/FAMILY LABOR	41.1	41.1	41.1	41.1	41.1
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	33.3	33.3	33.3	33.3	33.3
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	7.6	7.6	7.6	7.6	7.6
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	27.5	27.5	27.5	27.5	27.5
FOREMAN LABOR	.2	.2	.2	.2	.2
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.2	.2	.2	.2	.2
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	44.0	44.0	44.0	44.0	44.0

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIC--RUBBER, 2HA COCO
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	35.4	35.4	35.4	35.4	35.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.8	14.8	14.8	14.8	14.8
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	34.4	34.4	34.4	34.4	34.4
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	5.3	5.3	5.3	5.3	5.3
		FOREMAN LABOR	.2	.2	.2	.2	.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.2	.2	.2	.2	.2
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	315.3	315.3	315.3	315.3	315.3
		FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	2.2	2.2	2.2	2.2	2.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.4	2.7	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	22.3	9.2	13.1	13.4	14.9	9.3	6.6	6.2	5.8
		ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.6	19.6	23.5	23.9	24.8	19.3	16.5	16.2	15.7
		ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	34.0	22.2	26.1	26.6	28.1	22.6	19.8	19.5	19.0
		ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	27.8	15.9	19.8	20.2	21.1	15.5	12.8	12.4	12.0
		ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.4	19.5	23.4	23.7	25.2	19.6	16.9	16.5	16.1
		ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
		FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS									
		01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.3	14.4	18.3	18.6	19.5	13.9	11.2	10.8	10.4
	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.0	14.5	17.6	17.9	19.4	13.9	11.2	10.8	10.3
	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	30.9	18.8	22.7	23.0	23.9	18.4	15.7	15.3	14.8
	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	.5	.4	.4	.4
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.7	25.5	25.8	27.3	21.8	19.0	18.7	18.2	17.9
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
	FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
	FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.6	25.5	25.8	26.7	21.2	18.5	18.1	17.6	17.3
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
	FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
	FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	32.0	20.6	24.5	24.8	26.3	20.8	18.0	17.7	17.2	16.9

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS									
			01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
		ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
		FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
		FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	25.6	12.1	16.0	16.3	17.2	11.7	9.0	8.6	8.1	7.8
		ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
		FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	.7	.5	.4	.2	.1
		FOREMAN LABOR	1.3	.5	.8	.8	.9	.5	.4	.4	.4	.4
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	124.6	306.1	225.6	257.1	264.8	252.3	197.1	173.7	168.7	163.9
		ESTATE LABOR	23.2	48.4	15.3	32.3	29.9	23.4	7.4	5.5	3.8	1.8
		FOREMAN LABOR	5.3	12.6	7.1	9.7	10.4	9.2	5.8	5.0	4.7	4.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
	HIRED LABOR	CASUAL/FAMILY LABOR	9.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	23.2	48.4	15.3	32.3	29.9	23.4	7.4	5.5	3.8	1.8
		FOREMAN LABOR	5.3	12.6	7.1	9.7	10.4	9.2	5.8	5.0	4.7	4.5

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	5.4	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.4	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1	15.1
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	18.7	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4	18.4
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
APR. REQUIRED LAB CASUAL/FAMILY LABOR	11.6	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	15.7	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4
ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	10.0	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS									
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	10.0	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	14.5	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2	14.2
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS									
		11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	159.9	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5	157.5
	ESTATE LABOR	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

		CALENDAR YEARS				
		21	22	23	24	25
WITH PROJECT						
TOTAL CROPPED AREA ; IN HECTARE		3.0	3.0	3.0	3.0	3.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	5.1	5.1	5.1	5.1	5.1
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	15.1	15.1	15.1	15.1	15.1
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	18.4	18.4	18.4	18.4	18.4
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	11.3	11.3	11.3	11.3	11.3
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	15.4	15.4	15.4	15.4	15.4
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	9.7	9.7	9.7	9.7	9.7
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	9.7	9.7	9.7	9.7	9.7
	FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	14.2	14.2	14.2	14.2	14.2

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIID--RUBBER, 1HA RUB
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.6	17.6	17.6	17.6	17.6
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.0	17.0	17.0	17.0	17.0
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	16.6	16.6	16.6	16.6	16.6
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.5	7.5	7.5	7.5	7.5
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	157.5	157.5	157.5	157.5	157.5
		FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	.0	22.3	9.2	13.1	13.4	14.9	17.7	16.5	17.0	11.1
ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	.0	31.6	19.6	23.5	23.9	24.8	27.7	26.5	27.0	21.1
ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	34.0	22.2	26.1	26.6	28.1	31.0	29.7	30.3	24.4
ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR CASUAL/FAMILY LABOR	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
APR. REQUIRED LAB CASUAL/FAMILY LABOR	.0	27.8	15.9	19.8	20.2	21.1	23.9	22.7	23.2	17.3
ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	.0	31.4	19.5	23.4	23.7	25.2	28.0	26.8	27.3	21.4
ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.3	14.4	18.3	18.6	19.5	22.3	21.1	21.6	15.7
	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.0	14.5	17.6	17.9	19.4	22.3	21.1	21.6	15.7
	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	.0	30.9	18.8	22.7	23.0	23.9	26.8	25.6	26.1	20.2
	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.0	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7
	FOREMAN LABOR	.0	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7
SEP. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.7	25.5	25.8	27.3	30.2	29.0	29.5	23.6	21.5
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
OCT. REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.6	25.5	25.8	26.7	29.6	28.4	28.9	23.0	20.9
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
NOV. REQUIRED LAB	CASUAL/FAMILY LABOR	32.0	20.6	24.5	24.8	26.3	29.2	28.0	28.5	22.6	20.5

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	25.6	12.1	16.0	16.3	17.2	20.1	18.9	19.4	13.5	11.4
	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	5.8	.5	2.8	2.4	2.6	3.0	2.4	2.5	.7	.6
	FOREMAN LABOR	1.3	.5	.8	.8	.9	1.0	1.0	1.1	.7	.6
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	124.6	306.1	225.6	257.1	264.8	285.9	303.9	296.1	276.6	221.5
	ESTATE LABOR	23.2	48.4	15.3	32.3	29.9	32.7	33.8	29.4	22.5	7.8
	FOREMAN LABOR	5.3	12.6	7.1	9.7	10.4	11.3	12.4	12.4	11.2	8.1
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	9.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	23.2	48.4	15.3	32.3	29.9	32.7	33.8	29.4	22.5	7.8
	FOREMAN LABOR	5.3	12.6	7.1	9.7	10.4	11.3	12.4	12.4	11.2	8.1

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
WITH PROJECT										
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	9.1	8.4	8.0	7.6	7.3	7.3	7.3	7.3	7.3	7.3
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	19.0	18.3	17.9	17.6	17.3	17.3	17.3	17.3	17.3	17.3
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	22.3	21.6	21.2	20.9	20.5	20.5	20.5	20.5	20.5	20.5
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
APR. REQUIRED LAB CASUAL/FAMILY LABOR	15.3	14.6	14.1	13.8	13.5	13.5	13.5	13.5	13.5	13.5
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	19.4	18.7	18.3	17.9	17.6	17.6	17.6	17.6	17.6	17.6
ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	13.7	13.0	12.6	12.2	11.9	11.9	11.9	11.9	11.9	11.9

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
PAGE OF

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS									
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	13.6	12.9	12.5	12.2	11.9	11.9	11.9	11.9	11.9	11.9
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	18.1	17.4	17.0	16.7	16.4	16.4	16.4	16.4	16.4	16.4
		ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.6	.4	.2	.1	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	20.8	20.4	20.1	19.8	19.8	19.8	19.8	19.8	19.8	19.8
		ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	20.2	19.8	19.5	19.2	19.2	19.2	19.2	19.2	19.2	19.2
		ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	19.8	19.4	19.1	18.8	18.8	18.8	18.8	18.8	18.8	18.8
		ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS									
		11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	10.7	10.3	10.0	9.7	9.7	9.7	9.7	9.7	9.7	9.7
	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.4	.2	.1	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	202.3	194.9	190.0	186.1	183.7	183.7	183.7	183.7	183.7	183.7
	ESTATE LABOR	5.9	3.8	1.8	.4	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	7.2	6.9	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5
FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
HIRED LABOR	ESTATE LABOR	5.9	3.8	1.8	.4	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	7.2	6.9	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

		CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
TOTAL CROPPED AREA ; IN HECTARE		4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	7.3	7.3	7.3	7.3	7.3
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	17.3	17.3	17.3	17.3	17.3
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	20.5	20.5	20.5	20.5	20.5
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	13.5	13.5	13.5	13.5	13.5
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	17.6	17.6	17.6	17.6	17.6
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	11.9	11.9	11.9	11.9	11.9
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
JUL. REQUIRED LAB	CASUAL/FAMILY LABOR	11.9	11.9	11.9	11.9	11.9
	FOREMAN LABOR	.5	.5	.5	.5	.5
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
AUG. REQUIRED LAB	CASUAL/FAMILY LABOR	16.4	16.4	16.4	16.4	16.4

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIE--RUBBER, 2HA RUB
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	19.8	19.8	19.8	19.8	19.8
		FOREMAN LABOR	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	19.2	19.2	19.2	19.2	19.2
		FOREMAN LABOR	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	18.8	18.8	18.8	18.8	18.8
		FOREMAN LABOR	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	9.7	9.7	9.7	9.7	9.7
		FOREMAN LABOR	.5	.5	.5	.5	.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.5	.5	.5	.5	.5
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	183.7	183.7	183.7	183.7	183.7
		FOREMAN LABOR	6.5	6.5	6.5	6.5	6.5
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	6.5	6.5	6.5	6.5	6.5

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
TOTAL CROPPED AREA ; IN HECTARE			2.0	2.4	2.8	3.2	3.6	4.0	4.0	4.0	4.0	4.0
JAN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	22.3	9.2	8.9	9.5	11.0	11.5	13.2	11.6	12.2
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
FEB.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.6	19.6	19.3	20.0	20.9	21.5	21.1	17.5	16.2
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
MAR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	34.0	22.2	21.9	22.7	24.2	24.8	26.4	24.8	25.5
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
APR.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	27.8	15.9	18.8	22.7	26.8	30.5	33.4	29.8	28.4
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
MAY.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	31.4	19.5	19.2	19.8	21.3	21.8	23.5	21.9	22.5
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT												
JUN.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.3	14.4	14.1	14.7	15.6	16.1	15.8	12.2	10.8
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	26.0	14.5	13.4	14.0	15.5	16.1	17.7	16.2	16.8
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	.0	30.9	18.8	21.7	25.5	29.6	33.4	36.2	32.7	31.3
		ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.0	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3
		FOREMAN LABOR	.0	1.3	.5	.5	.6	.7	.6	.7	.5	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.7	21.3	21.9	23.4	24.0	25.6	24.0	24.7	26.2
		ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
		FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
		FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	33.5	21.6	21.3	21.9	22.8	23.4	23.0	19.5	18.1	17.6
		ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
		FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
	HIRED LABOR	CASUAL/FAMILY LABOR	3.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
		ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
		FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	32.0	20.6	20.3	20.9	22.4	23.0	24.6	23.0	23.7	25.2

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

		CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
	ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
	FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	CASUAL/FAMILY LABOR	2.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
	FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
DEC. REQUIRED LAB	CASUAL/FAMILY LABOR	25.6	12.1	18.0	18.6	19.5	20.1	19.7	10.0	8.6	8.1
	ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
	FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	5.8	.5	1.7	1.8	1.9	1.6	1.6	.4	.3	.2
	FOREMAN LABOR	1.3	.5	.5	.6	.7	.6	.7	.5	.4	.4
YEAR REQUIRED LAB	CASUAL/FAMILY LABOR	124.6	306.1	215.0	220.5	237.0	255.2	268.7	263.7	241.8	241.0
	ESTATE LABOR	23.2	48.4	10.6	20.3	21.5	21.4	19.4	14.2	4.8	3.6
	FOREMAN LABOR	5.3	12.6	6.1	6.6	7.6	7.9	8.0	7.4	5.3	4.8
FAMILY LABOR	CASUAL/FAMILY LABOR	360.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0	600.0	600.0
HIRED LABOR	CASUAL/FAMILY LABOR	9.0	2.0	.0	.0	.0	.0	.0	.0	.0	.0
	ESTATE LABOR	23.2	48.4	10.6	20.3	21.5	21.4	19.4	14.2	4.8	3.6
	FOREMAN LABOR	5.3	12.6	6.1	6.6	7.6	7.9	8.0	7.4	5.3	4.8

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

		CALENDAR YEARS									
		11	12	13	14	15	16	17	18	19	20
WITH PROJECT											
TOTAL CROPPED AREA ; IN HECTARE		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB	CASUAL/FAMILY LABOR	13.8	15.6	15.3	15.1	15.1	15.1	15.1	15.1	15.1	15.1
	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FEB. REQUIRED LAB	CASUAL/FAMILY LABOR	15.7	15.5	15.3	15.1	15.1	15.1	15.1	15.1	15.1	15.1
	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAR. REQUIRED LAB	CASUAL/FAMILY LABOR	27.0	28.8	28.6	28.4	28.4	28.4	28.4	28.4	28.4	28.4
	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
APR. REQUIRED LAB	CASUAL/FAMILY LABOR	28.0	27.7	27.5	27.3	27.3	27.3	27.3	27.3	27.3	27.3
	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
MAY. REQUIRED LAB	CASUAL/FAMILY LABOR	24.1	25.9	25.6	25.4	25.4	25.4	25.4	25.4	25.4	25.4
	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
	FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUN. REQUIRED LAB	CASUAL/FAMILY LABOR	10.4	10.2	9.9	9.7	9.7	9.7	9.7	9.7	9.7	9.7

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

WITH PROJECT

			CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
JUL.	REQUIRED LAB	CASUAL/FAMILY LABOR	18.3	20.1	19.9	19.7	19.7	19.7	19.7	19.7	19.7	19.7
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
AUG.	REQUIRED LAB	CASUAL/FAMILY LABOR	30.8	30.6	30.4	30.2	30.2	30.2	30.2	30.2	30.2	30.2
		ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.2	.1	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	28.0	27.8	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.4	17.2	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	27.0	26.8	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0

INDONESIA--TRANSMIGRATION II FARM MODELS

MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS									
			11	12	13	14	15	16	17	18	19	20
WITH PROJECT												
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.9	7.7	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
		ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	ESTATE LABOR	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	248.4	253.7	251.1	249.5	249.5	249.5	249.5	249.5	249.5	249.5
		ESTATE LABOR	2.4	1.2	.3	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	4.6	4.4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	ESTATE LABOR	2.4	1.2	.3	.0	.0	.0	.0	.0	.0	.0
		FOREMAN LABOR	4.6	4.4	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
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MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT					
TOTAL CROPPED AREA ; IN HECTARE	4.0	4.0	4.0	4.0	4.0
JAN. REQUIRED LAB CASUAL/FAMILY LABOR	15.1	15.1	15.1	15.1	15.1
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
FEB. REQUIRED LAB CASUAL/FAMILY LABOR	15.1	15.1	15.1	15.1	15.1
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
MAR. REQUIRED LAB CASUAL/FAMILY LABOR	28.4	28.4	28.4	28.4	28.4
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
APR. REQUIRED LAB CASUAL/FAMILY LABOR	27.3	27.3	27.3	27.3	27.3
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
MAY. REQUIRED LAB CASUAL/FAMILY LABOR	25.4	25.4	25.4	25.4	25.4
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
JUN. REQUIRED LAB CASUAL/FAMILY LABOR	9.7	9.7	9.7	9.7	9.7
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
JUL. REQUIRED LAB CASUAL/FAMILY LABOR	19.7	19.7	19.7	19.7	19.7
FOREMAN LABOR	.4	.4	.4	.4	.4
FAMILY LABOR CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
HIRED LABOR FOREMAN LABOR	.4	.4	.4	.4	.4
AUG. REQUIRED LAB CASUAL/FAMILY LABOR	30.2	30.2	30.2	30.2	30.2

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
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MONTHLY LABOR REQUIREMENT BY SUB-AREA
IIIF--RUBBER, 2HA CO/RUB
(IN MANDAY)

			CALENDAR YEARS 21	22	23	24	25
WITH PROJECT							
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
SEP.	REQUIRED LAB	CASUAL/FAMILY LABOR	27.6	27.6	27.6	27.6	27.6
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
OCT.	REQUIRED LAB	CASUAL/FAMILY LABOR	17.0	17.0	17.0	17.0	17.0
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
NOV.	REQUIRED LAB	CASUAL/FAMILY LABOR	26.6	26.6	26.6	26.6	26.6
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
DEC.	REQUIRED LAB	CASUAL/FAMILY LABOR	7.5	7.5	7.5	7.5	7.5
		FOREMAN LABOR	.4	.4	.4	.4	.4
	FAMILY LABOR	CASUAL/FAMILY LABOR	50.0	50.0	50.0	50.0	50.0
	HIRED LABOR	FOREMAN LABOR	.4	.4	.4	.4	.4
YEAR	REQUIRED LAB	CASUAL/FAMILY LABOR	249.5	249.5	249.5	249.5	249.5
		FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3
	FAMILY LABOR	CASUAL/FAMILY LABOR	600.0	600.0	600.0	600.0	600.0
	HIRED LABOR	FOREMAN LABOR	4.3	4.3	4.3	4.3	4.3

C18700/J25632/D2224/A16

INDONESIA

TRANSMIGRATION II

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Appendix 2: Estimated Yields and Physical Input Use

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IA--FOODCROP, BASIC 2HA

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50
YIELD											
RICE	KG	.00	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	.0	4,000.0	5,000.0	5,500.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	.00	180.00	225.00	27.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	200.00	240.00	280.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	.0	.0	.0	.0	.0	1,600.0	2,240.0	2,800.0	3,200.0	3,200.0
PEPPER	KG	.00	.00	.00	.00	30.00	40.00	45.00	50.00	50.00	50.00
COCONUT	NUT	.0	.0	.0	.0	.0	990.0	1,276.0	1,496.0	1,760.0	1,760.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	175.00	153.00	153.00	153.00	153.00	153.00	153.00	153.00	153.00	153.00
TSP	KG	232.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
CASSAVA CUTTINGS	KG	625.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	12.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	22.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
PINEAPPLE TOPS	TOP	300.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IA--FOODCROP, BASIC 2HA

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
PEPPER CUTTINGS	KG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	112.00	267.65	266.00	261.85	268.10	276.10	276.10	276.10	276.10	276.10

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
TABLE
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PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IA--FOODCROP, BASIC 2HA

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50
YIELD											
RICE	KG	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	153.00	153.00	153.00	153.00	153.00	153.00	153.00	153.00	153.00	153.00
TSP	KG	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	276.10	276.10	276.10	276.10	276.10	276.10	276.10	276.10	276.10	276.10

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IA--FOODCROP, BASIC 2HA

	UNITS	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	127.50	127.50	127.50	127.50	127.50
YIELD						
RICE	KG	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS						
UREA	KG	153.00	153.00	153.00	153.00	153.00
TSP	KG	210.50	210.50	210.50	210.50	210.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	276.10	276.10	276.10	276.10	276.10

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IB--FOODCROP, 1HA COCO

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	106.25	109.26	108.33	118.33	118.33	118.33	118.33	118.33	118.33
YIELD											
RICE	KG	.00	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	.0	4,000.0	5,000.0	5,500.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	.00	180.00	225.00	27.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	200.00	240.00	280.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	.0	.0	.0	.0	.0	1,600.0	2,240.0	2,800.0	3,200.0	3,200.0
PEPPER	KG	.00	.00	.00	.00	30.00	40.00	45.00	50.00	50.00	50.00
COCONUT	NUT	0	0	0	0	0	990	1,276	5,456	9,834	14,542
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	175.00	153.00	237.00	256.00	286.00	253.00	253.00	253.00	253.00	253.00
TSP	KG	232.50	210.50	294.50	313.50	343.50	310.50	310.50	310.50	310.50	310.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
CASSAVA CUTTINGS	KG	625.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	12.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	22.00	.00	88.00	66.00	66.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
PINEAPPLE TOPS	TOP	300.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IB--FOODCROP, 1HA COCO

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
PEPPER CUTTINGS	KG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	112.00	267.65	278.40	283.95	299.80	308.10	316.10	338.10	356.10	368.10

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IB--FOODCROP, 1HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	118.33	118.33	118.33	118.33	118.33	118.33	118.33	118.33	118.33	118.33
YIELD											
RICE	KG	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	17,116	18,568	19,360	19,360	19,360	19,360	19,360	19,360	19,360	19,360
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00	253.00
TSP	KG	310.50	310.50	310.50	310.50	310.50	310.50	310.50	310.50	310.50	310.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	368.10	368.10	368.10	368.10	368.10	368.10	368.10	368.10	368.10	368.10

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IB--FOODCROP, 1HA COCO

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	118.33	118.33	118.33	118.33	118.33
YIELD						
RICE	KG	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	19,360	19,360	19,360	19,360	19,360
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS						
UREA	KG	253.00	253.00	253.00	253.00	253.00
TSP	KG	310.50	310.50	310.50	310.50	310.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	368.10	368.10	368.10	368.10	368.10

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IC--FOODCROP, 2HA COCO

		CALENDAR YEARS									
	UNITS	01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	106.25	109.26	108.33	104.41	106.76	106.25	113.75	113.75	113.75
YIELD											
RICE	KG	.00	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	.0	4,000.0	5,000.0	5,500.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	.00	180.00	225.00	27.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	200.00	240.00	280.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	.0	.0	.0	.0	.0	1,600.0	2,240.0	2,800.0	3,200.0	3,200.0
PEPPER	KG	.00	.00	.00	.00	30.00	40.00	45.00	50.00	50.00	50.00
COCONUT	NUT	0	0	0	0	0	990	1,276	5,456	9,834	14,542
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	175.00	153.00	237.00	256.00	286.00	337.00	356.00	386.00	353.00	353.00
TSP	KG	232.50	210.50	294.50	313.50	343.50	394.50	413.50	443.50	410.50	410.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
CASSAVA CUTTINGS	KG	625.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	12.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	22.00	.00	88.00	66.00	66.00	88.00	66.00	66.00	.00	.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
PINEAPPLE TOPS	TOP	300.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IC--FOODCROP, 2HA COCO

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
PEPPER CUTTINGS	KG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	112.00	267.65	278.40	283.95	299.80	320.50	338.20	369.80	388.10	408.10

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IC--FOODCROP, 2HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75
YIELD											
RICE	KG	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	21,076	26,642	32,142	34,716	36,168	36,960	36,960	36,960	36,960	36,960
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	353.00	353.00	353.00	353.00	353.00	353.00	353.00	353.00	353.00	353.00
TSP	KG	410.50	410.50	410.50	410.50	410.50	410.50	410.50	410.50	410.50	410.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	430.10	448.10	460.10	460.10	460.10	460.10	460.10	460.10	460.10	460.10

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IC--FOODCROP, 2HA COCO

	UNITS	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	113.75	113.75	113.75	113.75	113.75
YIELD						
RICE	KG	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	36,960	36,960	36,960	36,960	36,960
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS						
UREA	KG	353.00	353.00	353.00	353.00	353.00
TSP	KG	410.50	410.50	410.50	410.50	410.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	460.10	460.10	460.10	460.10	460.10

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
ID--FOODCROP, 1HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	106.25	109.26	108.33	118.33	118.33	118.33	118.33	118.33	118.33
YIELD											
RICE	KG	.00	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	.0	4,000.0	5,000.0	5,500.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	.00	180.00	225.00	27.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	200.00	240.00	280.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	.0	.0	.0	.0	.0	1,600.0	2,240.0	2,800.0	3,200.0	3,200.0
PEPPER	KG	.00	.00	.00	.00	30.00	40.00	45.00	50.00	50.00	50.00
COCONUT	NUT	.0	.0	.0	.0	.0	990.0	1,276.0	1,496.0	1,760.0	1,760.0
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	120.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	175.00	153.00	153.00	183.00	213.90	251.50	266.80	277.20	290.50	299.50
TSP	KG	232.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50
PHOSPHATE	KG	.00	.00	168.00	186.00	238.20	170.60	178.80	162.00	154.30	146.50
POTASH	KG	.00	.00	.00	30.00	60.90	98.50	113.80	124.20	137.50	146.50
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
CASSAVA CUTTINGS	KG	625.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	12.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	22.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
ID--FOODCROP, 1HA RUB

		CALENDAR YEARS									
	UNITS	01	02	03	04	05	06	07	08	09	10
PINEAPPLE TOPS	TOP	300.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	.00	.00	200.00	150.00	150.00	.00	.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	.00	.00	20.00	15.00	15.00	.00	.00	.00	.00	.00
DALAPON	LT	.00	.00	3.20	2.40	2.40	.00	.00	.00	.00	.00
ALANG 2 OIL	LT	.00	.00	.40	1.90	2.30	2.60	2.00	2.00	1.60	1.30
SOLAR	LT	.00	.00	12.00	57.00	69.00	78.00	60.00	60.00	48.00	39.00
2-4-5T (BUTYL ESTER)	LT	.00	.00	2.00	1.50	1.50	.00	.00	.00	.00	.00
CHAIN SAW HOURS	HR	.00	.00	64.00	48.00	48.00	.00	.00	.00	.00	.00
LINING PEGS	PEG	.00	.00	100.00	75.00	75.00	.00	.00	.00	.00	.00
KEROSENE	LT	.00	.00	10.00	7.50	7.50	.00	.00	.00	.00	.00
PJ	KG	.00	.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
CP	KG	.00	.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
CM	KG	.00	.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
KIESERITE	KG	.00	.00	.00	20.00	34.20	48.20	46.50	44.80	47.20	49.30
LABOR											
CASUAL/FAMILY LABOR	MANDAY	112.00	267.65	299.60	368.65	390.50	383.98	333.70	318.42	313.47	308.62
ESTATE LABOR	MANDAY	.00	.00	9.28	26.32	23.88	18.72	6.00	5.49	3.79	1.85
FOREMAN LABOR	MANDAY	.00	.00	2.13	6.65	7.39	6.49	3.60	2.89	2.58	2.33

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
ID--FOODCROP, 1HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	118.33	118.33	118.33	118.33	118.33	118.33	118.33	118.33	118.33	118.33
YIELD											
RICE	KG	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0
RUBBER	KG	290.0	560.0	750.0	890.0	955.0	1,025.0	1,090.0	1,155.0	1,215.0	1,282.5
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	307.00	307.00	307.00	307.00	307.00	307.00	307.00	307.00	307.00	307.00
TSP	KG	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
ID--FOODCROP, 1HA RUB

	UNITS	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
LABOR											
CASUAL/FAMILY LABOR	MANDAY	304.71	302.26	302.26	302.26	302.26	302.26	302.26	302.26	302.26	302.26
ESTATE LABOR	MANDAY	.43	.00	.00	.00	.00	.00	.00	.00	.00	.00
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
ID--FOODCROP, 1HA RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	118.33	118.33	118.33	118.33	118.33
YIELD						
RICE	KG	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0
RUBBER	KG	1,347.5	1,385.0	1,400.0	1,400.0	1,400.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS						
UREA	KG	307.00	307.00	307.00	307.00	307.00
TSP	KG	210.50	210.50	210.50	210.50	210.50
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
ID--FOODCROP, 1HA RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	302.26	302.26	302.26	302.26	302.26
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IE--FOODCROP, 2HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	106.25	109.26	108.33	104.41	106.76	106.25	113.75	113.75	113.75
YIELD											
RICE	KG	.00	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	.0	4,000.0	5,000.0	5,500.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	.00	180.00	225.00	27.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	200.00	240.00	280.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	.0	.0	.0	.0	.0	1,600.0	2,240.0	2,800.0	3,200.0	3,200.0
PEPPER	KG	.00	.00	.00	.00	30.00	40.00	45.00	50.00	50.00	50.00
COCONUT	NUT	.0	.0	.0	.0	.0	990.0	1,276.0	1,496.0	1,760.0	1,760.0
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	120.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	175.00	153.00	153.00	183.00	213.90	251.50	296.80	338.10	389.00	413.30
TSP	KG	232.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50
PHOSPHATE	KG	.00	.00	168.00	186.00	238.20	338.60	364.80	400.20	324.90	325.30
POTASH	KG	.00	.00	.00	30.00	60.90	98.50	143.80	185.10	236.00	260.30
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
CASSAVA CUTTINGS	KG	625.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	12.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	22.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IE--FOODCROP, 2HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
PINEAPPLE TOPS	TOP	300.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	.00	.00	200.00	150.00	150.00	200.00	150.00	150.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	.00	.00	20.00	15.00	15.00	20.00	15.00	15.00	.00	.00
DALAPON	LT	.00	.00	3.20	2.40	2.40	3.20	2.40	2.40	.00	.00
ALANG 2 OIL	LT	.00	.00	.40	1.90	2.30	3.00	3.90	4.30	4.20	3.30
SOLAR	LT	.00	.00	12.00	57.00	69.00	90.00	117.00	129.00	126.00	99.00
2-4-5T (BUTYL ESTER)	LT	.00	.00	2.00	1.50	1.50	2.00	1.50	1.50	.00	.00
CHAIN SAW HOURS	HR	.00	.00	64.00	48.00	48.00	64.00	48.00	48.00	.00	.00
LINING PEGS	PEG	.00	.00	100.00	75.00	75.00	100.00	75.00	75.00	.00	.00
KEROSENE	LT	.00	.00	10.00	7.50	7.50	10.00	7.50	7.50	.00	.00
PJ	KG	.00	.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
CP	KG	.00	.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
CM	KG	.00	.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
KIESERITE	KG	.00	.00	.00	20.00	34.20	48.20	66.50	79.00	95.40	95.80
LABOR											
CASUAL/FAMILY LABOR	MANDAY	112.00	267.65	299.60	368.65	390.50	417.58	440.50	440.82	421.35	366.22
ESTATE LABOR	MANDAY	.00	.00	9.28	26.32	23.88	28.00	32.32	29.37	22.51	7.85
FOREMAN LABOR	MANDAY	.00	.00	2.13	6.65	7.39	8.62	10.25	10.28	9.07	5.93

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

ANNEX
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PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IE--FOODCROP, 2HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75
YIELD											
RICE	KG	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0
RUBBER	KG	290.0	560.0	870.0	1,180.0	1,515.0	1,775.0	1,980.0	2,110.0	2,240.0	2,372.5
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	431.20	444.50	453.50	461.00	461.00	461.00	461.00	461.00	461.00	461.00
TSP	KG	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50	210.50
PHOSPHATE	KG	316.00	308.30	300.50	308.00	308.00	308.00	308.00	308.00	308.00	308.00
POTASH	KG	278.20	291.50	300.50	308.00	308.00	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
ALANG 2 OIL	LT	3.00	2.60	2.30	2.00	2.00	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	90.00	78.00	69.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	96.80	99.20	101.30	104.00	104.00	104.00	104.00	104.00	104.00	104.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IE--FOODCROP, 2HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
LABOR											
CASUAL/FAMILY LABOR	MANDAY	347.03	339.63	334.78	330.87	328.42	328.42	328.42	328.42	328.42	328.42
ESTATE LABOR	MANDAY	5.92	3.79	1.85	.43	.00	.00	.00	.00	.00	.00
FOREMAN LABOR	MANDAY	5.05	4.74	4.49	4.32	4.32	4.32	4.32	4.32	4.32	4.32

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IE--FOODCROP, 2HA RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	113.75	113.75	113.75	113.75	113.75
YIELD						
RICE	KG	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	1,760.0	1,760.0	1,760.0	1,760.0	1,760.0
RUBBER	KG	2,502.5	2,600.0	2,682.5	2,747.5	2,785.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS						
UREA	KG	461.00	461.00	461.00	461.00	461.00
TSP	KG	210.50	210.50	210.50	210.50	210.50
PHOSPHATE	KG	308.00	308.00	308.00	308.00	308.00
POTASH	KG	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00
ALANG 2 OIL	LT	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	104.00	104.00	104.00	104.00	104.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IE--FOODCROP, 2HA RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
LABOR						
CASUAL/FAMILY LABOR	MANDAY	328.42	328.42	328.42	328.42	328.42
FOREMAN LABOR	MANDAY	4.32	4.32	4.32	4.32	4.32

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IF--FOODCROP, 2HA CO/RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	127.50	106.25	105.36	104.69	104.17	103.75	113.75	113.75	113.75	113.75
YIELD											
RICE	KG	.00	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	.0	4,000.0	5,000.0	5,500.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	.00	180.00	225.00	27.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	200.00	240.00	280.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	.0	.0	.0	.0	.0	1,600.0	2,240.0	2,800.0	3,200.0	3,200.0
PEPPER	KG	.00	.00	.00	.00	30.00	40.00	45.00	50.00	50.00	50.00
COCONUT	NUT	.0	.0	.0	.0	.0	990.0	1,276.0	3,476.0	6,292.0	9,284.0
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	60.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	.00	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	175.00	153.00	195.00	230.00	269.20	312.80	357.60	361.40	377.20	388.80
TSP	KG	232.50	210.50	252.50	272.50	292.50	312.50	332.50	310.50	310.50	310.50
PHOSPHATE	KG	.00	.00	84.00	114.00	147.60	185.20	221.20	163.00	163.80	161.00
POTASH	KG	.00	.00	.00	15.00	34.20	57.80	82.60	108.40	124.20	135.80
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
CASSAVA CUTTINGS	KG	625.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	12.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	22.00	.00	44.00	44.00	44.00	44.00	44.00	.00	.00	.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IF--FOODCROP, 2HA CO/RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
PINEAPPLE TOPS	TOP	300.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	16.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	.00	.00	100.00	100.00	100.00	100.00	100.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	.00	.00	10.00	10.00	10.00	10.00	10.00	.00	.00	.00
DALAPON	LT	.00	.00	1.60	1.60	1.60	1.60	1.60	.00	.00	.00
ALANG 2 OIL	LT	.00	.00	.20	1.00	1.40	1.80	2.20	2.40	1.80	1.60
SOLAR	LT	.00	.00	6.00	30.00	42.00	54.00	66.00	72.00	54.00	48.00
2-4-5T (BUTYL ESTER)	LT	.00	.00	1.00	1.00	1.00	1.00	1.00	.00	.00	.00
CHAIN SAW HOURS	HR	.00	.00	32.00	32.00	32.00	32.00	32.00	.00	.00	.00
LINING PEGS	PEG	.00	.00	50.00	50.00	50.00	50.00	50.00	.00	.00	.00
KEROSENE	LT	.00	.00	5.00	5.00	5.00	5.00	5.00	.00	.00	.00
PJ	KG	.00	.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
CP	KG	.00	.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
CM	KG	.00	.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
KIESERITE	KG	.00	.00	.00	10.00	19.60	29.00	38.00	46.60	47.00	47.80
LABOR											
CASUAL/FAMILY LABOR	MANDAY	112.00	267.65	289.00	332.05	362.70	386.94	405.26	408.50	386.56	385.80
ESTATE LABOR	MANDAY	.00	.00	4.64	14.32	15.52	16.72	17.92	14.22	4.83	3.63
FOREMAN LABOR	MANDAY	.00	.00	1.06	3.59	4.59	5.19	5.79	5.27	3.18	2.61

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IF--FOODCROP, 2HA CO/RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75	113.75
YIELD											
RICE	KG	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	12,804	16,324	17,864	18,832	19,360	19,360	19,360	19,360	19,360	19,360
RUBBER	KG	160.0	320.0	500.0	690.0	830.0	950.0	1,020.0	1,080.0	1,145.0	1,215.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS											
UREA	KG	396.00	402.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00	407.00
TSP	KG	310.50	310.50	310.50	310.50	310.50	310.50	310.50	310.50	310.50	310.50
PHOSPHATE	KG	154.20	149.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	143.00	149.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
ALANG 2 OIL	LT	1.40	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	42.00	36.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	48.80	50.20	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IF--FOODCROP, 2HA CO/RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
LABOR											
CASUAL/FAMILY LABOR	MANDAY	393.19	398.50	395.89	394.26	394.26	394.26	394.26	394.26	394.26	394.26
ESTATE LABOR	MANDAY	2.43	1.23	.29	.00	.00	.00	.00	.00	.00	.00
FOREMAN LABOR	MANDAY	2.44	2.27	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IF--FOODCROP, 2HA CO/RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	113.75	113.75	113.75	113.75	113.75
YIELD						
RICE	KG	750.00	750.00	750.00	750.00	750.00
CASSAVA	KG	6,000.0	6,000.0	6,000.0	6,000.0	6,000.0
CORN (DRY)	KG	500.00	500.00	500.00	500.00	500.00
RICE BEAN (WET)	KG	150.00	150.00	150.00	150.00	150.00
MUNG BEAN (WET)	KG	90.00	90.00	90.00	90.00	90.00
GROUNDNUT	KG	300.00	300.00	300.00	300.00	300.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	500.00	500.00	500.00	500.00	500.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	310.00	310.00	310.00	310.00	310.00
CITRUS	FRUIT	3,200.0	3,200.0	3,200.0	3,200.0	3,200.0
PEPPER	KG	50.00	50.00	50.00	50.00	50.00
COCONUT	NUT	19,360	19,360	19,360	19,360	19,360
RUBBER	KG	1,275.0	1,325.0	1,365.0	1,390.0	1,400.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	90.00	90.00	90.00	90.00	90.00
RICE BEAN	KG	150.00	150.00	150.00	150.00	150.00
CORN	KG	500.00	500.00	500.00	500.00	500.00
MATERIAL INPUTS						
UREA	KG	407.00	407.00	407.00	407.00	407.00
TSP	KG	310.50	310.50	310.50	310.50	310.50
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	2.10	2.10	2.10	2.10	2.10
RICE SEED	KG	30.00	30.00	30.00	30.00	30.00
CORN SEED	KG	20.00	20.00	20.00	20.00	20.00
MUNG BEAN SEED	KG	2.25	2.25	2.25	2.25	2.25
RICE BEAN SEED	KG	6.00	6.00	6.00	6.00	6.00
GROUNDNUT SEED	KG	21.00	21.00	21.00	21.00	21.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IF--FOODCROP, 2HA CO/RUB

		CALENDAR YEARS				
	UNITS	21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	394.26	394.26	394.26	394.26	394.26
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIA--COCONUT, BASIC 2HA

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50
YIELD											
RICE	KG	.00	320.00	380.00	500.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	.0	1,600.0	2,000.0	2,200.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	.00	24.00	30.00	37.50	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	.00	135.00	180.00	240.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	120.00	144.00	168.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	480.00	672.00	840.00	960.00	960.00
COCONUT	NUT	0	0	0	0	0	9,900	12,760	14,960	17,600	17,600
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	294.60	182.80	182.80	182.80	182.80	182.80	182.80	182.80	182.80	182.80
TSP	KG	312.10	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
CASSAVA CUTTINGS	KG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	7.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	220.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PINEAPPLE TOPS	TOP	180.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	4.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	82.50	157.19	158.38	155.89	176.49	217.69	217.69	217.69	217.69	217.69

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIA--COCONUT, BASIC 2HA

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50	108.50
YIELD											
RICE	KG	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	182.80	182.80	182.80	182.80	182.80	182.80	182.80	182.80	182.80	182.80
TSP	KG	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	217.69	217.69	217.69	217.69	217.69	217.69	217.69	217.69	217.69	217.69

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIA--COCONUT, BASIC 2HA

	UNITS	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	108.50	108.50	108.50	108.50	108.50
YIELD						
RICE	KG	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	17,600	17,600	17,600	17,600	17,600
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS						
UREA	KG	182.80	182.80	182.80	182.80	182.80
TSP	KG	200.30	200.30	200.30	200.30	200.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	217.69	217.69	217.69	217.69	217.69

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIB--COCONUT, 1HA COCO

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	90.42	95.19	95.67	105.67	105.67	105.67	105.67	105.67	105.67
YIELD											
RICE	KG	.00	320.00	380.00	500.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	.0	1,600.0	2,000.0	2,200.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	.00	24.00	30.00	37.50	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	.00	135.00	180.00	240.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	120.00	144.00	168.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	480.00	672.00	840.00	960.00	960.00
COCONUT	NUT	0	0	0	0	0	9,900	12,760	18,920	25,674	30,382
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	294.60	182.80	266.80	285.80	315.80	282.80	282.80	282.80	282.80	282.80
TSP	KG	312.10	200.30	284.30	303.30	333.30	300.30	300.30	300.30	300.30	300.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
CASSAVA CUTTINGS	KG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	7.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	220.00	.00	88.00	66.00	66.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PINEAPPLE TOPS	TOP	180.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	4.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	82.50	157.19	170.78	177.99	208.19	249.69	257.69	279.69	297.69	309.69

INDONESIA

ANNEX
TABLE
PAGE OF

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIB--COCONUT, 1HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	105.67	105.67	105.67	105.67	105.67	105.67	105.67	105.67	105.67	105.67
YIELD											
RICE	KG	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	32,956	34,408	35,200	35,200	35,200	35,200	35,200	35,200	35,200	35,200
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	282.80	282.80	282.80	282.80	282.80	282.80	282.80	282.80	282.80	282.80
TSP	KG	300.30	300.30	300.30	300.30	300.30	300.30	300.30	300.30	300.30	300.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	309.69	309.69	309.69	309.69	309.69	309.69	309.69	309.69	309.69	309.69

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIB--COCONUT, 1HA COCO

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	105.67	105.67	105.67	105.67	105.67
YIELD						
RICE	KG	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	35,200	35,200	35,200	35,200	35,200
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS						
UREA	KG	282.80	282.80	282.80	282.80	282.80
TSP	KG	300.30	300.30	300.30	300.30	300.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	309.69	309.69	309.69	309.69	309.69

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIC--COCONUT, 2HA COCO

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	90.42	95.19	95.67	93.24	96.49	96.75	104.25	104.25	104.25
YIELD											
RICE	KG	.00	320.00	380.00	500.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	.0	1,600.0	2,000.0	2,200.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	.00	24.00	30.00	37.50	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	.00	135.00	180.00	240.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	120.00	144.00	168.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	480.00	672.00	840.00	960.00	960.00
COCONUT	NUT	0	0	0	0	0	9,900	12,760	18,920	25,674	30,382
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	294.60	182.80	266.80	285.80	315.80	366.80	385.80	415.80	382.80	382.80
TSP	KG	312.10	200.30	284.30	303.30	333.30	384.30	403.30	433.30	400.30	400.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
CASSAVA CUTTINGS	KG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	7.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	220.00	.00	88.00	66.00	66.00	88.00	66.00	66.00	.00	.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PINEAPPLE TOPS	TOP	180.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	4.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	82.50	157.19	170.78	177.99	208.19	262.09	279.79	311.39	329.69	349.69

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIC--COCONUT, 2HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25
YIELD											
RICE	KG	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	36,916	42,482	47,982	50,556	52,008	52,800	52,800	52,800	52,800	52,800
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	382.80	382.80	382.80	382.80	382.80	382.80	382.80	382.80	382.80	382.80
TSP	KG	400.30	400.30	400.30	400.30	400.30	400.30	400.30	400.30	400.30	400.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	371.69	389.69	401.69	401.69	401.69	401.69	401.69	401.69	401.69	401.69

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIC--COCONUT, 2HA COCO

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	104.25	104.25	104.25	104.25	104.25
YIELD						
RICE	KG	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	52,800	52,800	52,600	52,800	52,800
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS						
UREA	KG	382.80	382.80	382.80	382.80	382.80
TSP	KG	400.30	400.30	400.30	400.30	400.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	401.69	401.69	401.69	401.69	401.69

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IID--COCONUT, 1HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	90.42	95.19	95.67	105.67	105.67	105.67	105.67	105.67	105.67
YIELD											
RICE	KG	.00	320.00	380.00	500.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	.0	1,600.0	2,000.0	2,200.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	.00	24.00	30.00	37.50	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	.00	135.00	180.00	240.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	120.00	144.00	168.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	480.00	672.00	840.00	960.00	960.00
COCONUT	NUT	0	0	0	0	0	9,900	12,760	14,960	17,600	17,600
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	120.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	294.60	182.80	182.80	212.80	243.70	281.30	296.60	307.00	320.30	329.30
TSP	KG	312.10	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30
PHOSPHATE	KG	.00	.00	168.00	186.00	238.20	170.60	178.80	162.00	154.30	146.50
POTASH	KG	.00	.00	.00	30.00	60.90	98.50	113.80	124.20	137.50	146.50
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
CASSAVA CUTTINGS	KG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	7.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	220.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PINEAPPLE TOPS	TOP	180.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	4.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IID--COCONUT, 1HA RUB

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
RUBBER BUDDED STUMP	STUMP	.00	.00	200.00	150.00	150.00	.00	.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	.00	.00	20.00	15.00	15.00	.00	.00	.00	.00	.00
DALAPON	LT	.00	.00	3.20	2.40	2.40	.00	.00	.00	.00	.00
ALANG 2 OIL	LT	.00	.00	.40	1.90	2.30	2.60	2.00	2.00	1.60	1.30
SOLAR	LT	.00	.00	12.00	57.00	69.00	78.00	60.00	60.00	48.00	39.00
2-4-5T (BUTYL ESTER)	LT	.00	.00	2.00	1.50	1.50	.00	.00	.00	.00	.00
CHAIN SAW HOURS	HR	.00	.00	64.00	48.00	48.00	.00	.00	.00	.00	.00
LINING PEGS	PEG	.00	.00	100.00	75.00	75.00	.00	.00	.00	.00	.00
KEROSENE	LT	.00	.00	10.00	7.50	7.50	.00	.00	.00	.00	.00
PJ	KG	.00	.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
CP	KG	.00	.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
CM	KG	.00	.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
KIESERITE	KG	.00	.00	.00	20.00	34.20	48.20	46.50	44.80	47.20	49.30
LABOR											
CASUAL/FAMILY LABOR	MANDAY	82.50	157.19	191.98	262.69	298.89	325.57	275.29	260.01	255.06	250.21
ESTATE LABOR	MANDAY	.00	.00	9.28	26.32	23.88	18.72	6.00	5.49	3.79	1.85
FOREMAN LABOR	MANDAY	.00	.00	2.13	6.65	7.39	6.49	3.60	2.89	2.58	2.33

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IID--COCONUT, 1HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	105.67	105.67	105.67	105.67	105.67	105.67	105.67	105.67	105.67	105.67
YIELD											
RICE	KG	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600
RUBBER	KG	290.0	560.0	750.0	890.0	955.0	1,025.0	1,090.0	1,155.0	1,215.0	1,282.5
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	336.80	336.80	336.80	336.80	336.80	336.80	336.80	336.80	336.80	336.80
TSP	KG	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	246.30	243.85	243.85	243.85	243.85	243.85	243.85	243.85	243.85	243.85
ESTATE LABOR	MANDAY	.43	.00	.00	.00	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IID--COCONUT, 1HA RUB

		CALENDAR YEARS									
	UNITS	11	12	13	14	15	16	17	18	19	20
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IID--COCONUT, 1HA RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	105.67	105.67	105.67	105.67	105.67
YIELD						
RICE	KG	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	17,600	17,600	17,600	17,600	17,600
RUBBER	KG	1,347.5	1,385.0	1,400.0	1,400.0	1,400.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS						
UREA	KG	336.80	336.80	336.80	336.80	336.80
TSP	KG	200.30	200.30	200.30	200.30	200.30
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	243.85	243.85	243.85	243.85	243.85
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIE--COCONUT, 2HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	90.42	95.19	95.67	93.24	96.49	96.75	104.25	104.25	104.25
YIELD											
RICE	KG	.00	320.00	380.00	500.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	.0	1,600.0	2,000.0	2,200.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	.00	24.00	30.00	37.50	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	.00	135.00	180.00	240.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	120.00	144.00	168.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	480.00	672.00	840.00	960.00	960.00
COCONUT	NUT	0	0	0	0	0	9,900	12,760	14,960	17,600	17,600
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	120.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	294.60	182.80	182.80	212.80	243.70	281.30	326.60	367.90	418.80	443.10
TSP	KG	312.10	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30
PHOSPHATE	KG	.00	.00	168.00	186.00	238.20	338.60	364.80	400.20	324.90	325.30
POTASH	KG	.00	.00	.00	30.00	60.90	98.50	143.80	185.10	236.00	260.30
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
CASSAVA CUTTINGS	KG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	7.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	220.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PINEAPPLE TOPS	TOP	180.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	4.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIE--COCONUT, 2HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
RUBBER BUDDED STUMP	STUMP	.00	.00	200.00	150.00	150.00	200.00	150.00	150.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	.00	.00	20.00	15.00	15.00	20.00	15.00	15.00	.00	.00
DALAPON	LT	.00	.00	3.20	2.40	2.40	3.20	2.40	2.40	.00	.00
ALANG 2 OIL	LT	.00	.00	.40	1.90	2.30	3.00	3.90	4.30	4.20	3.30
SOLAR	LT	.00	.00	12.00	57.00	69.00	90.00	117.00	129.00	126.00	99.00
2-4-5T (BUTYL ESTER)	LT	.00	.00	2.00	1.50	1.50	2.00	1.50	1.50	.00	.00
CHAIN SAW HOURS	HR	.00	.00	64.00	48.00	48.00	64.00	48.00	48.00	.00	.00
LINING PEGS	PEG	.00	.00	100.00	75.00	75.00	100.00	75.00	75.00	.00	.00
KEROSENE	LT	.00	.00	10.00	7.50	7.50	10.00	7.50	7.50	.00	.00
PJ	KG	.00	.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
CP	KG	.00	.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
CM	KG	.00	.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
KIESERITE	KG	.00	.00	.00	20.00	34.20	48.20	66.50	79.00	95.40	95.80
LABOR											
CASUAL/FAMILY LABOR	MANDAY	82.50	157.19	191.98	262.69	298.89	359.17	382.09	382.41	362.94	307.81
ESTATE LABOR	MANDAY	.00	.00	9.28	26.32	23.88	28.00	32.32	29.37	22.51	7.85
FOREMAN LABOR	MANDAY	.00	.00	2.13	6.65	7.39	8.62	10.25	10.28	9.07	5.93

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIE--COCONUT, 2HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25
YIELD											
RICE	KG	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600	17,600
RUBBER	KG	290.0	560.0	870.0	1,180.0	1,515.0	1,775.0	1,980.0	2,110.0	2,240.0	2,372.5
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	461.00	474.30	483.30	490.80	490.80	490.80	490.80	490.80	490.80	490.80
TSP	KG	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30	200.30
PHOSPHATE	KG	316.00	308.30	300.50	308.00	308.00	308.00	308.00	308.00	308.00	308.00
POTASH	KG	278.20	291.50	300.50	308.00	308.00	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ALANG 2 OIL	LT	3.00	2.60	2.30	2.00	2.00	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	90.00	78.00	69.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	96.80	99.20	101.30	104.00	104.00	104.00	104.00	104.00	104.00	104.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	288.62	281.22	276.37	272.46	270.01	270.01	270.01	270.01	270.01	270.01
ESTATE LABOR	MANDAY	5.92	3.79	1.85	.43	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIE--COCONUT, 2HA RUB

	UNITS	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
FOREMAN LABOR	MANDAY	5.05	4.74	4.49	4.32	4.32	4.32	4.32	4.32	4.32	4.32

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIE--COCONUT, 2HA RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	104.25	104.25	104.25	104.25	104.25
YIELD						
RICE	KG	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	17,600	17,600	17,600	17,600	17,600
RUBBER	KG	2,502.5	2,600.0	2,682.5	2,747.5	2,785.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS						
UREA	KG	490.80	490.80	490.80	490.80	490.80
TSP	KG	200.30	200.30	200.30	200.30	200.30
PHOSPHATE	KG	308.00	308.00	308.00	308.00	308.00
POTASH	KG	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00
ALANG 2 OIL	LT	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	104.00	104.00	104.00	104.00	104.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	270.01	270.01	270.01	270.01	270.01
FOREMAN LABOR	MANDAY	4.32	4.32	4.32	4.32	4.32

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIF--COCONUT, 2HA CO/RUB

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	108.50	90.42	91.79	92.81	93.61	94.25	104.25	104.25	104.25	104.25
YIELD											
RICE	KG	.00	320.00	380.00	500.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	.0	1,600.0	2,000.0	2,200.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	.00	24.00	30.00	37.50	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	.00	135.00	180.00	240.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	.00	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	.00	.00	120.00	144.00	168.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	480.00	672.00	840.00	960.00	960.00
COCONUT	NUT	0	0	0	0	0	9,900	12,760	16,940	22,132	25,124
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	60.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	35.00	40.00	50.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	.00	60.00	75.00	85.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	.00	120.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	294.60	182.80	224.80	259.80	299.00	342.60	387.40	391.20	407.00	418.60
TSP	KG	312.10	200.30	242.30	262.30	282.30	302.30	322.30	300.30	300.30	300.30
PHOSPHATE	KG	.00	.00	84.00	114.00	147.60	185.20	221.20	163.00	163.80	161.00
POTASH	KG	.00	.00	.00	15.00	34.20	57.80	82.60	108.40	124.20	135.80
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
CASSAVA CUTTINGS	KG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	7.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	220.00	.00	44.00	44.00	44.00	44.00	44.00	.00	.00	.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PINEAPPLE TOPS	TOP	180.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	4.80	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIF--COCONUT, 2HA CO/RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
RUBBER BUDDED STUMP	STUMP	.00	.00	100.00	100.00	100.00	100.00	100.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	.00	.00	10.00	10.00	10.00	10.00	10.00	.00	.00	.00
DALAPON	LT	.00	.00	1.60	1.60	1.60	1.60	1.60	.00	.00	.00
ALANG 2 OIL	LT	.00	.00	.20	1.00	1.40	1.80	2.20	2.40	1.80	1.60
SOLAR	LT	.00	.00	6.00	30.00	42.00	54.00	66.00	72.00	54.00	48.00
2-4-5T (BUTYL ESTER)	LT	.00	.00	1.00	1.00	1.00	1.00	1.00	.00	.00	.00
CHAIN SAW HOURS	HR	.00	.00	32.00	32.00	32.00	32.00	32.00	.00	.00	.00
LINING PEGS	PEG	.00	.00	50.00	50.00	50.00	50.00	50.00	.00	.00	.00
KEROSENE	LT	.00	.00	5.00	5.00	5.00	5.00	5.00	.00	.00	.00
PJ	KG	.00	.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
CP	KG	.00	.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
CM	KG	.00	.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
KIESERITE	KG	.00	.00	.00	10.00	19.60	29.00	38.00	46.60	47.00	47.80
LABOR											
CASUAL/FAMILY LABOR	MANDAY	82.50	157.19	181.38	226.09	271.09	328.53	346.85	350.09	328.15	327.39
ESTATE LABOR	MANDAY	.00	.00	4.64	14.32	15.52	16.72	17.92	14.22	4.83	3.63
FOREMAN LABOR	MANDAY	.00	.00	1.06	3.59	4.59	5.19	5.79	5.27	3.18	2.61

INDONESIA

ANNEX
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INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIF--COCONUT, 2HA CO/RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
						CALENDAR YEARS					
WITH PROJECT											
CROPPING INTENSITY	PERCENT	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25	104.25
YIELD											
RICE	KG	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	28,644	32,164	33,704	34,672	35,200	35,200	35,200	35,200	35,200	35,200
RUBBER	KG	160.0	320.0	500.0	690.0	830.0	950.0	1,020.0	1,080.0	1,145.0	1,215.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS											
UREA	KG	425.80	431.80	436.80	436.80	436.80	436.80	436.80	436.80	436.80	436.80
TSP	KG	300.30	300.30	300.30	300.30	300.30	300.30	300.30	300.30	300.30	300.30
PHOSPHATE	KG	154.20	149.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	143.00	149.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
ALANG 2 OIL	LT	1.40	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	42.00	36.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	48.80	50.20	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	334.78	340.09	337.48	335.85	335.85	335.85	335.85	335.85	335.85	335.85
ESTATE LABOR	MANDAY	2.43	1.23	.29	.00	.00	.00	.00	.00	.00	.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIF--COCONUT, 2HA CO/RUB

	UNITS	CALENDAR YEARS 11	12	13	14	15	16	17	18	19	20
FOREMAN LABOR	MANDAY	2.44	2.27	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIF--COCONUT, 2HA CO/RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	104.25	104.25	104.25	104.25	104.25
YIELD						
RICE	KG	600.00	600.00	600.00	600.00	600.00
CASSAVA	KG	2,400.0	2,400.0	2,400.0	2,400.0	2,400.0
CORN (DRY)	KG	200.00	200.00	200.00	200.00	200.00
RICE BEAN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
MUNG BEAN (DRY)	KG	60.00	60.00	60.00	60.00	60.00
TOBACCO	KG	45.00	45.00	45.00	45.00	45.00
GINGER	KG	300.00	300.00	300.00	300.00	300.00
CHILLIES	KG	90.00	90.00	90.00	90.00	90.00
PINEAPPLES	FRUIT	186.00	186.00	186.00	186.00	186.00
CITRUS	FRUIT	960.00	960.00	960.00	960.00	960.00
COCONUT	NUT	35,200	35,200	35,200	35,200	35,200
RUBBER	KG	1,275.0	1,325.0	1,365.0	1,390.0	1,400.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	60.00	60.00	60.00	60.00	60.00
RICE BEAN	KG	100.00	100.00	100.00	100.00	100.00
CORN	KG	200.00	200.00	200.00	200.00	200.00
MATERIAL INPUTS						
UREA	KG	436.80	436.80	436.80	436.80	436.80
TSP	KG	300.30	300.30	300.30	300.30	300.30
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	1.14	1.14	1.14	1.14	1.14
RICE SEED	KG	24.00	24.00	24.00	24.00	24.00
CORN SEED	KG	8.00	8.00	8.00	8.00	8.00
MUNG BEAN SEED	KG	1.50	1.50	1.50	1.50	1.50
RICE BEAN SEED	KG	4.00	4.00	4.00	4.00	4.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00
LABOR						
CASUAL/FAMILY LABOR	MANDAY	335.85	335.85	335.85	335.85	335.85
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIA--RUBBER, BASIC 2HA

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	97.50	97.50	97.50	97.50	97.50	97.50	97.50	97.50	97.50
YIELD											
RICE	KG	.00	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	.0	2,000.0	2,500.0	2,750.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	.00	60.00	75.00	9.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	45.00	60.00	80.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	.00	10.00	12.50	16.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	.00	.00	40.00	48.00	56.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	160.00	224.00	280.00	320.00	320.00
PEPPER	KG	.00	.00	.00	.00	6.00	8.00	9.00	10.00	10.00	10.00
COCONUT	NUT	.00	.00	.00	.00	.00	495.00	638.00	748.00	880.00	880.00
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	300.00	500.00	800.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	67.20	135.10	156.10	178.10	184.10	189.10	214.10	214.10	214.10	214.10
TSP	KG	86.70	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	420.00	150.00	168.00	188.00	180.00	129.00	154.00	154.00	154.00	154.00
POTASH	KG	.00	75.00	96.00	118.00	124.00	129.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CASSAVA CUTTINGS	KG	312.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	2.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	11.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIA--RUBBER, BASIC 2HA

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
PINEAPPLE TOPS	TOP	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	1.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	500.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	50.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DALAPON	LT	8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALANG 2 OIL	LT	1.00	4.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	120.00	60.00	60.00	60.00	60.00	30.00	30.00	30.00	30.00
2-4-5T (BUTYL ESTER)	LT	5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHAIN SAW HOURS	HR	160.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LINING PEGS	PEG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
KEROSENE	LT	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PJ	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
CP	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
CM	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
KIESERITE	KG	.00	50.00	48.00	47.00	45.00	43.00	52.00	52.00	52.00	52.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	124.55	306.13	191.96	150.33	142.38	144.38	139.50	131.34	131.34	131.34
ESTATE LABOR	MANDAY	23.20	48.40	6.00	6.00	6.00	4.72	1.44	.00	.00	.00
FOREMAN LABOR	MANDAY	5.32	12.64	5.00	3.00	3.00	2.72	2.16	2.16	2.16	2.16

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIA--RUBBER, BASIC 2HA

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	97.50	97.50	97.50	97.50	97.50	97.50	97.50	97.50	97.50
YIELD											
RICE	KG	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00
RUBBER	KG	900.0	950.0	1,000.0	1,100.0	1,150.0	1,200.0	1,275.0	1,350.0	1,400.0	1,400.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	214.10	214.10	214.10	214.10	214.10	214.10	214.10	214.10	214.10	214.10
TSP	KG	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIA--RUBBER, BASIC 2HA

	UNITS	11	12	13	14	15	16	17	18	19	20
						CALENDAR YEARS					
LABOR											
CASUAL/FAMILY LABOR	MANDAY	131.34	131.34	131.34	131.34	131.34	131.34	131.34	131.34	131.34	131.34
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIA--RUBBER, BASIC 2HA

	UNITS	21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	97.50	97.50	97.50	97.50	97.50
YIELD						
RICE	KG	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	880.00	880.00	880.00	880.00	880.00
RUBBER	KG	1,400.0	1,400.0	1,400.0	1,300.0	1,100.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS						
UREA	KG	214.10	214.10	214.10	214.10	214.10
TSP	KG	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00

(Years 21–25 are CALENDAR YEARS.)

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIA--RUBBER, BASIC 2HA

	UNITS	CALENDAR YEARS 21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	131.34	131.34	131.34	131.34	131.34
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIB--RUBBER, 1HA COCO

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	81.25	87.04	88.33	98.33	98.33	98.33	98.33	98.33	98.33
YIELD											
RICE	KG	.00	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	.0	2,000.0	2,500.0	2,750.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	.00	60.00	75.00	9.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	45.00	60.00	80.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	.00	10.00	12.50	16.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	.00	.00	40.00	48.00	56.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	160.00	224.00	280.00	320.00	320.00
PEPPER	KG	.00	.00	.00	.00	6.00	8.00	9.00	10.00	10.00	10.00
COCONUT	NUT	0	0	0	0	0	495	638	4,708	8,954	13,662
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	300.00	500.00	800.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	67.20	135.10	240.10	281.10	317.10	289.10	314.10	314.10	314.10	314.10
TSP	KG	86.70	79.60	163.60	182.60	212.60	179.60	179.60	179.60	179.60	179.60
PHOSPHATE	KG	420.00	150.00	168.00	188.00	180.00	129.00	154.00	154.00	154.00	154.00
POTASH	KG	.00	75.00	96.00	118.00	124.00	129.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CASSAVA CUTTINGS	KG	312.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	2.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	11.00	.00	88.00	66.00	66.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIB--RUBBER, 1HA COCO

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
PINEAPPLE TOPS	TOP	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	1.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	500.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	50.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DALAPON	LT	8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALANG 2 OIL	LT	1.00	4.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	120.00	60.00	60.00	60.00	60.00	30.00	30.00	30.00	30.00
2-4-5T (BUTYL ESTER)	LT	5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHAIN SAW HOURS	HR	160.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LINING PEGS	PEG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
KEROSENE	LT	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PJ	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
CP	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
CM	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
KIESERITE	KG	.00	50.00	48.00	47.00	45.00	43.00	52.00	52.00	52.00	52.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	124.55	306.13	204.36	172.43	174.08	176.38	179.50	193.34	211.34	223.34
ESTATE LABOR	MANDAY	23.20	48.40	6.00	6.00	6.00	4.72	1.44	.00	.00	.00
FOREMAN LABOR	MANDAY	5.32	12.64	5.00	3.00	3.00	2.72	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIB--RUBBER, 1HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	98.33	98.33	98.33	98.33	98.33	98.33	98.33	98.33	98.33	98.33
YIELD											
RICE	KG	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	16,236	17,688	18,480	18,480	18,480	18,480	18,480	18,480	18,480	18,480
RUBBER	KG	900.0	950.0	1,000.0	1,100.0	1,150.0	1,200.0	1,275.0	1,350.0	1,400.0	1,400.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	314.10	314.10	314.10	314.10	314.10	314.10	314.10	314.10	314.10	314.10
TSP	KG	179.60	179.60	179.60	179.60	179.60	179.60	179.60	179.60	179.60	179.60
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIB--RUBBER, 1HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
LABOR											
CASUAL/FAMILY LABOR	MANDAY	223.34	223.34	223.34	223.34	223.34	223.34	223.34	223.34	223.34	223.34
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIB--RUBBER, 1HA COCO

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	98.33	98.33	98.33	98.33	98.33
YIELD						
RICE	KG	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	18,480	18,480	18,480	18,480	18,480
RUBBER	KG	1,400.0	1,400.0	1,400.0	1,300.0	1,100.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS						
UREA	KG	314.10	314.10	314.10	314.10	314.10
TSP	KG	179.60	179.60	179.60	179.60	179.60
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIB--RUBBER, 1HA COCO

	UNITS	CALENDAR YEARS 21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	223.34	223.34	223.34	223.34	223.34
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIC--RUBBER, 2HA COCO

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	81.25	87.04	88.33	86.76	90.54	91.25	98.75	98.75	98.75
YIELD											
RICE	KG	.00	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	.0	2,000.0	2,500.0	2,750.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	.00	60.00	75.00	9.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	45.00	60.00	80.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	.00	10.00	12.50	16.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	.00	.00	40.00	48.00	56.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	160.00	224.00	280.00	320.00	320.00
PEPPER	KG	.00	.00	.00	.00	6.00	8.00	9.00	10.00	10.00	10.00
COCONUT	NUT	0	0	0	0	0	495	638	4,708	8,954	13,662
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	300.00	500.00	800.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	67.20	135.10	240.10	281.10	317.10	373.10	417.10	447.10	414.10	414.10
TSP	KG	86.70	79.60	163.60	182.60	212.60	263.60	282.60	312.60	279.60	279.60
PHOSPHATE	KG	420.00	150.00	168.00	188.00	180.00	129.00	154.00	154.00	154.00	154.00
POTASH	KG	.00	75.00	96.00	118.00	124.00	129.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CASSAVA CUTTINGS	KG	312.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	2.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	11.00	.00	88.00	66.00	66.00	88.00	66.00	66.00	.00	.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIC--RUBBER, 2HA COCO

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
PINEAPPLE TOPS	TOP	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	1.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	500.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	50.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
DALAPON	LT	8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ALANG 2 OIL	LT	1.00	4.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	120.00	60.00	60.00	60.00	60.00	30.00	30.00	30.00	30.00
2-4-5T (BUTYL ESTER)	LT	5.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHAIN SAW HOURS	HR	160.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
LINING PEGS	PEG	250.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
KEROSENE	LT	25.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PJ	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
CP	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
CM	KG	.00	6.00	.00	.00	.00	.00	.00	.00	.00	.00
KIESERITE	KG	.00	50.00	48.00	47.00	45.00	43.00	52.00	52.00	52.00	52.00
LABOR											
CASUAL/FAMILY LABOR	MANDAY	124.55	306.13	204.36	172.43	174.08	188.78	201.60	225.04	243.34	263.34
ESTATE LABOR	MANDAY	23.20	48.40	6.00	6.00	6.00	4.72	1.44	.00	.00	.00
FOREMAN LABOR	MANDAY	5.32	12.64	5.00	3.00	3.00	2.72	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIC--RUBBER, 2HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75
YIELD											
RICE	KG	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	20,196	25,762	31,262	33,836	35,288	36,080	36,080	36,080	36,080	36,080
RUBBER	KG	900.0	950.0	1,000.0	1,100.0	1,150.0	1,200.0	1,275.0	1,350.0	1,400.0	1,400.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	414.10	414.10	414.10	414.10	414.10	414.10	414.10	414.10	414.10	414.10
TSP	KG	279.60	279.60	279.60	279.60	279.60	279.60	279.60	279.60	279.60	279.60
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIC--RUBBER, 2HA COCO

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
LABOR											
CASUAL/FAMILY LABOR	MANDAY	285.34	303.34	315.34	315.34	315.34	315.34	315.34	315.34	315.34	315.34
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIC--RUBBER, 2HA COCO

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	98.75	98.75	98.75	98.75	98.75
YIELD						
RICE	KG	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	36,080	36,080	36,080	36,080	36,080
RUBBER	KG	1,400.0	1,400.0	1,400.0	1,300.0	1,100.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS						
UREA	KG	414.10	414.10	414.10	414.10	414.10
TSP	KG	279.60	279.60	279.60	279.60	279.60
PHOSPHATE	KG	154.00	154.00	154.00	154.00	154.00
POTASH	KG	154.00	154.00	154.00	154.00	154.00
INSECTICIDE	LT	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	1.00	1.00	1.00	1.00	1.00
SOLAR	LT	30.00	30.00	30.00	30.00	30.00
KIESERITE	KG	52.00	52.00	52.00	52.00	52.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIC--RUBBER, 2HA COCO

		CALENDAR YEARS				
	UNITS	21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	315.34	315.34	315.34	315.34	315.34
FOREMAN LABOR	MANDAY	2.16	2.16	2.16	2.16	2.16

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIID--RUBBER, 1HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	81.25	87.04	88.33	98.33	98.33	98.33	98.33	98.33	98.33
YIELD											
RICE	KG	.00	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	.0	2,000.0	2,500.0	2,750.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	.00	60.00	75.00	9.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	45.00	60.00	80.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	.00	10.00	12.50	16.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	.00	.00	40.00	48.00	56.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	160.00	224.00	280.00	320.00	320.00
PEPPER	KG	.00	.00	.00	.00	6.00	8.00	9.00	10.00	10.00	10.00
COCONUT	NUT	.00	.00	.00	.00	.00	495.00	638.00	748.00	880.00	880.00
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	300.00	500.00	920.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	67.20	135.10	156.10	208.10	245.00	287.60	327.90	338.30	351.60	360.60
TSP	KG	86.70	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	420.00	150.00	336.00	374.00	418.20	299.60	332.80	316.00	308.30	300.50
POTASH	KG	.00	75.00	96.00	148.00	184.90	227.50	267.80	278.20	291.50	300.50
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CASSAVA CUTTINGS	KG	312.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	2.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	11.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIID--RUBBER, 1HA RUB

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
PINEAPPLE TOPS	TOP	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	1.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	500.00	.00	200.00	150.00	150.00	.00	.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	50.00	.00	20.00	15.00	15.00	.00	.00	.00	.00	.00
DALAPON	LT	8.00	.00	3.20	2.40	2.40	.00	.00	.00	.00	.00
ALANG 2 OIL	LT	1.00	4.00	2.40	3.90	4.30	4.60	3.00	3.00	2.60	2.30
SOLAR	LT	30.00	120.00	72.00	117.00	129.00	138.00	90.00	90.00	78.00	69.00
2-4-5T (BUTYL ESTER)	LT	5.00	.00	2.00	1.50	1.50	.00	.00	.00	.00	.00
CHAIN SAW HOURS	HR	160.00	.00	64.00	48.00	48.00	.00	.00	.00	.00	.00
LINING PEGS	PEG	250.00	.00	100.00	75.00	75.00	.00	.00	.00	.00	.00
KEROSENE	LT	25.00	.00	10.00	7.50	7.50	.00	.00	.00	.00	.00
PJ	KG	.00	6.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
CP	KG	.00	6.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
CM	KG	.00	6.00	.00	2.40	1.80	1.80	.00	.00	.00	.00
KIESERITE	KG	.00	50.00	48.00	67.00	79.20	91.20	98.50	96.80	99.20	101.30
LABOR											
CASUAL/FAMILY LABOR	MANDAY	124.55	306.13	225.56	257.13	264.78	252.26	197.10	173.66	168.71	163.86
ESTATE LABOR	MANDAY	23.20	48.40	15.28	32.32	29.88	23.44	7.44	5.49	3.79	1.85
FOREMAN LABOR	MANDAY	5.32	12.64	7.13	9.65	10.39	9.21	5.76	5.05	4.74	4.49

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIID--RUBBER, 1HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	98.33	98.33	98.33	98.33	98.33	98.33	98.33	98.33	98.33	98.33
YIELD											
RICE	KG	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00
RUBBER	KG	1,190.0	1,510.0	1,750.0	1,990.0	2,105.0	2,225.0	2,365.0	2,505.0	2,615.0	2,682.5
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	368.10	368.10	368.10	368.10	368.10	368.10	368.10	368.10	368.10	368.10
TSP	KG	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00
POTASH	KG	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIID--RUBBER, 1HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
LABOR											
CASUAL/FAMILY LABOR	MANDAY	159.95	157.50	157.50	157.50	157.50	157.50	157.50	157.50	157.50	157.50
ESTATE LABOR	MANDAY	.43	.00	.00	.00	.00	.00	.00	.00	.00	.00
FOREMAN LABOR	MANDAY	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIID--RUBBER, 1HA RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	98.33	98.33	98.33	98.33	98.33
YIELD						
RICE	KG	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	880.00	880.00	880.00	880.00	880.00
RUBBER	KG	2,747.5	2,785.0	2,800.0	2,700.0	2,500.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS						
UREA	KG	368.10	368.10	368.10	368.10	368.10
TSP	KG	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	308.00	308.00	308.00	308.00	308.00
POTASH	KG	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	104.00	104.00	104.00	104.00	104.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIID--RUBBER, 1HA RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	157.50	157.50	157.50	157.50	157.50
FOREMAN LABOR	MANDAY	4.32	4.32	4.32	4.32	4.32

INDONESIA

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIE--RUBBER, 2HA RUB

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	81.25	87.04	88.33	86.76	90.54	91.25	98.75	98.75	98.75
YIELD											
RICE	KG	.00	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	.0	2,000.0	2,500.0	2,750.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	.00	60.00	75.00	9.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	45.00	60.00	80.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	.00	10.00	12.50	16.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	.00	.00	40.00	48.00	56.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	160.00	224.00	280.00	320.00	320.00
PEPPER	KG	.00	.00	.00	.00	6.00	8.00	9.00	10.00	10.00	10.00
COCONUT	NUT	.00	.00	.00	.00	.00	495.00	638.00	748.00	880.00	880.00
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	300.00	500.00	920.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	67.20	135.10	156.10	208.10	245.00	287.60	357.90	399.20	450.10	474.40
TSP	KG	86.70	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	420.00	150.00	336.00	374.00	418.20	467.60	518.80	554.20	478.90	479.30
POTASH	KG	.00	75.00	96.00	148.00	184.90	227.50	297.80	339.10	390.00	414.30
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CASSAVA CUTTINGS	KG	312.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	2.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	11.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIE--RUBBER, 2HA RUB

	UNITS	01	02	03	04	05	06	07	08	09	10
		CALENDAR YEARS									
PINEAPPLE TOPS	TOP	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	1.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	500.00	.00	200.00	150.00	150.00	200.00	150.00	150.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	50.00	.00	20.00	15.00	15.00	20.00	15.00	15.00	.00	.00
DALAPON	LT	8.00	.00	3.20	2.40	2.40	3.20	2.40	2.40	.00	.00
ALANG 2 OIL	LT	1.00	4.00	2.40	3.90	4.30	5.00	4.90	5.30	5.20	4.30
SOLAR	LT	30.00	120.00	72.00	117.00	129.00	150.00	147.00	159.00	156.00	129.00
2-4-5T (BUTYL ESTER)	LT	5.00	.00	2.00	1.50	1.50	2.00	1.50	1.50	.00	.00
CHAIN SAW HOURS	HR	160.00	.00	64.00	48.00	48.00	64.00	48.00	48.00	.00	.00
LINING PEGS	PEG	250.00	.00	100.00	75.00	75.00	100.00	75.00	75.00	.00	.00
KEROSENE	LT	25.00	.00	10.00	7.50	7.50	10.00	7.50	7.50	.00	.00
PJ	KG	.00	6.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
CP	KG	.00	6.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
CM	KG	.00	6.00	.00	2.40	1.80	1.80	2.40	1.80	1.80	.00
KIESERITE	KG	.00	50.00	48.00	67.00	79.20	91.20	118.50	131.00	147.40	147.80
LABOR											
CASUAL/FAMILY LABOR	MANDAY	124.55	306.13	225.56	257.13	264.78	285.86	303.90	296.06	276.59	221.46
ESTATE LABOR	MANDAY	23.20	48.40	15.28	32.32	29.88	32.72	33.76	29.37	22.51	7.85
FOREMAN LABOR	MANDAY	5.32	12.64	7.13	9.65	10.39	11.34	12.41	12.44	11.23	8.09

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIE--RUBBER, 2HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75
YIELD											
RICE	KG	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00	880.00
RUBBER	KG	1,190.0	1,510.0	1,870.0	2,280.0	2,665.0	2,975.0	3,255.0	3,460.0	3,640.0	3,772.5
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	492.30	505.60	514.60	522.10	522.10	522.10	522.10	522.10	522.10	522.10
TSP	KG	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	470.00	462.30	454.50	462.00	462.00	462.00	462.00	462.00	462.00	462.00
POTASH	KG	432.20	445.50	454.50	462.00	462.00	462.00	462.00	462.00	462.00	462.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	4.00	3.60	3.30	3.00	3.00	3.00	3.00	3.00	3.00	3.00
SOLAR	LT	120.00	108.00	99.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
KIESERITE	KG	148.80	151.20	153.30	156.00	156.00	156.00	156.00	156.00	156.00	156.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIE--RUBBER, 2HA RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
LABOR											
CASUAL/FAMILY LABOR	MANDAY	202.27	194.87	190.02	186.11	183.66	183.66	183.66	183.66	183.66	183.66
ESTATE LABOR	MANDAY	5.92	3.79	1.85	.43	.00	.00	.00	.00	.00	.00
FOREMAN LABOR	MANDAY	7.21	6.90	6.65	6.48	6.48	6.48	6.48	6.48	6.48	6.48

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIE--RUBBER, 2HA RUB

	UNITS	21	22	23	24	25
		CALENDAR YEARS				
WITH PROJECT						
CROPPING INTENSITY	PERCENT	98.75	98.75	98.75	98.75	98.75
YIELD						
RICE	KG	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	880.00	880.00	880.00	880.00	880.00
RUBBER	KG	3,902.5	4,000.0	4,082.5	4,047.5	3,885.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS						
UREA	KG	522.10	522.10	522.10	522.10	522.10
TSP	KG	79.60	79.60	79.60	79.60	79.60
PHOSPHATE	KG	462.00	462.00	462.00	462.00	462.00
POTASH	KG	462.00	462.00	462.00	462.00	462.00
INSECTICIDE	LT	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	3.00	3.00	3.00	3.00	3.00
SOLAR	LT	90.00	90.00	90.00	90.00	90.00
KIESERITE	KG	156.00	156.00	156.00	156.00	156.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIE--RUBBER, 2HA RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	183.66	183.66	183.66	183.66	183.66
FOREMAN LABOR	MANDAY	6.48	6.48	6.48	6.48	6.48

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIF--RUBBER, 2HA CO/RUB

	UNITS	CALENDAR YEARS 01	02	03	04	05	06	07	08	09	10
WITH PROJECT											
CROPPING INTENSITY	PERCENT	97.50	81.25	83.93	85.94	87.50	88.75	98.75	98.75	98.75	98.75
YIELD											
RICE	KG	.00	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	.0	2,000.0	2,500.0	2,750.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	.00	60.00	75.00	9.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	.00	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	.00	45.00	60.00	80.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	.00	10.00	12.50	16.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	.00	.00	40.00	48.00	56.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	.00	.00	.00	.00	.00	160.00	224.00	280.00	320.00	320.00
PEPPER	KG	.00	.00	.00	.00	6.00	8.00	9.00	10.00	10.00	10.00
COCONUT	NUT	.0	.0	.0	.0	.0	495.0	638.0	2,728.0	5,412.0	8,404.0
RUBBER	KG	.00	.00	.00	.00	.00	.00	.00	300.00	500.00	860.00
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	.00	17.50	20.00	25.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	.00	30.00	37.50	42.50	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	.00	60.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	67.20	135.10	198.10	255.10	300.30	348.90	418.70	422.50	438.30	449.90
TSP	KG	86.70	79.60	121.60	141.60	161.60	181.60	201.60	179.60	179.60	179.60
PHOSPHATE	KG	420.00	150.00	252.00	302.00	327.60	314.20	375.20	317.00	317.80	315.00
POTASH	KG	.00	75.00	96.00	133.00	158.20	186.80	236.60	262.40	278.20	289.80
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
CASSAVA CUTTINGS	KG	312.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
CHILLIES SEED	KG	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00
GINGER SEED	KG	2.50	.00	.00	.00	.00	.00	.00	.00	.00	.00
COCONUT SEEDLINGS	SEEDLING	11.00	.00	44.00	44.00	44.00	44.00	44.00	.00	.00	.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIF--RUBBER, 2HA CO/RUB

		CALENDAR YEARS									
	UNITS	01	02	03	04	05	06	07	08	09	10
PINEAPPLE TOPS	TOP	60.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
CITRUS SEEDLINGS	SEEDLING	1.60	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOBACCO SEED	KG	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
PEPPER CUTTINGS	KG	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
RUBBER BUDDED STUMP	STUMP	500.00	.00	100.00	100.00	100.00	100.00	100.00	.00	.00	.00
RUBBER POLYBAG STUMP	STUMP	50.00	.00	10.00	10.00	10.00	10.00	10.00	.00	.00	.00
DALAPON	LT	8.00	.00	1.60	1.60	1.60	1.60	1.60	.00	.00	.00
ALANG 2 OIL	LT	1.00	4.00	2.20	3.00	3.40	3.80	3.20	3.40	2.80	2.60
SOLAR	LT	30.00	120.00	66.00	90.00	102.00	114.00	96.00	102.00	84.00	78.00
2-4-5T (BUTYL ESTER)	LT	5.00	.00	1.00	1.00	1.00	1.00	1.00	.00	.00	.00
CHAIN SAW HOURS	HR	160.00	.00	32.00	32.00	32.00	32.00	32.00	.00	.00	.00
LINING PEGS	PEG	250.00	.00	50.00	50.00	50.00	50.00	50.00	.00	.00	.00
KEROSENE	LT	25.00	.00	5.00	5.00	5.00	5.00	5.00	.00	.00	.00
PJ	KG	.00	6.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
CP	KG	.00	6.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
CM	KG	.00	6.00	.00	1.20	1.20	1.20	1.20	1.20	.00	.00
KIESERITE	KG	.00	50.00	48.00	57.00	64.60	72.00	90.00	98.60	99.00	99.80
LABOR											
CASUAL/FAMILY LABOR	MANDAY	124.55	306.13	214.96	220.53	236.98	255.22	268.66	263.74	241.80	241.04
ESTATE LABOR	MANDAY	23.20	48.40	10.64	20.32	21.52	21.44	19.36	14.22	4.83	3.63
FOREMAN LABOR	MANDAY	5.32	12.64	6.06	6.59	7.59	7.91	7.95	7.43	5.34	4.77

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIF--RUBBER, 2HA CO/RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
WITH PROJECT											
CROPPING INTENSITY	PERCENT	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75	98.75
YIELD											
RICE	KG	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	11,924	15,444	16,984	17,952	18,480	18,480	18,480	18,480	18,480	18,480
RUBBER	KG	1,060.0	1,270.0	1,500.0	1,790.0	1,980.0	2,150.0	2,295.0	2,430.0	2,545.0	2,615.0
PRODUCT LINE PRODUCTION											
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS											
UREA	KG	457.10	463.10	468.10	468.10	468.10	468.10	468.10	468.10	468.10	468.10
TSP	KG	179.60	179.60	179.60	179.60	179.60	179.60	179.60	179.60	179.60	179.60
PHOSPHATE	KG	308.20	303.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00
POTASH	KG	297.00	303.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	.79	.79	.79	.79	.79	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	2.40	2.20	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	72.00	66.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	100.80	102.20	104.00	104.00	104.00	104.00	104.00	104.00	104.00	104.00

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIF--RUBBER, 2HA CO/RUB

	UNITS	11	12	13	14	15	16	17	18	19	20
		CALENDAR YEARS									
LABOR											
CASUAL/FAMILY LABOR	MANDAY	248.43	253.74	251.13	249.50	249.50	249.50	249.50	249.50	249.50	249.50
ESTATE LABOR	MANDAY	2.43	1.23	.29	.00	.00	.00	.00	.00	.00	.00
FOREMAN LABOR	MANDAY	4.60	4.43	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4.32

INDONESIA

ANNEX
TABLE
PAGE OF

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIF--RUBBER, 2HA CO/RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
WITH PROJECT						
CROPPING INTENSITY	PERCENT	98.75	98.75	98.75	98.75	98.75
YIELD						
RICE	KG	375.00	375.00	375.00	375.00	375.00
CASSAVA	KG	3,000.0	3,000.0	3,000.0	3,000.0	3,000.0
CORN (DRY)	KG	100.00	100.00	100.00	100.00	100.00
RICE BEAN (DRY)	KG	50.00	50.00	50.00	50.00	50.00
MUNG BEAN (DRY)	KG	30.00	30.00	30.00	30.00	30.00
GROUNDNUT	KG	100.00	100.00	100.00	100.00	100.00
TOBACCO	KG	75.00	75.00	75.00	75.00	75.00
GINGER	KG	100.00	100.00	100.00	100.00	100.00
CHILLIES	KG	18.00	18.00	18.00	18.00	18.00
PINEAPPLES	FRUIT	62.00	62.00	62.00	62.00	62.00
CITRUS	FRUIT	320.00	320.00	320.00	320.00	320.00
PEPPER	KG	10.00	10.00	10.00	10.00	10.00
COCONUT	NUT	18,480	18,480	18,480	18,480	18,480
RUBBER	KG	2,675.0	2,725.0	2,765.0	2,690.0	2,500.0
PRODUCT LINE PRODUCTION						
MUNG BEAN	KG	30.00	30.00	30.00	30.00	30.00
RICE BEAN	KG	50.00	50.00	50.00	50.00	50.00
CORN	KG	100.00	100.00	100.00	100.00	100.00
MATERIAL INPUTS						
UREA	KG	468.10	468.10	468.10	468.10	468.10
TSP	KG	179.60	179.60	179.60	179.60	179.60
PHOSPHATE	KG	308.00	308.00	308.00	308.00	308.00
POTASH	KG	308.00	308.00	308.00	308.00	308.00
INSECTICIDE	LT	.79	.79	.79	.79	.79
RICE SEED	KG	15.00	15.00	15.00	15.00	15.00
CORN SEED	KG	4.00	4.00	4.00	4.00	4.00
MUNG BEAN SEED	KG	.75	.75	.75	.75	.75
RICE BEAN SEED	KG	2.00	2.00	2.00	2.00	2.00
GROUNDNUT SEED	KG	7.00	7.00	7.00	7.00	7.00
ALANG 2 OIL	LT	2.00	2.00	2.00	2.00	2.00
SOLAR	LT	60.00	60.00	60.00	60.00	60.00
KIESERITE	KG	104.00	104.00	104.00	104.00	104.00

INDONESIA--TRANSMIGRATION II FARM MODELS

PHYSICAL INPUTS AND OUTPUTS BY FARM TYPE
IIIF--RUBBER, 2HA CO/RUB

	UNITS	CALENDAR YEARS 21	22	23	24	25
LABOR						
CASUAL/FAMILY LABOR	MANDAY	249.50	249.50	249.50	249.50	249.50
FOREMAN LABOR	MANDAY	4.32	4.32	4.32	4.32	4.32

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INDONESIA

TRANSMIGRATION II

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Appendix 3: Farm Budget Analysis

Table 1: SUMMARY OF FARM BUDGET ANALYSIS /a

	Gross value of production	Costs of /b production	Net value of production	Subsistence /c	Net farm income	Per capita net /d farm income	
	(Rp '000)					Rp '000	US$ /e
A. Model							
Base 2.0 ha	419.5	54.9	364.6	135.1	229.5	45.9	111
Year 5	493.9	58.6	435.3	135.1	300.2	60.0	145
10	493,9	58.6	435.3	135.1	300.2	60.0	145
15	493.9	58.6	435.3	135.1	300.2	60.0	145
20	493.9	58.6	435.3	135.1	300.2	60.0	145
With 1.0 ha coconuts							
Year 5	410.4	82.8	327.6	135.1	192.5	38.5	92
10	685.6	82.8	602.88	135.1	467.7	93.5	225
15	894.2	93.3	800.9	135.1	665.8	133.2	321
20	894.2	93.3	800.9	135.1	665.8	133.2	321
25	894.2	93.3	800.9	135.1	665.8	133.2	321
With 2.0 ha coconuts							
Year 5	410.4	82.8	327.6	135.1	192.5	38.5	92
10	683.6	85.6	600.0	135.1	464.9	93.0	224
15	1,410.3	133.9	67.4	135.1	1,132.3	226.5	546
20	1,422.2	134.5	87.7	135.1	1,152.6	230.5	555
25	1,422.2	134.5	87.7	135.1	1,152.6	230.5	555
With 1.0 ha rubber							
Year 5	419.5	155.8	263.7	135.1	128.6	25.7	62
10	549.5	84.1	465.4	135.1	330.3	66.1	159
15	936.1	115.2	820.9	135.1	685.8	137.2	331
20	1,087.9	122.8	965.1	135.1	830.0	166.0	400
25	1,142.1	125.5	1,016.6	135.1	881.5	176.3	425
With 2.0 ha rubber							
Year 5	419.5	155.8	263.7	135.1	128.6	25.7	62
10	549.5	161.2	388.3	135.1	253.2	50.6	122
15	1,195.3	190.5	1,004.8	135.1	869.7	173.9	419
20	1,592.6	210.4	1,382.2	135.1	1,247.1	249.4	601
25	1,783.4	219.9	1,569.5	135.1	1,428.4	285.7	688
With 1.0 ha rubber and 1.0 ha coconuts							
Year 5	919.5	134.1	285.4	135.1	150.3	30.1	72
10	664.6	104.8	559.8	135.1	424.7	84.9	205
15	1,043.1	122.7	920.4	135.1	785.3	157.1	378
20	1,165.8	128.8	1,037.0	135.1	901.9	180.4	435
25	1,223.7	131.7	1,092.0	135.1	956.9	191.4	462

/a Constant 1978 financial prices.

/b Includes Ipeda tax and hired labor costs.

/c See Annex 1, Table 15.

/d Assumes family size of five.

/e Official exchange rate Rp 415 = US$1.00.

	Gross value of production	Costs of /b production	Net value of production	Subsistence /c	Net farm income	Per capita net /d farm income	
	(Rp '000)					Rp '000	US$ /e
B. Model 2 /a							
Base 2.0 ha							
Year 5	492.4	56.0	436.4	135.1	301.3	60.3	145
10 & on	772.7	70.0	702.7	135.1	567.6	113.5	274
With 1.0 ha coconuts							
Year 5	492.4	83.0	409.4	135.1	301.3	60.3	145
10	964.4	92.9	871.5	135.1	736.4	147.3	355
15 & on	1,036.7	96.5	940.2	135.1	805.1	161.0	388
With 2.0 ha coconuts							
Year 5	492.4	83.0	409.4	135.1	274.3	54.9	132
10	964.4	106.1	858.3	135.1	723.2	144.6	349
15	1,288.8	129.9	1,158.9	135.1	1,023.8	204.8	493
20 & on	1,300.7	130.5	1,172.2	135.1	1,023.8	204.8	499
With 1.0 ha rubber							
Year 5	492.4	139.7	352.7	135.1	211.6	43.2	105
10	828.3	101.1	727.2	135.1	592.1	118.9	285
15	1,214.9	121.5	1,093.4	135.1	958.3	191.7	462
20	1,366.7	129.1	1,237.6	135.1	1,102.5	220.5	531
25	1,420.9	135.7	1,285.2	135.1	1,150.1	230.0	559
With 2.0 ha rubber							
Year 5	492.4	139.7	352.7	135.1	217.6	43.5	105
10	828.3	130.0	698.3	135.1	563.2	112.6	271
15	1,474.1	160.8	1,313.3	135.1	1,178.2	235.6	568
20	1,871.4	180.7	1,690.7	135.1	1,555.6	311.1	750
25	2,062.2	190.3	1,071.9	135.1	1,736.8	347.4	837
With 1.0 ha rubber and 1.0 ha coconuts							
Year 5	492.4	127.1	365.3	135.1	230.2	46.0	111
10	913.3	125.1	788.2	135.1	658.1	130.6	315
15	1,321.9	144.3	1,177.6	135.1	1,042.5	208.5	502
20	1,444.6	150.5	1,294.1	135.1	1,159.0	231.8	559
25	1,502.5	153.4	1,349.1	135.1	1,214.0	242.8	585

/a Constant 1978 financial prices.

/b Includes Ipeda tax and hired labor costs.

/c See Annex 1, Table 15.

/d Assumes family size of five.

/e Official exchange rate Rp 415 = US$1.00.

	Gross value of production	Costs of /b production	Net value of production	Subsistence /c	Net farm income	Per capita net /d farm income	
	(Rp '000)					Rp '000	US$ /e
B. Model 3 /a							
Base 2.0 ha							
Year 5	165.4	55.2	110.2	135.1	(24.9)	(5.0)	(12)
10	554.5	70.0	474.5	135.1	349.4	69.9	168
15	716.5	80.1	636.4	135.1	503.3	100.7	243
20	832.3	83.9	748.4	135.1	613.3	122.7	296
25	693.4	76.7	616.7	135.1	481.6	96.3	232
With 1.0 ha coconuts							
Year 5	165.4	82.3	83.1	135.1	(52.0)	(10.4)	(25)
10	746.2	102.4	643.8	135.1	508.7	101.7	245
15	980.5	113.8	866.7	135.1	731.6	146.3	353
20	1,096.3	119.8	976.5	135.1	841.4	168.3	405
25	957.4	112.9	844.5	135.1	709.4	141.9	342
With 2.0 ha coconuts							
Year 5	165.4	82.3	83.1	135.1	(52.0)	(10.4)	(25)
10	746.2	104.8	641.4	135.1	506.3	101.3	244
15	1,232.6	129.1	1,103.5	135.1	968.4	193.7	467
20	1,351.3	135.0	1,216.3	135.1	1,081.2	216.2	521
25	1,221.4	128.5	1,092.9	135.1	957.8	191.6	462
With 1.0 ha rubber							
Year 5	165.4	140.9	24.5	135.1	(110.6)	(22.1)	(53)
10	610.1	104.8	505.3	135.1	370.2	74.0	178
15	1,158.7	130.8	1,027.9	135.1	892.8	198.6	430
20	1,426.3	144.2	1,282.1	135.1	1,147.0	229.4	553
25	1,341.6	140.0	1,201.6	135.1	1,066.5	213.3	514
With 2.0 ha rubber							
Year 5	165.4	140.9	24.5	135.1	(110.6)	(22.1)	(53)
10	610.1	149.1	461.0	135.1	325.9	65.2	157
15	1,418.0	177.0	1,241.0	135.1	1,105.9	221.2	533
20	1,931.0	202.6	1,728.4	135.1	1,593.3	318.7	768
25	1,982.6	205.2	1,777.4	135.1	1,642.3	328.5	791
With 1.0 ha rubber and 1.0 ha coconuts							
Year 5	165.4	140.9	24.5	135.1	(110.6)	(22.1)	(53)
10	610.1	149.1	461.0	135.1	325.9	65.2	157
15	1,418.0	177.0	1,241.0	135.1	1,105,9	221.2	533
20	1,931.0	202.6	1,728.4	135.1	1,593.3	318.7	768
25	1,341.6	140.0	1,201.6	135.1	1,066.5	213.3	514

/a Constant 1978 financial prices.

/b Includes Ipeda tax and hired labor costs.

/c See Annex 1, Table 15.

/d Assumes family size of five.

/e Official exchange rate Rp 415 = US$1.00.

Table 2: FARM BUDGET - MODEL 1 - BASE 2.0 Ha /a
(Rp'000)

Year	3	5	7	9 onward
Gross value of production	294.9	419.5	472.3	493.9
Less: Costs of production	35.7	35.7	35.7	35.7
Net value of production	259.2	383.8	436.6	458.2
Less: Hired labor /b	1.4			
Subsistence /c	135.1	135.1	135.1	135.1
IPEDA tax /d	13.0	19.2	21.8	22.9
Net farm income	109.7	229.5	279.7	300.2

/a Constant 1978 financial prices.

/b Valued at Rp 600/man-day.

/c See Annex 1, Table 15.

/d 5% of net value of production.

Table 3: FARM BUDGET - Mixed Food Crop Model 1
- With 1.0 ha Coconuts /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	279.0	410.4	543.4	685.6	894.2	894.2	894.2	894.2
Less: costs of production	62.1	65.6	51.1	51.1	51.1	51.1	51.1	51.1
Net value of production	216.9	344.8	492.3	634.5	843.1	843.1	843.1	843.1
Less: subsistence /b	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
IPEDA tax /c	10.8	17.2	24.6	31.7	42.2	42.2	42.2	42.2
Hired labor /d	1.4							

/a Constant 1978 financial prices.

/b See Annex 1, Table 15.

/c 5% of the net value of production.

/d Valued at Rp 600 day - see Annex 2, Appendix 1.

Table 4: FARM BUDGET - MIXED FOOD CROP MODEL 1

2.0 Ha Coconuts /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	279.0	410.4	543.4	685.6	1,267.4	1,410.3	1,422.2	1,422.2
Less: costs of production	62.1	65.6	72.5	60.3	60.3	60.3	60.3	60.3
Net value of production	216.9	344.8	470.9	625.3	1,207.1	1,350.0	1,361.9	1,361.9
Less: IPEDA tax /b	10.8	17.2	24.6	31.7	60.4	67.5	68.1	86.1
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d	1.4	1.4	1.4	2.8	6.1	6.1	6.1	6.1
Net farm income	69.6	192.5	331.2	464.9	1,105.5	1,141.2	1,152.6	1,152.6

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Valued at Rp 600/day for hired casual labor.

Table 5: FARM BUDGET - MIXED FOOD CROP MODEL 1

1.0 Ha Rubber /a
(Rp ′000)

Year	3	5	8	10	12	15	20	25
Gross value of production	294.9	419.5	485.5	549.5	753.2	936.1	1,087.9	1,142.1
Less: costs of production	99.6	105.9	65.1	66.5	68.2	68.2	68.2	68.2
Net value of production	195.3	313.6	420.4	483.0	685.0	867.9	1,019.7	1,073.9
Less: IPEDA tax /b	9.8	15.7	21.0	24.2	34.3	43.4	51.0	53.7
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual family	11.0	11.9	-	-	-	-	-	-
Casual estate	5.8	14.9	3.4	1.1	1.4	1.4	1.4	1.4
Estate foreman	2.1	7.4	2.9	2.3	2.2	2.2	2.2	2.2
Net farm income	31.5	128.6	258.0	320.3	512.0	684.8	830.0	881.5

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual family labor at Rp 600/day; casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 6: FARM BUDGET - MIXED FOOD CROP MODEL 1

2.0 Ha Rubber /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	794.9	419.5	472.3	549.5	753.2	1,195.3	1,592.6	1,783.9
Less: costs of production	99.6	105.9	131.9	129.4	132.1	133.1	133.1	133.1
Net value of production	195.3	313.6	340.4	420.1	621.1	1,062.2	1,459.5	1,650.3
Less: IPEDA tax /b	9.8	15.7	17.0	21.0	31.1	53.1	73.0	82.5
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual family	11.0	11.9	0.2	-	-	-	-	-
Casual estate	5.8	14.9	18.4	4.9	1.1	-	-	-
Estate foreman	2.1	7.4	10.3	5.9	4.3	4.3	4.3	4.3
Net farm income	31.5	128.6	159.4	253.2	449.5	869.7	1,247.1	1,428.4

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual family labor at Rp 600/day; casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 7: FARM BUDGET - MIXED FOOD CROP MODEL 1

1.0 Ha Coconuts and 1.0 Ha Rubber /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	294.9	419.5	543.7	664.6	830.8	1,043.1	1,165.8	1,223.7
Less: costs of production	80.2	98.1	83.7	70.2	71.9	71.9	71.9	71.9
Net value of production	214.7	321.4	460.0	594.4	758.9	971.2	1,093.9	1,151.8
Less: IPEDA tax /b	10.7	16.1	23.0	29.7	37.9	48.6	54.7	57.6
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual family	5.9	5.6	-	-	-	-	-	-
Casual estate	2.9	9.7	8.9	2.3	0.2	-	-	-
Estate foreman	1.1	4.6	5.3	2.6	2.2	2.2	2.2	2.2
Net farm income	59.0	150.3	287.7	424.7	583.5	785.3	901.9	956.9

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual family labor at Rp 600/day; casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 8: FARM BUDGET - MODEL 2

Base 2.0 Ha /a
(Rp '000)

Year	3	5	8	10 and on
Gross value of production	414.8	492.4	731.3	772.7
Less: costs of production	33.0	33.0	33.0	33.0
Net value of production	381.8	459.4	698.3	739.7
Less: IPEDA tax /b	19.0	23.0	34.9	37.0
Subsistence /c	135.1	135.1	135.1	135.1
Net farm income	227.7	301.3	528.3	567.6

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

Table 9: FARM BUDGET - MODEL 2

1.0 Ha Coconuts /a
(Rp ′000)

Year	3	5	8	10	12 and on
Gross value of production	414.8	492.4	790.7	964.4	1,036.7
Less: costs of production	58.0	61.5	47.0	47.0	47.0
Net value of production	356.8	430.9	743.7	917.4	989.7
Less: IPEDA tax /b	17.8	21.5	37.2	45.9	49.5
Subsistence /c	135.1	135.1	135.1	135.1	135.1
Net farm income	203.9	274.3	571.4	736.4	805.1

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

Table 10: FARM BUDGET - MODEL 2

2.0 Ha Coconuts /a
(Rp '000)

Year	3	5	8	10	12	15	20 and on
Gross value of production	414.8	492.4	790.7	964.4	1,145.9	1,288.8	1,300.7
Less: costs of production	58.0	61.5	75.5	61.0	61.0	61.0	61.0
Net value of production	381.8	430.9	715.2	903.4	1,084.9	1,227.8	1,239.7
Less: IPEDA tax /b	19.0	21.5	35.8	45.1	54.2	61.4	62.0
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d Family casual	-	-	-	-	7.5	7.5	7.5
Net farm income	227.7	274.3	544.3	723.2	888.1	23.8	35.1

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Valued at Rp 600/day.

Table 11: FARM BUDGET - MIXED FOOD CROP MODEL 2

Perennial Crop Coconut and 1.0 Ha Rubber /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	414.8	492.4	731.3	828.3	1,032.0	1,214.9	1,366.7	1,420.9
Less: costs of production	93.0	97.7	57.8	59.2	60.2	60.2	60.2	60.2
Net value of production	321.8	344.7	673.5	769.1	971.8	1,154.7	1,306.5	1,360.7
Less: IPEDA tax /b	16.1	19.7	33.7	38.5	48.6	57.7	65.3	68.3
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	5.8	14.9	3.4	1.1	1.4	1.4	1.4	1.4
Estate foreman	2.1	7.4	2.9	2.3	2.2	2.2	2.2	2.2
Net farm income	162.7	211.6	498.4	592.1	784.5	958.3	1,102.5	1,153.7

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 12: FARM BUDGET - MIXED FOOD CROP MODEL 2

Perennial Crop Coconut and 2.0 Ha Rubber /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	414.8	492.4	731.3	828.3	1,032.0	1,474.1	1,871.4	2,062.2
Less: costs of production	93.0	97.7	122.2	81.9	86.2	87.2	87.2	87.2
Net value of production	321.8	394.7	609.1	746.4	945.8	1,386.9	1,784.2	1,975.0
Less: IPEDA tax /b	16.1	19.7	30.5	37.3	47.6	69.3	89.2	98.8
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	5.8	14.9	18.4	4.9	1.1	-	-	-
Estate foreman	2.1	7.4	10.3	5.9	4.3	4.3	4.3	4.3
Net farm income	162.7	217.6	414.8	563.2	757.7	1,178.2	1,555.6	1,736.8

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 13: FARM BUDGET - PERENNIAL CROP COCONUT - MODEL 2
1.0 ha Rubber and 1.0 ha Coconut
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	414.8	492.4	761.0	913.3	1,190.6	1,321.9	1,444.6	1,502.5
Less: costs of production	71.9	92.8	79.5	78.5	80.0	80.0	80.0	80.0
Net value of production	342.9	399.6	681.5	834.8	1,110.6	1,241.9	1,364.6	1,422.5
Less: Ipeda tax /b	17.2	20.0	34.2	41.7	55.3	62.1	68.3	71.2
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	2.9	9.7	8.9	2.3	0.2			
Estate Foreman	1.1	4.6	5.3	2.6	2.2	2.2	2.2	2.2
Net farm income	186.6	230.2	498.0	653.1	918.1	1,042.5	1,159.0	1,214.0

/a Constant 1978 financial prices.

/b 5% of net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day;
estate foreman labor at Rp 1,000/day.

Table 14: FARM BUDGET - PERENNIAL CROP RUBBER MODEL 3

Base 2.0 Ha /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	111.3	165.4	320.4	554.5	623.9	716.5	832.3	693.4
Less: costs of production	36.6	40.1	42.2	42.2	42.2	42.2	42.2	42.2
Net value of production	74.7	125.3	278.2	512.3	581.7	674.3	790.1	651.2
Less: IPEDA tax /b	3.7	6.3	13.9	25.6	29.1	33.7	39.5	32.3
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	3.8	3.8	-	-	-	-	-	-
Estate foreman	5.0	5.0	2.2	2.2	2.2	2.2	2.2	2.2
Net farm income	(72.9)	(24.9)	127.0	349.4	415.3	503.3	613.3	481.6

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 15: FARM BUDGET - PERENNIAL CROP RUBBER MODEL 3

1.0 Ha Coconuts /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	111.3	165.4	379.8	746.8	876.0	980.5	1,693.4	957.4
Less: costs of production	61.6	68.7	66.1	66.1	66.1	66.1	66.1	66.1
Net value of production	49.7	96.7	313.7	680.1	809.9	914.4	1,030.2	891.3
Less: IPEDA tax /b	2.5	4.8	15.7	34.1	40.5	45.5	51.5	44.6
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	3.8	3.8	-	-	-	-	-	-
Estate foreman	5.0	5.0	2.2	2.2	2.2	2.2	2.2	2.2
Net farm income	(96.7)	(52.0)	160.7	508.7	632.1	731.6	841.4	709.4

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 16: FARM BUDGET - PERENNIAL CROP RUBBER MODEL 3

2.0 Ha Coconuts /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	111.3	165.4	379.8	746.2	997.1	1,232.6	1,351.3	1,221.4
Less: costs of production	61.6	68.7	83.2	68.7	68.7	68.7	68.7	68.7
Net value of production	49.7	96.7	296.6	677.5	928.4	1,163.9	1,282.6	1,152.7
Less: IPEDA tax /b	2.5	4.8	14.8	33.9	46.4	58.2	64.1	57.6
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	3.8	3.8	-	-	-	-	-	-
Estate foreman	5.0	5.0	2.2	2.2	2.2	2.2	2.2	2.2
Net farm income	(96.7)	(52.0)	144.5	506.3	744.7	968.4	1,081.2	957.8

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 17: FARM BUDGET - PERENNIAL CROP RUBBER MODEL 3

1.0 Ha Rubber /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	111.3	165.4	320.4	610.1	883.2	1,158.7	1,426.3	1,341.6
Less: costs of production	95.7	109.0	70.6	72.3	72.2	72.2	72.2	72.2
Net value of production	15.6	56.4	249.8	537.8	811.0	1,086.5	1,354.1	1,269.4
Less: IPEDA tax /b	0.8	2.8	12.5	26.9	40.6	54.3	67.7	63.5
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	9.6	18.7	3.4	1.1	-	-	-	-
Estate foreman	7.1	10.4	5.0	4.5	4.3	4.3	4.3	4.3
Net farm income	(137.0)	(110.6)	93.8	370.2	631.0	892.8	1,147.0	1,066.5

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

ANNEX 2
Appendix 3

Table 18: FARM BUDGET - PERENNIAL CROP RUBBER MODEL 3

2.0 Ha Rubber /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	111.3	165.4	320.4	610.1	883.2	1,418.0	1,931.0	1,982.6
Less: costs of production	95.7	109.0	131.4	111.2	93.4	104.8	104.8	104.8
Net value of production	15.6	56.4	189.0	498.9	789.8	1,313.2	1,826.2	1,877.8
Less: IPEDA tax /b	0.8	2.8	9.5	24.9	39.5	65.7	94.3	93.9
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	9.6	18.7	18.4	4.9	1.1	-	-	-
Estate foreman	7.1	10.4	12.4	8.1	6.6	6.5	6.5	6.5
Net farm income	(137.0)	(110.6)	13.6	325.9	607.5	1,105.9	1,593.3	1,642.3

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

Table 19: FARM BUDGET - PERENNIAL CROP RUBBER MODEL 3

1.0 Ha Rubber and 1.0 Ha Coconuts /a
(Rp '000)

Year	3	5	8	10	12	15	20	25
Gross value of production	111.3	165.4	350.1	695.1	967.4	1,265.7	1,504.2	1,423.2
Less: costs of production	79.1	108.0	105.5	103.0	104.6	104.6	104.6	104.6
Net value of production	32.2	57.4	244.6	592.1	862.8	1,161.1	1,399.6	1,318.6
Less: IPEDA tax /b	0.2	2.9	12.2	29.6	43.1	58.1	70.1	65.9
Subsistence /c	135.1	135.1	135.1	135.1	135.1	135.1	135.1	135.1
Hired labor /d								
Casual estate	6.6	13.4	8.9	2.3	0.2	-	-	-
Estate foreman	6.1	7.6	7.4	4.8	4.3	4.3	4.3	4.3
Net farm income	(115.8)	(101.6)	81.0	420.3	680.1	963.6	1,190.1	1,113.3

/a Constant 1978 financial prices.

/b 5% of the net value of production.

/c See Annex 1, Table 15.

/d Casual estate labor at Rp 625/day; estate foreman labor at Rp 1,000/day.

C18700/J25632/D2224/A18

INDONESIA

TRANSMIGRATION II

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Appendix 4: Simulated Economic Rate of Return Analysis

ANNEX 2
Appendix 4

Table 1: RESULTS OF SIMULATED ECONOMIC RATE OF RETURN

	Rate of Return (%)									Rp				
	Best estimate	Benefits				Costs				Net Present Value				
		-20	-10	+10	+20	-20	-10	+10	+20	10%	12%	15%	17%	20%
Model 1 (Mixed Food Crops)														
Base 2.0 ha	16	11	14	18	21	22	19	14	12	1,035	600	123	(113)	(384)
1.0 ha Coconuts	24	19	21	26	28	29	26	22	20	4,000	2,891	1,707	1,140	512
2.0 ha Coconuts	26	22	24	28	30	31	28	24	22	6,013	4,384	2,677	1,874	1,002
1.0 ha Rubber	17	13	15	19	21	21	19	15	14	2,012	1,207	370	(21)	(442)
2.0 ha Rubber	18	14	16	19	21	22	20	16	15	2,760	1,705	633	196	(367)
1.0 ha Rubber & 1.0 ha Coconuts	21	17	19	23	26	26	23	20	18	4,400	3,027	1,606	947	240
Model 2 (Perennial Crop Coconut)														
Base 2.0 ha	21	17	20	23	25	26	24	20	18	3,138	2,222	1,232	750	208
1.0 ha Coconuts	26	22	24	28	29	30	28	24	23	6,092	4,502	2,806	1,994	1,094
2.0 ha Coconuts	28	24	26	29	31	32	29	26	24	8,109	5,998	3,778	2,730	1,586
1.0 ha Rubber	21	17	19	23	24	25	23	19	18	4,112	2,828	1,479	843	158
2.0 ha Rubber	21	18	19	23	24	25	23	20	18	4,869	3,333	1,748	1,014	230
1.0 ha Rubber & 1.0 ha Coconuts	24	20	22	26	27	28	26	22	21	6,528	4,672	2,735	1,827	846
Model 3 (Perennial Crop Rubber)														
Base 2.0 ha	11	8	9	12	13	14	12	10	8	265	(309)	(900)	(1,173)	(1,463)
1.0 ha Coconuts	17	14	16	19	20	20	19	16	15	3,233	1,984	683	81	(568)
2.0 ha Coconuts	20	22	21	18	17	23	21	18	17	5,246	3,477	1,654	815	(77)
1.0 ha Rubber	14	11	12	15	16	16	15	12	11	1,507	555	(401)	(845)	(1,098)
2.0 ha Rubber	15	12	13	16	17	17	16	13	12	2,253	1,050	(198)	(680)	(1,224)
1.0 ha Rubber & 1.0 ha Coconuts	17	15	16	18	20	19	19	16	15	3,921	2,397	845	139	(602)

Table 2: SIMULATED ECONOMIC RATE OF RETURN
Model 1: Base 2.0 ha
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,322.1	73.6	75.2	1,470.9	28.5
2	28.3	53.9	150.4	232.6	224.9
3	28.3	53.9	150.4	232.6	287.3
4	28.3	53.9	150.4	232.6	331.0
5	28.3	53.9	150.4	232.6	419.7
6		53.9	150.4	204.3	488.0
7		61.7	150.4	212.1	576.2
8		61.7	150.4	212.1	596.5
9		61.7	150.4	212.1	615.0
10		61.7	150.4	212.1	615.7
11		61.7	150.4	212.1	615.0
12		61.7	150.4	212.1	615.0
13		61.7	150.4	212.1	615.0
14		61.7	150.4	212.1	615.0
15		61.7	150.4	212.1	615.0
16		61.7	150.4	212.1	615.0
17		61.7	150.4	212.1	615.0
18		61.7	150.4	212.1	615.0
19		61.7	150.4	212.1	615.0
20		61.7	150.4	212.1	615.0
21		61.7	150.4	212.1	615.0
22		61.7	150.4	212.1	615.0
23		61.7	150.4	212.1	615.0
24		61.7	150.4	212.1	615.0
25		61.7	150.4	212.1	615.0
Rate of return: 16%					
Net present value discount factor	10%	12%	15%	17%	20%
	1,035	600	123	(113)	(384)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 3: SIMULATED ECONOMIC RATE OF RETURN
Model 1: 1.0 ha Coconuts
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,322.1	73.6	75.2	1,470.9	28.5
2	28.3	53.9	150.4	232.6	224.9
3	28.3	72.5	150.4	251.2	287.3
4	28.3	76.1	150.4	254.8	331.0
5	28.3	82.3	150.4	261.0	419.7
6		74.5	150.4	224.9	488.0
7		86.4	150.4	236.8	576.2
8		86.4	150.4	236.8	783.4
9		86.4	150.4	236.8	996.1
10		86.4	150.4	236.8	1,218.3
11		86.4	150.4	236.8	1,339.8
12		86.4	150.4	236.8	1,408.3
13		86.4	150.4	236.8	1,445.7
14		86.4	150.4	236.8	1,445.7
15		86.4	150.4	236.8	1,445.7
16		86.4	150.4	236.8	1,445.7
17		86.4	150.4	236.8	1,445.7
18		86.4	150.4	236.8	1,445.7
19		86.4	150.4	236.8	1,445.7
20		86.4	150.4	236.8	1,445.7
21		86.4	150.4	236.8	1,445.7
22		86.4	150.4	236.8	1,445.7
23		86.4	150.4	236.8	1,445.7
24		86.4	150.4	236.8	1,445.7
25		86.4	150.4	236.8	1,445.7
Rate of return:	24%				
Net present value discount factor	10%	12%	15%	17%	20%
	4,000	2,891	1,707	1,140	512

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 4: SIMULATED ECONOMIC RATE OF RETURN
Model 1: 2.0 ha Coconuts
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,322.1	73.6	75.2	1,470.9	28.5
2	28.3	53.9	150.4	232.6	224.9
3	28.3	72.5	150.4	251.2	287.3
4	28.3	76.1	150.4	254.8	331.0
5	28.3	82.3	150.4	261.0	419.7
6		93.1	150.4	243.5	488.0
7		112.8	150.4	263.2	576.2
8		120.2	150.4	270.6	783.4
9		111.1	150.4	261.5	996.1
10		111.1	150.4	261.5	1,218.3
11		111.1	150.4	261.5	1,526.7
12		111.1	150.4	261.5	1,789.4
13		111.1	150.4	261.5	2,049.0
14		111.1	150.4	261.5	2,170.5
15		111.1	150.4	261.5	2,239.0
16		111.1	150.4	261.5	2,276.4
17		111.1	150.4	261.5	2,276.4
18		111.1	150.4	261.5	2,276.4
19		111.1	150.4	261.5	2,276.4
20		111.1	150.4	261.5	2,276.4
21		111.1	150.4	261.5	2,276.4
22		111.1	150.4	261.5	2,276.4
23		111.1	150.4	261.5	2,276.4
24		111.1	150.4	261.5	2,276.4
25		111.1	150.4	261.5	2,276.4

Rate of return: 26%

Net present value discount factor	10%	12%	15%	17%	20%
	6,013	4,384	2,677	1,874	1,002

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 5: SIMULATED ECONOMIC RATE OF RETURN
Model 1: 1.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,322.1	73.6	75.2	1,470.9	28.5
2	28.3	53.9	150.4	232.6	224.9
3	338.9	143.2	150.4	632.5	287.3
4	28.3	146.2	150.4	324.9	331.0
5	28.3	151.3	150.4	330.0	419.7
6		117.5	150.4	267.9	488.0
7		114.0	150.4	264.4	576.2
8		114.1	150.4	264.5	596.5
9		99.9	150.4	250.3	615.0
10		99.6	150.4	250.0	680.4
11		99.9	150.4	250.3	773.0
12		99.7	150.4	250.1	920.2
13		99.7	150.4	250.1	1,023.7
14		99.7	150.4	250.1	1,100.0
15		99.7	150.4	250.1	1,135.5
16		99.7	150.4	250.1	1,173.6
17		99.7	150.4	250.1	1,209.0
18		99.7	150.4	250.1	1,244.5
19		99.7	150.4	250.1	1,277.2
20		99.7	150.4	250.1	1,313.9
21		99.7	150.4	250.1	1,349.4
22		99.7	150.4	250.1	1,369.0
23		99.7	150.4	250.1	1,378.0
24		99.7	150.4	250.1	1,378.0
25		99.7	150.4	250.1	1,378.0
Rate of return:	17%				
Net present value					
discount factor	10%	12%	15%	17%	20%
	2,012	1,207	370	(21)	(442)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 6: SIMULATED ECONOMIC RATE OF RETURN
Model 1: 2.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,322.1	189.3	75.2	1,470.9	28.5
2	28.3	118.0	150.4	232.6	224.9
3	338.9	88.3	150.4	632.5	287.3
4	28.3	93.9	150.4	324.9	331.0
5	28.3	100.6	150.4	330.0	419.7
6		90.7	150.4	342.3	488.0
7		87.8	150.4	357.3	576.2
8		86.9	150.4	363.3	596.5
9		165.5	150.4	315.9	615.0
10		151.8	150.4	302.2	680.4
11		152.5	150.4	302.9	773.0
12		137.8	150.4	288.2	920.2
13		137.5	150.4	287.9	1,089.1
14		137.9	150.4	288.3	1,258.1
15		137.7	150.4	288.1	1,440.7
16		137.7	150.4	288.1	1,582.4
17		137.7	150.4	288.1	1,694.1
18		137.7	150.4	288.1	1,764.9
19		137.7	150.4	288.1	1,835.8
20		137.7	150.4	288.1	1,908.0
21		137.7	150.4	288.1	1,978.8
22		137.7	150.4	288.1	2,032.0
23		137.7	150.4	288.1	2,076.9
24		137.7	150.4	288.1	2,112.4
25		137.7	150.4	288.1	2,132.8

Rate of return: 18%

Net present value discount factor	10%	12%	15%	17%	20%
	2,760	1,705	633	146	(367)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 7: SIMULATED ECONOMIC RATE OF RETURN
Model 1: 1.0 ha Coconuts and 1.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,322.1	73.6	75.2	1,470.9	28.5
2	28.3	53.9	150.4	232.6	224.9
3	338.9	107.9	150.4	597.2	287.3
4	28.3	138.9	150.4	317.6	331.0
5	28.3	147.1	150.4	325.8	419.7
6		160.8	150.4	311.2	488.0
7		189.7	150.4	340.1	576.2
8		162.2	150.4	312.6	690.0
9		123.9	150.4	274.3	828.9
10		124.4	150.4	274.8	1,002.8
11		124.4	150.4	274.8	1,223.5
12		124.3	150.4	274.7	1,476.8
13		124.6	150.4	275.0	1,647.6
14		124.4	150.4	274.8	1,796.8
15		124.4	150.4	274.8	1,898.0
16		124.4	150.4	274.8	1,963.4
17		124.4	150.4	274.8	2,001.6
18		124.4	150.4	274.8	2,034.3
19		124.4	150.4	274.8	2,069.7
20		124.4	150.4	274.8	2,107.9
21		124.4	150.4	274.8	2,140.6
22		124.4	150.4	274.8	2,167.8
23		124.4	150.4	274.8	2,189.6
24		124.4	150.4	274.8	2,203.2
25		124.4	150.4	274.8	2,208.7
Rate of return: 18%					
Net present value discount factor	10%	12%	15%	17%	20%
	4,400	3,027	1,606	947	240

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 8: SIMULATED ECONOMIC RATE OF RETURN
Model 2: Base 2.0 ha
(Rp'000)

		COSTS				
		Investment /a	Crop production	Subsistence /b	Total	Benefits
Year	1	1,309.1	84.2	75.2	1,468.5	-
	2	28.3	49.4	150.4	228.1	122.9
	3	28.3	49.4	150.4	228.1	157.8
	4	28.3	49.4	150.4	228.1	199.7
	5	28.3	49.4	150.4	228.1	235.3
	6		49.4	150.4	199.8	646.0
	7		57.4	150.4	207.8	879.1
	8		57.4	150.4	207.8	985.5
	9		57.4	150.4	207.8	1,111.9
	10		57.4	150.4	207.8	1,111.9
	11		57.4	150.4	207.8	1,111.9
	12		57.4	150.4	207.8	1,111.9
	13		57.4	150.4	207.8	1,111.9
	14		57.4	150.4	207.8	1,111.9
	15		57.4	150.4	207.8	1,111.9
	16		57.4	150.4	207.8	1,111.9
	17		57.4	150.4	207.8	1,111.9
	18		57.4	150.4	207.8	1,111.9
	19		57.4	150.4	207.8	1,111.9
	20		57.4	150.4	207.8	1,111.9
	21		57.4	150.4	207.8	1,111.9
	22		57.4	150.4	207.8	1,111.9
	23		57.4	150.4	207.8	1,111.9
	24		57.4	150.4	207.8	1,111.9
	25		57.4	150.4	207.8	1,111.9

Rate of return: 21%

Net present value discount factor	10%	12%	15%	17%	20%
	3,138	2,222	1,232	750	208

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 9: SIMULATED ECONOMIC RATE OF RETURN
Model 2: 1.0 ha Coconuts
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,309.1	84.2	75.2	1,468.5	122.9
2	28.3	49.4	150.4	228.1	157.8
3	28.3	68.0	150.4	246.7	199.7
4	28.3	71.6	150.4	250.3	235.3
5	28.3	77.8	150.4	266.5	646.0
6		70.0	150.4	220.4	879.1
7		82.1	150.4	232.5	1,172.4
8		82.1	150.4	232.5	1,493.0
9		82.1	150.4	232.5	1,715.2
10		82.1	150.4	232.5	1,836.7
11		82.1	150.4	232.5	1,905.2
12		82.1	150.4	232.5	1,942.6
13		82.1	150.4	232.5	1,942.6
14		82.1	150.4	232.5	1,942.6
15		82.1	150.4	232.5	1,942.6
16		82.1	150.4	232.5	1,942.6
17		82.1	150.4	232.5	1,942.6
18		82.1	150.4	232.5	1,942.6
19		82.1	150.4	232.5	1,942.6
20		82.1	150.4	232.5	1,942.6
21		82.1	150.4	232.5	1,942.6
22		82.1	150.4	232.5	1,942.6
23		82.1	150.4	232.5	1,942.6
24		82.1	150.4	232.5	1,942.6
25		82.1	150.4	232.5	1,942.6

Rate of return: 26%

Net present value discount factor	10%	12%	15%	17%	20%
	6,092	4,502	2,806	1,994	1,094

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 10: SIMULATED ECONOMIC RATE OF RETURN
Model 2: 2.0 ha Coconuts
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,309.1	84.2	75.2	1,468.5	-
2	28.3	49.4	150.4	228.1	122.9
3	28.3	68.0	150.4	246.7	157.8
4	28.3	71.6	150.4	250.3	199.7
5	28.3	77.8	150.4	266.5	646.0
6		88.6	150.4	239.0	879.1
7		108.5	150.4	258.9	1,172.4
8		115.9	150.4	266.3	1,493.0
9		106.8	150.4	257.2	1,715.2
10		106.8	150.4	257.2	2,023.6
11		106.8	150.4	257.2	2,286.3
12		106.8	150.4	257.2	2,545.9
13		106.8	150.4	257.2	2,667.4
14		106.8	150.4	257.2	2,736.0
15		106.8	150.4	257.2	2,773.3
16		106.8	150.4	257.2	2,773.3
17		106.8	150.4	257.2	2,773.3
18		106.8	150.4	257.2	2,773.3
19		106.8	150.4	257.2	2,773.3
20		106.8	150.4	257.2	2,773.3
21		106.8	150.4	257.2	2,773.3
22		106.8	150.4	257.2	2,773.3
23		106.8	150.4	257.2	2,773.3
24		106.8	150.4	257.2	2,773.3
25		106.8	150.4	257.2	2,773.3
Rate of return:	28%				
Net present value discount factor	10%	12%	15%	17%	20%
	8,109	5,998	3,778	2,730	1,586

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 11: SIMULATED ECONOMIC RATE OF RETURN
Model 2: 1.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,309.1	84.2	75.2	1,468.5	-
2	28.3	49.4	150.4	228.1	122.9
3	338.9	124.0	150.4	613.3	157.8
4	28.3	142.3	150.4	321.0	199.7
5	28.3	147.4	150.4	326.1	235.0
6		113.9	150.4	263.8	646.0
7		109.8	150.4	260.2	879.1
8		110.0	150.4	260.4	985.5
9		95.1	150.4	245.5	1,111.9
10		95.6	150.4	246.0	1,177.3
11		95.3	150.4	245.7	1,270.0
12		95.7	150.4	246.1	1,417.1
13		95.4	150.4	245.8	1,520.7
14		95.4	150.4	245.8	1,597.0
15		95.4	150.4	245.8	1,632.4
16		95.4	150.4	245.8	1,670.5
17		95.4	150.4	245.8	1,706.0
18		95.4	150.4	245.8	1,741.4
19		95.4	150.4	245.8	1,774.1
20		95.4	150.4	245.8	1,810.9
21		95.4	150.4	245.8	1,846.3
22		95.4	150.4	245.8	1,866.7
23		95.4	150.4	245.8	1,874.9
24		95.4	150.4	245.8	1,874.9
25		95.4	150.4	245.8	1,874.9
Rate of return: 21%					
Net present value discount factor	10%	12%	15%	17%	20%
	4,112	2,828	1,979	843	150

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 12: SIMULATED ECONOMIC RATE OF RETURN
Model 2: 2.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,309.1	84.2	75.2	1,468.5	-
2	28.3	49.4	150.4	228.1	122.9
3	338.9	124.0	150.4	613.3	157.8
4	28.3	142.3	150.4	321.0	199.7
5	28.3	147.4	150.4	326.1	235.0
6		188.1	150.4	338.5	646.0
7		203.3	150.4	353.7	879.1
8		209.2	150.4	359.6	985.5
9		160.7	150.4	311.1	1,111.9
10		147.7	150.4	298.1	1,177.3
11		148.2	150.4	298.6	1,270.0
12		133.6	150.4	284.0	1,417.1
13		133.3	150.4	283.7	1,586.1
14		133.6	150.4	284.0	1,755.0
15		133.4	150.4	283.8	1,937.6
16		133.4	150.4	283.8	2,079.3
17		133.4	150.4	283.8	2,191.0
18		133.4	150.4	283.8	2,261.9
19		133.4	150.4	283.8	2,332.7
20		133.4	150.4	283.8	2,404.9
21		133.4	150.4	283.8	2,475.8
22		133.4	150.4	283.8	2,528.9
23		133.4	150.4	283.8	2,573.9
24		133.4	150.4	283.8	2,609.3
25		133.4	150.4	283.8	2,629.7
Rate of return: 21%					
Net present value discount factor	10%	12%	15%	17%	20%
	4,869	3,333	1,748	1,014	230

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 13: SIMULATED ECONOMIC RATE OF RETURN
Model 2: 1.0 ha Coconuts and 1.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,309.1	84.2	75.2	1,468.5	-
2	28.3	49.4	150.4	232.6	122.9
3	338.9	103.5	150.4	592.8	157.8
4	28.3	124.2	150.4	302.9	199.7
5	28.3	135.0	150.4	311.7	235.3
6		146.2	150.4	296.6	646.0
7		172.3	150.4	322.7	879.1
8		143.7	150.4	294.1	1,079.0
9		119.6	150.4	270.0	1,325.8
10		120.1	150.4	270.5	1,499.7
11		120.1	150.4	270.5	1,720.4
12		120.0	150.4	270.4	1,973.7
13		120.1	150.4	270.5	2,144.5
14		120.1	150.4	270.5	2,293.8
15		120.1	150.4	270.5	2,395.0
16		120.1	150.4	270.5	2,460.4
17		120.1	150.4	270.5	2,498.5
18		120.1	150.4	270.5	2,531.2
19		120.1	150.4	270.5	2,566.6
20		120.1	150.4	270.5	2,604.8
21		120.1	150.4	270.5	2,637.5
22		120.1	150.4	270.5	2,664.7
23		120.1	150.4	270.5	2,686.5
24		120.1	150.4	270.5	2,700.2
25		120.1	150.4	270.5	2,705.6
Rate of return:	24%				
Net present value discount factor	10%	12%	15%	17%	20%
	6,528	4,672	2,735	1,827	846

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 14: SIMULATED ECONOMIC RATE OF RETURN
Model 3: Base 2.0 ha
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,619.7	189.3	75.2	1,884.2	-
2	28.3	118.0	150.4	296.7	92.8
3	28.3	69.8	150.4	248.5	116.8
4	28.3	71.8	150.4	250.5	135.2
5	28.3	72.2	150.4	250.9	171.6
6		70.1	150.4	220.9	194.9
7		63.1	150.4	213.5	232.0
8		62.2	150.4	212.6	401.9
9		62.2	150.4	212.6	517.7
10		62.2	150.4	212.6	681.2
11		62.2	150.4	212.6	735.7
12		62.2	150.4	212.6	762.9
13		62.2	150.4	212.6	790.2
14		62.2	150.4	212.6	844.7
15		62.2	150.4	212.6	871.9
16		62.2	150.4	212.6	899.2
17		62.2	150.4	212.6	940.1
18		62.2	150.4	212.6	980.9
19		62.2	150.4	212.6	1,008.2
20		62.2	150.4	212.6	1,008.2
21		62.2	150.4	212.6	1,008.2
22		62.2	150.4	212.6	1,008.2
23		62.2	150.4	212.6	1,008.2
24		62.2	150.4	212.6	953.7
25		62.2	150.4	212.6	844.7
Rate of return: 11%					
Net present value discount factor	10%	12%	15%	17%	20%
	265	(309)	(900)	(1,173)	(1,463)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 15: SIMULATED ECONOMIC RATE OF RETURN
Model 3: 1.0 ha Coconuts
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,619.7	189.3	75.2	1,884.2	-
2	28.3	118.0	150.4	296.7	92.8
3	28.3	88.3	150.4	267.0	116.8
4	28.3	93.9	150.4	222.6	135.2
5	28.3	100.6	150.4	279.3	171.6
6		90.7	150.4	241.1	194.9
7		87.8	150.4	238.2	232.0
8		86.9	150.4	237.3	588.8
9		86.9	150.4	237.3	898.8
10		86.9	150.4	237.3	1,284.5
11		86.9	150.4	237.3	1,460.5
12		86.9	150.4	237.3	1,556.3
13		86.9	150.4	237.3	1,620.9
14		86.9	150.4	237.3	1,675.4
15		86.9	150.4	237.3	1,702.7
16		86.9	150.4	237.3	1,729.9
17		86.9	150.4	237.3	1,770.8
18		86.9	150.4	237.3	1,811.7
19		86.9	150.4	237.3	1,838.9
20		86.9	150.4	237.3	1,838.9
21		86.9	150.4	237.3	1,838.9
22		86.9	150.4	237.3	1,838.9
23		86.9	150.4	237.3	1,838.9
24		86.9	150.4	237.3	1,784.4
25		86.9	150.4	237.3	1,675.4
Rate of return: 17%					
Net present value					
discount factor	10%	12%	15%	17%	20%
	3,233	1,984	683	81	(568)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 16: SIMULATED ECONOMIC RATE OF RETURN
Model 3: 2.0 ha Coconuts
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,619.7	189.3	75.2	1,884.2	-
2	28.3	118.0	150.4	296.7	92.8
3	28.3	88.3	150.4	267.0	116.8
4	28.3	93.9	150.4	272.6	135.2
5	28.3	100.6	150.4	279.3	171.6
6		109.3	150.4	259.7	194.9
7		114.3	150.4	264.7	232.0
8		120.7	150.4	271.1	588.8
9		111.6	150.4	262.0	898.8
10		111.6	150.4	262.0	1,284.5
11		111.6	150.4	262.0	1,647.4
12		111.6	150.4	262.0	1,937.4
13		111.6	150.4	262.0	2,224.2
14		111.6	150.4	262.0	2,400.2
15		111.6	150.4	262.0	2,496.0
16		111.6	150.4	262.0	2,560.6
17		111.6	150.4	262.0	2,601.5
18		111.6	150.4	262.0	2,642.4
19		111.6	150.4	262.0	2,669.6
20		111.6	150.4	262.0	2,669.6
21		111.6	150.4	262.0	2,669.6
22		111.6	150.4	262.0	2,669.6
23		111.6	150.4	262.0	2,669.6
24		111.6	150.4	262.0	2,615.1
25		111.6	150.4	262.0	2,506.1
Rate of return: 20%					
Net present value discount factor	10%	12%	15%.	17%	20%
	5,246	3,477	1,654	815	(77)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 17: SIMULATED ECONOMIC RATE OF RETURN
Model 3: 1.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,619.7	189.3	75.2	1,884.2	-
2	28.3	118.0	150.4	296.7	92.8
3	28.3	144.3	150.4	323.0	116.8
4	28.3	164.5	150.4	343.2	135.2
5	28.3	170.2	150.4	348.9	171.6
6		134.1	150.4	284.5	194.9
7		115.6	150.4	266.0	232.0
8		114.8	150.4	265.2	401.9
9		100.4	150.4	250.8	517.7
10		100.1	150.4	250.5	746.6
11		100.5	150.4	250.9	893.7
12		100.2	150.4	250.6	1,068.1
13		100.2	150.4	250.6	1,198.9
14		100.2	150.4	250.6	1,329.7
15		100.2	150.4	250.6	1,392.4
16		100.2	150.4	250.6	1,457.8
17		100.2	150.4	250.6	1,534.1
18		100.2	150.4	250.6	1,610.4
19		100.2	150.4	250.6	1,670.4
20		100.2	150.4	250.6	1,707.2
21		100.2	150.4	250.6	1,742.6
22		100.2	150.4	250.6	1,763.0
23		100.2	150.4	250.6	1,771.2
24		100.2	150.4	250.6	1,716.7
25		100.2	150.4	250.6	1,607.7
Rate of return:	14%				
Net present value discount factor	10%	12%	15%	17%	20%
	1,507	555	(410)	(845)	(1,098)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 18: SIMULATED ECONOMIC RATE OF RETURN
Model 3: 2.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,619.7	189.3	75.2	1,884.2	-
2	28.3	118.0	150.4	296.7	92.8
3	28.3	144.3	150.4	323.0	116.8
4	28.3	164.5	150.4	343.2	135.2
5	28.3	170.2	150.4	348.9	171.6
6		208.7	150.4	359.1	194.9
7		209.1	150.4	359.5	232.0
8		214.1	150.4	364.5	401.9
9		166.5	150.4	316.9	517.7
10		152.5	150.4	302.9	746.6
11		153.0	150.4	307.4	893.7
12		138.4	150.4	288.8	1,068.1
13		138.1	150.4	288.5	1,264.3
14		138.5	150.4	288.9	1,487.8
15		138.2	150.4	288.6	1,697.6
16		138.2	150.4	288.6	1,866.6
17		138.2	150.4	288.6	2,019.2
18		138.2	150.4	288.6	2,130.9
19		138.2	150.4	288.6	2,229.0
20		138.2	150.4	288.6	2,301.2
21		138.2	150.4	288.6	2,372.1
22		138.2	150.4	288.6	2,425.2
23		138.2	150.4	288.6	2,470.2
24		138.2	150.4	288.6	2,451.1
25		138.2	150.4	288.6	2,362.5
Rate of return: 15%					
Net present value discount factor	10%	12%	15%	17%	20%
	2,253	1,050	(148)	(680)	(1,224)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 19: SIMULATED ECONOMIC RATE OF RETURN
Model 3: 1.0 ha Coconuts and 1.0 ha Rubber
(Rp'000)

	COSTS				
	Investment /a	Crop production	Subsistence /b	Total	Benefits
Year 1	1,619.7	189.3	75.2	1,884.2	-
2	28.3	118.0	150.4	296.7	92.8
3	28.3	123.7	150.4	302.4	116.8
4	28.3	146.4	150.4	325.1	135.2
5	28.3	157.8	150.4	336.5	171.6
6		166.9	150.4	317.3	194.9
7		178.0	150.4	328.4	232.0
8		148.5	150.4	298.5	495.3
9		124.5	150.4	274.9	731.6
10		124.9	150.4	275.3	1,069.0
11		124.9	150.4	275.3	1,344.2
12		124.8	150.4	275.2	1,624.8
13		125.1	150.4	275.5	1,822.8
14		124.9	150.4	275.3	2,026.5
15		124.9	150.4	275.3	2,155.0
16		124.9	150.4	275.3	2,247.7
17		124.9	150.4	275.3	2,326.7
18		124.9	150.4	275.3	2,400.3
19		124.9	150.4	275.3	2,462.9
20		124.9	150.4	275.3	2,501.1
21		124.9	150.4	275.3	2,533.8
22		124.9	150.4	275.3	2,561.0
23		124.9	150.4	275.3	2,582.8
24		124.9	150.4	275.3	2,542.0
25		124.9	150.4	275.3	2,438.4
Rate of return: 17%					
Net present value discount factor	10%	12%	15%	17%	20%
	3,921	2,397	845	139	(602)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

INDONESIA

TRANSMIGRATION II

A Comparative Analysis of Alternative Cropping Strategies for Land Settlement

Summary of Existing Farm Models

Introduction

1. Three farm models have been selected from existing Bank reports/projects for comparison with the theoretical models developed for this analysis: The Baturaja settlement model from Transmigration I; Model 3 from the Identification of Transmigration II, III and IV (this model consists of 0.8 ha pasture land, 1.0 ha food crops, 0.2 ha house lot, and 2.0 ha clonal rubber at full development); and, the smallholder new rubber development model for Jambi from NES II. These models represent the approach adopted for land settlement in Indonesia in previous Bank projects in that all three models have rubber developed as the primary farm cash crop, with food crops being grown on a subsistence basis.

2. These three models lend well for comparison with the theoretical models in that (i) all are similar in total farm size; (ii) all were developed for implementation on soils similar to those in the Transmigration II project area (red yellow podzolic soils); (iii) all were designed for land settlement projects; and (iv) all have an initial cropping strategy provided to the

farmer by a project in the early years of settlement and assume that full farm development is largely the responsibility of the farmer, although the projects provide planting materials and extension advice to the farmers for farm development.

3. The existing farm models have been summarized and brought into a common medium for comparison with the theoretical farm models developed for the analysis. All physical data concerning farm development, yields, input requirements, etc., have been adapted as presented in original form. Farm budgets, crop production costs, etc., have been reestimated using the prices derived in Annex 1 (see Tables 8-14) to bring the existing farm models up to constant 1978 dollars and Rps. A simulated economic rate of return has been estimated for each of the existing models using the assumptions discussed in Annex 1, and with per family investment costs adjusted to constant 1978 levels by the conversion factors shown in Annex 1, Table 18. The methodology utilized for comparing the existing and theoretical models is the same as discussed in para. 5 of the main report.

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4. The existing models have been summarized using the two step process discussed in para. 6 of the main report. The models are analyzed in their full farm development form as originally presented, and then analyzed assuming only 2.0 ha of the farm area is developed, the "initial farm development" cropping strategy. The assumptions used for developing the 2.0 ha farm model variations are discussed in the summaries of each model.

5. The results of all analyses are shown in Appendices 1-3 at the end of the annex.

Baturaja Settlement Model - Transmigration I

6. The Baturaja settlement model provides a farmer with five ha of land. It assumes that by full development of the farm (in Year 12 on site), a farmer will have three ha of rubber (one block planted and two settler planted), 1.8 ha of food crop and pasture land and a cow provided by the project, and 0.2 ha of land as the family garden and houselot. The farm development sequence is as follows:

(a) Farmer arrives on site in May of Year 1. 0.5 ha of land has been cleared by the time of arrival, which the farmer develops for food and garden crops (0.3 and 0.2 ha each, respectively).

(b) In Year 2, the farmer clears himself 0.5 ha of his reserve land. This 0.5 ha is planted to food crops, with the food crop land from the previous year planted to cassava, and then to a legume cover crop. The farmer receives his cow at the end of the year. In addition, he receives 1.0 ha of block planted rubber on contract from PNP X.

(c) In Years 3-5, the farmer clears himself 0.5 ha of land per annum. This newly cleared land is planted to food crops, then to cassava, and then to the legume cover crop. No one area of land is planted with food crops more than one year consecutively.

(d) In Years 6-7 the farmer clears 0.5 ha per year and plants rubber. In Year 6 food crops - cassava - legume cover crop have completed their initial rotation on newly cleared land. Food crops are grown in their initial 0.3 ha block, and cassava is grown only in the family garden. In future years food crops are rotated with the legume cover crop around a 2.8 ha block, with 0.3 ha of food crops and 2.5 ha of pasture/legume cover crop per annum.

(e) In Years 11-12 the farmer clears 0.5 ha of land each year and plants rubber, thus completing on-farm development.

7. The summary analysis of the Baturaja settlement model is presented in Tables 1-9. Tables 1-3 show per family investment costs, on-farm land development, and crop production costs per ha. All physical development information is taken as presented in the Transmigration I project appraisal report. Tables 4-6 and 7-9 show a summary labor analysis, farm budget, and simulated economic rate of return for, respectively, the full 5 ha farm development and 2.0 ha initial farm development assuming the farmer has only the 1.0 ha block planted rubber and 0.2 ha family garden, 0.3 ha food crops and 0.5 ha pasture land/legume cover crop.

8. For the 2.0 ha analysis it is assumed that the settler receives 0.5 ha of cleared land on arrival on site in May/June of Year 1. This land is developed for food crops and garden crops in the same manner as for the full farm development model. In Year 2 the farmer clears 0.5 ha of land, which is planted with food crops, with the previous years food crop land planted with cassava, and then a legume cover crop. The farmer also receives 1.0 ha of block planted rubber and a cow in Year 2. This completes on-farm development. Food crops and the legume cover pasture crop are rotated in a 0.8 ha block, with 0.3 ha of food crops planted every year.

Model 3: Identification of Transmigration II, III and IV

9. Model 3 provides a settler with 4 ha of land. Full farm development includes 2.0 ha of clonal rubber (farmer planted with estate assistance), 1.0 ha of intercropped food crops, 0.8 ha pasture land, and 0.2 ha family

house lot and garden. In addition, the model also provides the settler with a cow. The farmer development sequence is as follows:

(a) Farmer arrives on site in May of Year 1 (Year 0 for economic purposes). On arrival he is given a 0.7 ha plot of clean cleared land, which is developed for food crops (0.5 ha), family garden (0.1 ha) and house lot (0.1 ha). It is assumed that the settler builds his own house.

(b) In Year 2 the settler clears an additional 0.8 ha of his land. Of this land 0.3 ha is used for pasture development, and 0.5 ha is utilized for food crops, bringing the total area of land under food crops to 1.0 ha. The farmer receives his cow at the end of Year 2.

(c) In Years 3-5 the farmer plants his first ha of clonal rubber, and in Years 3-4 clears the remainder of his land utilized for pasture land. The annual sequence of land clearing is as follows: Year 3 - 0.4 ha rubber, 0.3 ha pasture; Year 4 - 0.3 ha rubber, 0.2 ha pasture; Year 5 - 0.3 ha rubber. At the end of year five the farmer has cleared and cropped all land except for one ha of reserve land.

(d) This remaining ha of reserve land is left uncleared until Year 10. In Year 10 the farmer clears 0.25 ha of this land and plants it to rubber. The same sequence is followed in Years 11-13, with 0.25 ha of land cleared and planted to rubber each year. Full farm development is thus completed in Year 13.

10. The summary analysis of Model 3 is presented in Tables 10-17. Table 10 shows per family investment costs. Tables 11-12 show farm development and yields and crop production costs. Tables 13-15 show family labor supply/demand balances, farm budget, and simulated economic rate of return analysis for the model assuming full farm (4.0 ha) development. Tables 16-17 show the farm budget and simulated economic rate of return analysis for the farm model assuming only two ha of land are developed (the labor supply/demand balance for this model is presented in Table 13). All the results of the analyses are presented in the appendices at the end of the chapter.

11. The 2.0 ha initial farm development model developed for the analysis assumes the following:

(a) The farmer arrives on site in Year 1 and receives 0.7 ha of cleared land. This land is utilized for food crops, garden and house lot.

(b) In Year 2 the farmer clears another 0.5 ha of land for food crops, but does not clear any land for pasture development (it is assumed the farmer is not provided with a cow).

(c) In Years 3-5 the farmer clears, respectively, 0.4, 0.3, and 0.3 ha of land for rubber, but does not clear any land for pasture development. It is assumed farm development is complete in Year 5 with the farmer having 1.0 ha each of food crops and rubber, and 0.2 ha for the family house lot and garden.

New Smallholder New Rubber Settlement Model - NES II

12. The smallholder new rubber settlement model provides a settler with 5 ha of land. At full development, the settler has 2 ha of block planted rubber, 0.2 ha for family house lot and garden, and 2.8 ha of land planted to food crops (1.0 ha) and a legume cover crop (1.8 ha). It is assumed that the area planted to food and legume crops is rotated in the manner described in para. 3; however, the model provides no cattle for the settlers, so the farmer has the option of planting part of the 2.8 ha food/legume crop area to perennial crops if he so desires.

13. On-farm development is as follows:

(a) Settler arrives on site in May/June of Year 1 (Year 0 for economic analysis). 0.6 ha has been cleared by his arrival on site, and is developed as follows: 0.4 for food crops, 0.05 for house lot, and 0.15 for family garden. In addition the settler receives 2.0 ha of block planted rubber, planted under contract with PNP __.

(b) In Years 3-9 the settler clears 0.2 ha of land per annum. During this time period the area under food crops is gradually increased from 0.4 ha in Years 1 and 2 to 0.8 ha in Year 3, 0.9 ha in Year 4, and finally reaching 1.0

ha in Year 5. The legume cover crop area is increased from 0.2 ha in Year 3 to 1.3 ha by Year 8. Table 19 shows the detailed features of on-farm development. [Rubber development costs are considered investment costs until the first year of tapping (Year 7 of planting), after which time they are assumed by the settler.]

(c) At the end of Year 8 the settler has 0.2 ha for house lot/garden, 2.0 ha block planted rubber, 1.0 ha food crop land, 0.8 ha under legume cover crop, and 1.0 ha reserve land. The model assumes this 1.0 ha reserve land is utilized in the food/legume cover crop rotation.

14. The basic model assumptions on family investment costs, family labor supply, farm development, yields, and crop production costs are shown in Tables 18-22. Tables 23 and 26 show farm family labor supply/demand balance for full farm development and 2.0 ha farm development./1 Tables 24 and 27 show farm budgets for the same, and Tables 25 and 28 show the simulated economic rate of return analysis for the same.

/1 For the 2.0 ha analysis for the NES II model, it is assumed that the farmer receives only 1.0 ha of block planted rubber and developes only his food crop area in Years 1 through 5. The settler does not clear any land for planting legume cover crop. Total farm area developed is thus 0.2 ha house lot garden, 1.0 ha rubber, and 1.0 ha food crops. All costs have been adjusted accordingly.

Table 1: PER FAMILY INVESTMENT COSTS - TRANSMIGRATION I /a

Item	Cost - constant 1976 US$
Recruitment/transport	300
Local site management	70
Infrastructure/roads	1,310
Settler house	500
Rubber development (1 ha) /b	1,865
Cow /c	290
Subsistence package	340
Total	4,670
Conversion factor to constant 1978 US$:	
Local	1.233
Foreign exchange /d	1.160
Total 1978 US$	5,577
Physical contingencies (10%)	578
Total Cost	6,155

/a Costs exclude crop production costs for food crops, garden crops and settler planted rubber.

/b All rubber development costs for years 1 to 6 for block planted rubber. Settler assumes costs after year 6.

/c Includes pasture development investment costs.

/d Foreign exchange costs are 53% of total costs.

Table 2: PHYSICAL DEVELOPMENT AND YIELDS - BATURAJA SETTLEMENT, TRANSMIGRATION I

	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Physical Development and Area Cropped (ha)																									
Garden crops	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Food crops																									
Rice	0.3	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Beans/groundnuts		0.3	0.5	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Cassava		0.3	0.5	0.5	0.5	0.5	0.5																		
Farmer planted rubber						0.5	0.5				0.5	0.5													
Fodder crop		0.3	0.5	0.5	0.5																				
Block planted rubber		1.0																							
Uncleared land	4.5	3.0	2.5	2.0	1.5	1.0	0.5																		
Yields (kg/ha) /a																									
Garden Area /b																									
Rice		120	150	180	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Cassava	1,600	800	800	1,000	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
Beans/groundnuts		60	60	80	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Food Crop Area																									
Rice	400	600	600	600	600	600	450	450	450	450	450	540	540	540	540	540	630	630	630	630	630	630	630	630	630
Cassava		1,800	1,800	1,800	1,800	1,800	1,800																		
Beans/groundnuts	180	360	360	360	400	400	370	370	370	370	370	460	460	460	460	460	460	460	460	460	460	460	460	460	460
Rubber (air dry sheet) /c																									
Block planted							200	500	700	1,000	1,100	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,080	972	872
Farmer planted																									
0.5												100	250	350	500	550	600	600	600	600	600	600	600	600	600
0.5													100	250	350	500	550	600	600	600	600	600	600	600	600
0.5																	100	250	350	500	550	600	600	600	600
0.5																		100	250	350	500	550	600	600	600

/a Assumes the following yields:

Yield Estimates (tons/ha)	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 & on
Garden Area																			
Rice (padi)	1.2	1.2	1.5	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Beans/groundnuts (in shell)	0.6	0.6	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Cassava (wet)	8	8	8	10	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Food Crop Area																			
Rice (padi)	1.2	1.2	1.2	1.2	1.2	1.2	1.5	1.5	1.5	1.5	1.5	1.8	1.8	1.8	1.8	1.8	2.1	2.1	2.1
Beans/groundnuts (in shell)	0.6	0.6	0.6	0.6	0.6	0.6	0.9	0.9	0.9	0.9	0.9	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Cassava (wet)		6	6	6	6	6	6												
Rubber (air dry sheet)																			
Block planted						0.2	0.5	0.7	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Farmer planted						0.2	0.5	0.7	1.0	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

/b Excludes fruit and vegetable crops.

/c Assumes peak yield retained until 20th year after planting, then decliing at 10% per year.

Table 3: PHYSICAL INPUTS AND COSTS - BATURAJA SETTLEMENT, TRANSMIGRATION I

	Seed/cuttings Amount kg/ha	Seed/cuttings Unit cost /a Rp/kg	Seed/cuttings Total cost '000 Rp	Urea Amount kg/ha	Urea Unit cost /a Rp/kg	Urea Total cost /a '000 Rp	TSP Amount kg/ha	TSP Unit cost Rp/kg	TSP Total cost /a '000 Rp	Crop protection Rp (ha) /a	Total costs ha '000 Rp /a
Food Crops											
Rice	50	150 (300) /b (300)	7.5 (15.0) (15.5)	100	70 (106.3) /b (127.9) /c	7.0 (10.6) (12.8)	50	70 (99.5) /b (119.1) /c	3.5 (5.0) (6.0)	2.5(4.1) /b (4.1) /c	20.5([illegible]) /b ([illegible]) /c
Cassava				50	70 (106.3) /b (127.9) /c	3.5 (5.3) (6.4)	50	70 (99.5) /b (119.1) /c	3.5 (5.0) (6.0)		7.0(10.3) /b ([illegible]) /c
Beans/Groundnuts	120	160 (160) /b (160) /c	19.2 (19.2)	50	70 (106.3) /b (127.9) /c	3.5 (5.3) (6.4)	100	70 (99.5) /b (119.1) /c	7.0(10.0) (11.9)	2.5(4.1) /b (4.1) /c	32.2(38.[illegible]) /b (41.6) /c

Pasture Maintenance Costs (Rp) /d	Year 1	2-20
Veterinarian	150.0	150.0
Maintenance		270.0
Tools	25.0	25.0
Pasture Maintenance		15.0
Total	175.0	460.0

Rubber Costs /e	Unit	Amount Yr. 1	2	3	4	5	6	7 & on	Cost '000 Rp Yr. 1	2	3	4	5	6	7 & on
Planting Materials	polybags	550	27.5						60.5	3.0					
Fertilizer	kg	225	240	280	280	430	430	400	48.6	24.4	28.1	28.1	37.0	37.0	25.4
Lining Pegs	pegs	550							1.1						
Tools									1.0	0.6	0.8				
Insecticides									0.2	0.3	0.3	2.2	0.3	16.6	0.3
Land Clearing /f									22.3						
Miscellaneous /g									0.2	5.6	0.5	0.3	0.5	0.6	0.6
Total									132.8	32.9	29.7	30.6	37.8	54.2	26.3

/a Numbers in parentheses are economic prices. Other numbers are financial prices.
/b 1978 prices.
/c 1985 prices.
/d Estimated on a per bull basis - one bull per farm.
/e Settler planted rubber - costs on a per ha basis and correspond to appropriate planting years. See table 4.
/f Includes cost of necessary chemicals.
/g Includes transport costs.

Table 4: SUMMARY LABOR ANALYSIS FULL 5 HA - BATURAJA SETTLEMENT, TRANSMIGRATION I
(Man-days)

	Year 1	2	3	4	5	6	7	8	9	10	11	12	13
Labor Supply /a													
Family Labor Units Year 1													
Husband	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Wife	0.15	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.15	
Child	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.25	0.5	0.6	0.7	1.0	
Child								0.05	0.05	0.05	0.05	0.05	
Child								0.05	0.05	0.05	0.05	0.05	
Total Family Labor Units	1.25	1.50	1.50	1.50	1.50	1.50	1.60	1.75	2.00	2.00	2.00	2.25	2.25
Total Man-days per Year (1FLU = 360 man-days)	450	540	540	540	540	540	570	630	720	720	720	810	810
Total Man-days per Month	37.5	45	45	45	45	45	47.5	52.5	60	60	60	67.5	67.5

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Labor Supply/Demand Balance /b													
Year 1													
Supply					37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	300
Demand					10	10	10	15	10	15	15	15	100
Surplus/(deficit)					27.5	27.5	27.5	27.5	27.5	22.5	22.5	22.5	200
Year 2													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	10	10	10	10	40	45	45	60	55	60	60	45	450
Surplus/(deficit)	35	35	35	35	5	0	0	(15)	(10)	(15)	(15)	-	90
Year 3													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	35	35	35	40	35	35	35	50	40	40	45	35	460
Surplus/(deficit)	10	10	10	5	10	10	10	(5)	5	5	0	10	80
Year 4													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	20	20	20	30	20	20	20	35	30	30	40	40	325
Surplus/(deficit)	25	25	25	15	25	25	25	10	15	15	5	5	215
Year 5													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	25	25	25	30	20	20	20	35	30	30	40	35	335
Surplus/(deficit)	20	20	20	15	25	25	25	10	15	15	5	10	205
Year 6													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	20	20	25	30	20	20	20	40	40	45	50	35	365
Surplus/(deficit)	25	25	20	15	25	25	25	5	5	0	(5)	10	175
Year 7													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	25	25	25	30	25	25	25	40	40	45	63	48	416
Surplus/(deficit)	25	20	20	15	20	20	20	5	5	0	(18)	(3)	124
Year 8													
Supply	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	630
Demand	38	38	38	43	38	38	38	38	33	38	38	38	456
Surplus/(deficit)	14.5	14.5	14.5	9.5	14.5	14.5	14.5	14.5	19.5	14.5	14.5	14.5	174
Year 9													
Supply	60	60	60	60	60	60	60	60	60	60	60	60	720
Demand	33	33	33	33	33	33	33	38	33	38	38	38	416
Surplus/(deficit)	27	27	27	27	27	27	27	22	27	22	22	22	304
Year 10													
Supply	60	60	60	60	60	60	60	60	60	60	60	60	720
Demand	33	33	33	33	33	33	38	33	38	38	38	38	421
Surplus/(deficit)	27	27	27	27	27	27	22	27	22	22	22	22	299
Year 11													
Supply	60	60	60	60	60	60	60	60	60	60	60	60	720
Demand	33	33	33	33	33	33	33	46	43	53	46	46	465
Surplus/(deficit)	27	27	27	27	27	27	27	14	17	7	14	14	255
Year 12													
Supply	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	810
Demand	41	43	41	46	41	41	41	54	51	61	66	56	582
Surplus/(deficit)	26.5	24.5	26.5	21.5	26.5	26.5	26.5	13.5	16.5	6.5	1.5	11.5	228
Year 13													
Supply	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	67.5	810
Demand	51	56	56	56	53	53	53	53	53	53	55	53	645
Surplus/(deficit)	16.5	11.5	11.5	11.5	14.5	14.5	14.5	14.5	14.5	14.5	12.5	14.5	165

/a Assumes wife decreases on farm labor as oldest male child grows up and works on farm.
/b Labor demand based on following crop labor requirements:

Block Planted Rubber (man-days/ha)

Year 1	
1. Felling and stumping (10% area)	40
2. Chemical clearing (40% area)	
Slashing and spraying	12
Wiping alang alang	20
Removing woody growth	8
3. Mechanical clearing (60% area)	
Slashing and clearing	50
4. Terraces and bunds	40
5. Roads and drains	5
6. Lining and holing	20
7. Planting rubber	15
8. Planting covers	15
9. Wiping alang alang and weeding	70
10. Fertilizing rubber	2
11. Fertilizing covers	3
12. Surveys and miscellaneous	40
Total Year 1	340
Year 2	
1. Supplying	2
2. Wiping alang alang	12
3. Weeding interrows	82
4. Weeding circles	16
5. Pests and diseases	2
6. Fertilizing rubber	5
7. Fertilizing covers	1
8. Roads, drains, terraces	12
9. Miscellaneous	18
Total Year 2	150
Year 3	
1. Wiping alang alang	12
2. Weeding interrows	24
3. Weeding circles	20
4. Pests and diseases	2
5. Pruning	4
6. Fertilizing trees	4
7. Roads, drains, terraces	2
8. Miscellaneous	17
Total	85
Year 4	
1. Wiping alang alang	12
2. Weeding interrows	12
3. Weeding circles	24
4. Pests and diseases	2
5. Pruning	4
6. Fertilizing trees	4
7. Roads, drains, terraces	2
8. Miscellaneous	10
Total Year 4	70
Year 5	
1. Wiping alang/weeding interrows	24
2. Weeding circles	12
3. Pests and diseases	2
4. Fertilizing trees	4
5. Roads, drains, terraces	2
6. Miscellaneous	16
Total Year 5	60
Year 6	
1. Wiping alang alang/weeding interrows	12
2. Weeding circles	12
3. Pests and diseases	1
4. Fertilizing trees	4
5. Roads, drains, terraces	2
6. Tapping and processing	85
7. Miscellaneous	16
Total Year 6	132
Mature	
1. General maintenance including fertilizing, weeding	24
2. Tapping and processing	180
Total Mature	204

Subsistence Crops (man-days/ha)

Rice/Beans	
1. Land preparation	55
2. Planting	25
3. Fertilizing	15
4. Weeding	80
5. Pest control	25
6. Harvesting and sun drying	30
7. Threshing and transport	15
Total Rice/Beans	245
Cassava	
1. Land preparation	35
2. Transport material and planting	10
3. Fertilizing	5
4. Weeding	65
5. Harvesting and transport	15
6. Cover crop establishment	25
Total Cassava	155

Farmer Planted Rubber /a

Year 1	
1. Terraces and bunds	50
2. Roads and drains	5
3. Lining and holing	20
4. Planting	15
5. Wiping alang alang and weeding	25
6. Fertilizing rubber	2
7. Miscellaneous	3
Total Year 1	120
Year 2 /b	
1. Supplying	2
2. Wiping alang alang	12
3. Weeding interrows	12
4. Weeding circles	16
5. Miscellaneous	18
Total Year 2	60

/a On land preapred for subsistence crops and with cover crop already established.

/b Years 3, 4, 5 at 5 man-days each month. Years 6 and mature as for block planted rubber.

Table 5: SUMMARY FARM BUDGET FOR FULL FIVE HA - BATURAJA SETTLEMENT, TRANSMIGRATION I /a
(Rp '000)

	Year 5 Project completion	Year 8	Year 10	Year 12 Full farm development	Year 20	Year 25
Gross Value of Production						
Rice	56.0	45.5	45.5	51.8	58.1	58.1
Cassava	13.0	13.0	5.2	5.2	5.2	5.2
Beans/groundnuts	80.0	75.2	75.2	89.6	89.6	89.6
Other garden crops	38.8	45.0	45.0	45.0	45.0	45.0
Rubber		212.0	463.0	602.9	1,504.8	1,516.3
Total	187.8	390.7	633.9	793.5	1,702.7	1,714.2
Less: Costs of production						
Food crops	35.1	22.3	22.3	22.3	22.3	22.3
Rubber		148.9	60.5	149.4	78.9	78.9
Net value of production	152.7	219.5	551.1	621.8	1,601.5	1,613.0
Add: Sale of poultry /b	24.0	24.0	24.0	24.0	24.0	24.0
cows /b			50.0	50.0	50.0	
Off-farm income /c	42.0					
Less: IPEDA tax /d	7.6	11.0	27.8	31.1	80.1	80.7
Hired labor /e				0.6		
Subsistence /f	135.1	135.1	135.1	135.1	135.1	135.1
Net farm income	76.8	97.4	462.2	529.0	1,460.3	1,421.2

/a Constant 1978 financial prices.

/b As presented in Transmigration I project appraisal report.

/c Assumed hired by estate as follows for rubber planting and maintenance at Rp 600/man-day.

Year	2	3	4	5	6	7
Man-days	300	140	85	70	60	47

/d 5% of net value of production.

/e To offset labor deficit months.

/f See Annex 1, Table 15 for cost per day of subsistence.

Table 6: SIMULATED ECONOMIC RATE OF RETURN FOR FULL FIVE HA - BATURAJA SETTLEMENT TRANSMIGRATION I
(Rp '000)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Gross Value of Production																									
Food crops /a	69.0	137.8	140.0	146.8	159.2	159.2	143.1	131.5	131.5	154.5	154.5	178.1	178.1	178.1	178.1	178.1	187.2	187.2	187.2	187.2	187.2	187.2	187.2	187.2	187.2
Rubber /b																									
Block planted							99.8	249.5	349.3	545.0	599.5	654.0	654.0	654.0	654.0	654.0	654.0	654.0	654.0	654.0	654.0	654.0	588.6	529.7	476.9
Settler planted												54.5	190.8	327.0	463.3	572.3	681.3	844.8	981.0	1,117.3	1,226.3	1,280.8	1,308.0	1,308.0	1,308.0
Other garden crops /c		21.3	25.8	30.8	38.8	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Total	69.0	159.1	165.8	177.6	198.0	204.2	287.9	426.0	525.8	744.5	799.0	931.6	1,067.8	1,204.1	1,340.4	1,449.4	1,567.5	1,731.0	1,867.2	2,003.5	2,112.5	2,167.0	2,128.8	2,069.9	2,017.1
Add: Sale of: Poultry /c		24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Cows /d										50.0		50.0		50.0		50.0		50.0		50.0		50.0		50.0	
Total	69.0	183.7	189.8	201.6	222.0	228.2	311.9	450.0	549.8	818.5	823.0	1,005.6	1,091.8	1,278.1	1,364.4	1,523.4	1,591.5	1,805.0	1,841.2	2,077.5	2,136.5	2,241.0	2,152.8	2,143.9	2,041.1
Less: Costs of production																									
Food crops /e	19.0	50.7	50.7	50.7	50.7	50.7	43.7	32.4	32.4	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5	33.5
Rubber /f						66.5	109.3	57.6	56.4	60.5	138.8	149.3	83.9	82.7	86.8	98.6	92.9	78.9	78.9	78.9	78.9	78.9	78.9	78.9	78.9
Total	19.0	50.7	50.7	50.7	50.7	117.2	153.0	90.0	88.8	94.0	172.3	182.8	117.4	116.2	120.3	132.1	126.4	112.4	112.4	112.4	112.4	112.4	112.4	112.4	112.4
Net value of production	50.0	132.4	139.1	150.9	171.3	111.0	158.5	360.0	961.0	724.6	650.7	822.8	974.4	1,161.9	1,244.1	1,391.3	1,465.1	1,692.6	1,778.8	1,965.1	2,024.1	2,128.6	2,040.4	2,031.5	1,928.7
Less: Investment costs /g																									
Infrastructure	1,362.9	157.1																							
Rubber /h	454.7	161.7	101.0	90.9	90.9	111.1																			
Subsistence /i	75.2	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4	150.4
Net simulated economic cash flow	(1,842.8)	(336.8)	(112.4)	(90.4)	(70.0)	(150.5)	8.1	209.6	310.6	574.2	500.3	672.4	829.0	1,011.5	1,093.7	1,240.9	1,314.7	1,542.2	1,628.4	1,814.7	1,873.7	1,978.2	1,890.0	1,881.1	1,778.3

Rate of return - 14%

/a Includes foodcrops grown in garden area.
/b See Table 4 for yields.
/c The production and value of other garden crops and poultry is as follows:

	Year 2	Year 3	Year 4	Year 5	Year 6	Full production
Garden						
Fruits						
Bananas (bunches)	25	25	25	25	25	2,750
Papaya	200	208	208	208	208	5,200
Pineapple	-	30	30	30	30	1,050
Jackfruit	-	-	-	-	50	4,000
Rambutan (bunches)	-	-	-	30	30	3,000
Citrus	-	-	75	150	150	2,250
						18,250
Vegetables						
Cassava leaves (bnchs)	360	360	360	360	360	5,400
Sweet potatoes (kg)	30	30	30	30	30	450
Sw potota leaves (bnchs)	150	150	150	150	150	750
Green beans (kg)	20	20	20	20	20	2,600
Long beans (bnch)	15	15	15	15	15	150
Long bean leaves (bnch)	50	50	50	50	50	250
Sesame (kg)	5	5	5	5	5	300
Sweet corn (cobs)	200	200	200	200	200	250
Soybeans (kg)	5	5	5	5	5	1,000
						11,150
Other						
Coffee (dry kg)	-	10	10	10	10	3,500
Coconuts (nuts)	-	-	-	-	150	2,250
Cloves (kg)	-	-	7	7	7	7,700
Chili peppers, tomatoes, markisa, soursop, etc (Rp)	2,150	2,150	2,150	2,150	2,150	2,150
Total value (Rp)	21,300	25,800	30,800	38,800	45,000	45,000
Poultry						
Eggs	850	850	850	850	850	17,000
Chicken	14	14	14	14	14	7,000
Total value (Rp)	24,000	24,000	24,000	24,000	24,000	24,000

/d Adjusted from Transmigration I project appraisal report.
/e Includes production costs for poultry, pasture and other garden crops.
/f Assumes production costs for block planted rubber are investment cost through year 6.
/g Foreign exchange shadow priced with conversion factor of 0.85 (US$1.00 = Rp 488).
/h Assumes production costs assumed by settler after year 6.
/i Settler is on site for only six months in year 1.

Table 7: SUMMARY LABOR ANALYSIS 2.0 HA - BATURAJA SETTLEMENT, TRANSMIGRATION I /a
(Man-days)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Year 1													
Supply								37.5	37.5	37.5	37.5	37.5	187.5
Demand								15	10	15	15	15	70
Surplus/(Deficit)								22.5	22.5	22.5	22.5	22.5	117.5
Year 2													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	10	10	10	10	10	45	45	60	55	60	60	45	450
Surplus/(Deficit)	35	35	35	35	5	0	0	(15)	(10)	(15)	(15)	0	90
Year 3													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	35	35	35	40	35	35	35	50	40	40	45	35	460
Surplus/(Deficit)	10	10	10	5	10	10	10	(5)	5	5	0	10	80
Year 4													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	20	20	20	30	20	20	20	35	30	30	40	40	325
Surplus/(Deficit)	25	25	25	15	25	25	25	10	15	15	5	5	215
Year 5													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	25	25	25	30	20	20	20	35	30	30	40	35	335
Surplus/(Deficit)	20	20	20	15	25	25	25	10	15	15	5	10	205
Year 6													
Supply	45	45	45	45	45	45	45	45	45	45	45	45	540
Demand	20	20	25	30	20	20	20	32	30	30	37	32	316
Surplus/(Deficit)	25	25	20	15	25	25	25	13	15	15	8	13	224
Year 7													
Supply	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	570
Demand	22	20	22	27	22	22	22	29	27	27	45	42	327
Surplus/(Deficit)	25.5	27.5	25.5	20.5	25.5	25.5	25.5	18.5	20.5	20.5	2.5	5.5	243
Year 8													
Supply	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	630
Demand	32	30	32	37	32	32	32	32	27	32	30	32	380
Surplus/(Deficit)	20.5	22.5	20.5	15.5	20.5	20.5	20.5	20.5	25.5	20.5	22.5	20.5	250

/a Labor supply and demand assumptions are the same as shown in Annex 3, Table 4.

Table 8: FARM BUDGET 2.0 HA - MODEL 3, BATURAJA SETTLEMENT, TRANSMIGRATION I /a
(Rp '000)

	Year 5 Project completion	Year 8	Year 10	Year 12	Year 20	Year 25
Gross Value of Production						
Food crops	149.9	131.7	123.9	146.6	152.9	152.9
Rubber		231.5	463.0	555.6	555.6	405.1
Other garden crops	38.8	45.0	45.0	45.0	45.0	45.0
Total	188.7	408.2	631.9	747.2	753.5	603.0
Less: Costs of production						
Food crops	35.1	22.3	22.3	22.3	22.3	22.3
Rubber		26.3	26.3	26.3	26.3	26.3
Net value of production	153.6	359.6	583.3	698.3	704.9	554.4
Add: Sale of poultry /b	24.0	24.0	24.0	24.0	24.0	24.0
cows /b			50.0	50.0	50.0	
Off-farm employment /c	42.0					
Less: IPEDA tax /d	7.7	18.0	29.2	34.9	35.2	27.7
Subsistence /e	135.1	135.1	135.1	135.1	135.1	135.1
Net farm income	76.8	230.5	493.0	620.2	608.6	415.6

/a Constant 1978 financial prices.

/b As adapted from appraisal report.

/c Hired by estate to help with block planted rubber for 70 man-days at Rp 600/day.

/d 5% of net value of production.

/e See Annex 1, Table 15.

Table 9: SIMULATED ECONOMIC RATE OF RETURN 2.0 HA - BATURAJA SETTLEMENT TRANSMIGRATION I
(Rp '000)

	COSTS				BENEFITS			
Year	Investment /a	Crop production	Subsistence /c	Total costs	Food crops	Garden/ poultry cow	Rubber	Total benefits
1	1,817.6	30.6	75.2	1,923.4	69.0			69.0
2	318.8	30.9	150.4	500.1	137.8	45.3		183.1
3	101.0	30.9	150.4	282.3	140.0	49.8		189.8
4	90.9	30.9	150.4	272.2	146.8	57.8		201.6
5	90.9	30.9	150.4	272.2	159.2	62.8		222.0
6	111.1	30.9	150.4	292.4	159.2	69.0		228.2
7		57.2	150.4	207.6	143.1	69.0	99.8	311.9
8		57.2	150.4	207.6	131.5	69.0	249.5	450.0
9		57.2	150.4	207.6	131.5	69.0	349.3	549.8
10		59.9	150.4	210.3	154.5	119.0	545.0	818.5
11		59.9	150.4	210.3	154.5	68.0	599.5	823.0
12		59.9	150.4	210.3	178.1	119.0	654.0	951.1
13		59.9	150.4	210.3	178.1	69.0	654.0	901.1
14		59.9	150.4	210.3	178.1	119.0	654.0	951.1
15		59.9	150.4	210.3	178.1	69.0	654.0	901.1
16		59.9	150.4	210.3	178.1	119.0	654.0	951.1
17		59.9	150.4	210.3	178.1	69.0	654.0	901.1
18		59.9	150.4	210.3	187.2	119.0	654.0	951.1
19		59.9	150.4	210.3	187.2	69.0	654.0	901.1
20		59.9	150.4	210.3	187.2	119.0	654.0	951.1
21		59.9	150.4	210.3	187.2	69.0	654.0	901.1
22		59.9	150.4	210.3	187.2	119.0	654.0	951.1
23			150.4	210.3	187.2	69.0	588.6	844.8
24				210.3	187.2	119.0	529.7	835.9
25				210.3	187.2	69.0	476.9	733.1

Rate of return - 12%

/a Includes shadow foreign exchange adjustment and rubber development costs for years 1 to 6.
/b Includes rubber costs for year 7 and on, and poultry, garden and pasture costs.
/c See Annex 1, Table 15. Assumes settler on site for six months in year 1.
/d As presented in the appraisal report and adjusted to 1978 values.

ANNEX 3

Table 10: PER FAMILY INVESTMENT COSTS - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III, AND IV /a

Item	Cost in 1976 US$	% Foreign exchange
Transportation /b	241	
Machinery /c	47	65
Land clearing /c	232	15
Roads and bridges	594	65
Housing	170	30
Infrastructure	371	35
Malaria control /d	11	40
Maintenance/recurrent costs /d	769	27
Pasture/cow /e	608	54
Total	3,043	37
Conversion to 1978 US$	1.233 (local) 1.16 (foreign exchange)	
Total 1978, US$	3,670	
Physical contingencies (10%)	367	
Total per family cost	4,037	

/a Costs for food crop and rubber production are done separately.

/b Includes recruitment.

/c Clearing of 0.7 ha prior to settler's arrival.

/d Both are assumed recurrent costs assumed to be financed by project, assuming a five-year project.

/e Includes pasture development.

Table 11: FARM DEVELOPMENT AND ESTIMATED YIELDS - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III, AND IV

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Farm Development (ha)													
House lot	0.1												
Garden crops	0.1												
Food crops	0.5	0.5											
Pasture		0.3	0.3	0.2									
Rubber			0.4	0.3	0.3					0.25	0.25	0.25	0.25
Uncleared	3.3	2.5	1.8	1.3	1.0					0.75	0.50	0.25	
Estimated Yields (kg) /a /b													
Garden crops													
Food crops													
Rice	437.5	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0
Corn	310.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0
Cassava	4,500.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0
Beans	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0
Groundnuts	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5
Rubber: first ha									160	320	510	600	680
second ha													

Year	14	15	16	17	18	19	20	21	22	23	24	25
Farm Development (ha)												
House lot												
Garden crops												
Food crops												
Pasture												
Rubber												
Uncleared												
Estimated Yields (kg) /a /b												
Garden crops												
Food crops												
Rice	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0	875.0
Corn	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0	620.0
Cassava	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0	9,000.0
Beans	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0	105.0
Groundnuts	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5	87.5
Rubber: first ha	757	804	880	920	953	978	993	1,000	990	973	948	923
second ha			100	225	375	544	631	713	781	844	894	931

/a Taken from Annex 4 of the report and assuming the following per intercropped ha yields:

Rice	875 kg
Corn	620 kg
Cassava	9,000 kg
Beans	210 kg
Groundnuts	175 kg

Rubber	Age of trees in years	Tapping year	Yield kg
	7	1	400
	8	2	500
	9	3	600
	10	4	675
	11	5	750
	12	6	825
	13	7	875
	14	8	925
	15	9	950
	16	10	975
	17	11	1,000
	18	12	1,000
	19	13	1,000
	20	14	975
	21	15	950
	22	16	925
	23	17	900
	24	18	875
	25	19	850

/b Garden crop yields are as follows:

	Unit	Yield per 0.1 ha
Fruit trees		
Banana	Bunches	10
Papaya	No. of fruit	100
Pineapple	No. of fruit	15
Jack fruit	No. of fruit	20
Rambutan	Bunches	15
Citrus	No. of fruit	100
Other trees		
Coffee	Dry beans: kg	5
Coconuts	No. of nuts	120
Cloves	kg	3
Vegetables		
Cassava leaves	kg	150
Sweet potatoes	kg	15
Sweet potato leaves	kg	75
Green beans	kg	10
Long beans	kg	10
Long beans leaves	kg	20
Sesame	kg	2
Corn	no. of cobs	60
Soybeans	kg	3

Table 12: PHYSICAL INPUTS AND COSTS OF PRODUCTION - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III, AND IV

	Unit	Amount Yr 1	2	3	4	5	7-16	17-25	Cost in Rp Yr 1	2	3	4	5	6	7-16	17-25
Clonal rubber																
Land clearing /a									25,650							
Land preparation /b									1,665							
Chemicals																
Solar	lt	21	12	12	6	6	4		462	264	264	132	132	88		
Kerosene		21	12	12	6	6	4		420	240	240	120	120	80		
Other /c									3,578	1,110	1,233	1,233	1,233	1,233	1,233	1,233
Planting materials																
Polybags		550							60,500	2,420						
Replacements /d			22													
Fertilizer	kg	305	270	315	330	345	365	365	14,038	14,400	15,293	16,155	16,830	18,043	18,043	18,043
Miscellaneous /e									3,332	1,393	1,541	1,665	1,850	44,943	5,234	5,234
Skilled labor /f	md	10	4	3	3	2	7		6,500	2,600	1,950	1,950	1,300	1,300	4,550	
Total									116,145	22,427	20,521	21,255	21,465	65,687	29,060	24,510

	Amount - kg/ha: Fertilizer Urea	Fertilizer TSP	Muriate of potash	Sulphate of Ammonia	Sulphate of Potash	Seed	Cost - Rp: Financial	Economic 1978	Economic 1985
Food crops /g									
Rice	150	75	50			50	26,650	44,900	49,600
Corn	90	50	35			12	13,020	21,200	24,500
Cassava		45	70	100		1,250	15,580	21,700	22,600
Beans		45		75	60	30	19,600	24,000	24,900
Groundnuts		65		75	40	50	19,600	24,600	25,900

Production costs - garden and poultry (Rp) /h	Yr 1	2	3	4	5	6-20
Garden	7,398	6,165	4,932	4,932	4,932	4,392
Poultry	986	2,096	3,206	3,206	3,206	3,206

Livestock and pasture cost (Rp) /h	Yr 1	2	3-20
Pasture development	32,588	22,875	
Purchase of cow		255,848	
Operating costs	9,869	9,864	9,864

/a Includes mechanical and manual cleaning.
/b Includes lining and holing and lining pegs.
/c Includes cost of using a sprayer.
/d Assumed to be 5% of total planted.
/e Includes tools and transport costs.
/f Estate extension staff.
/g See Annex 1, Table 8 for prices used. Costs include crop protection costs.
/h As presented in Annex 4 of the report, and adjusted to 1978 values.

Table 13: SUMMARY LABOR ANALYSIS - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III AND IV
(Man-days)

Family members	Age at time of arrival	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15-25
		Number of labor units per year														
Husband	30	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Wife	25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Child	8	-	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	
Child	6	-	-	-	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	-	-	-	
Child	4	-	-	-	-	-	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	-	
Total labor units		1.5	1.6	1.6	1.7	1.8	1.9	2.1	2.2	2.5	2.7	3.0	2.7	2.9	2.5	2.5
Man-days equivalent assuming 300 man-days worked per year		450	450	480	510	540	570	630	660	750	810	900	810	870	750	750

Full Farm Development - Labor Supply/Demand Balance

		Year																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Labor Requirements (man-days)																										
Land clearing at 100 man-days/ha		-	150	56	38	-	-	-	-	-	-	-	-	-												
Subsistence cropping at 270 man-days/ha		135	270	270	270	270	270	270	270	270	270	270	270	270												
Pasture at 80 man-days/ha		-	24	48	64	64	64	64	64	64	64	64	64	64												
ees and vegetables at 100 man-days/ha		10	10	10	10	10	10	10	10	10	10	10	10	10												
Subtotal		145	454	384	382	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344
Rubber development	0.4 ha	-	-	144	51	40	34	33	26	64	64	64	64	64	64	64	64	64	64	86	86	86	86	86	86	86
	0.3 ha	-	-	-	108	38	30	25	25	19	48	48	48	48	48	48	48	48	48	48	65	65	65	65	65	65
	0.1 ha	-	-	-	-	108	38	30	25	25	19	48	48	48	48	48	48	48	48	48	65	65	65	65	65	65
	0.25 ha	-	-	-	-	-	-	-	-	-	90	32	25	21	21	16	40	40	40	40	40	40	40	40	40	40
	0.25 ha	-	-	-	-	-	-	-	-	-	-	90	32	25	21	21	16	40	40	40	40	40	40	40	40	40
	0.25 ha	-	-	-	-	-	-	-	-	-	-	-	90	32	25	21	21	16	40	40	40	40	40	40	40	40
	0.25 ha	-	-	-	-	-	-	-	-	-	-	-	-	90	32	25	21	21	16	40	40	40	40	40	40	40
Subtotal		-	-	144	159	186	102	88	76	108	221	282	307	328	259	243	258	277	296	342	359	376	376	376	376	376
Total Labor Requirements		145	454	528	541	530	446	432	420	452	565	626	651	672	603	587	602	621	690	686	703	720	720	720	720	720
Labor availability		450	480	480	510	540	570	630	660	750	810	900	810	870	750	750	750	750	750	750	750	750	750	750	750	750
Labor deficit		-	-	48	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2.0 ha Farm Development - Labor Supply/Demand Balance

		Year																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Labor Requirements (man-days)																										
nd clearing at 100 man-days/ha		-	150	56	38	-	-	-	-	-	-	-	-	-												
bsistence cropping at 270 man-days/ha		135	270	270	270	270	270	270	270	270	270	270	270	270												
Pasture at 80 man-days/ha		-	24	48	64	64	64	64	64	64	64	64	64	64												
Trees and vegetables at 100 man-days/ha		10	10	10	10	10	10	10	10	10	10	10	10	10												
Subtotal		145	454	384	382	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344
Rubber development	0.4 ha	-	-	144	51	40	34	33	26	64	64	64	64	64	64	64	64	64	64	86	86	86	86	86	86	86
	0.1 ha	-	-	-	108	38	30	25	25	19	48	48	48	48	48	48	48	48	48	48	65	65	65	65	65	65
	0.1 ha	-	-	-	-	108	38	30	25	25	19	48	48	48	48	48	48	48	48	48	65	65	65	65	65	65
Total for Farm		145	454	528	541	530	446	432	420	952	471	504	504	504	504	504	504	504	504	526	543	560	560	560	560	560
Labor availability		450	430	480	510	540	570	630	660	750	810	900	810	870	750	750	750	750	750	750	750	750	750	750	750	750

Table 14: FARM BUDGET FOR FULL FARM DEVELOPMENT - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III, AND IV /a
(Rp '000)

	Year 5	Year 8	Year 10	Year 12	Year 20	Year 25
Gross Value of Production						
Rice	61.3	61.3	61.3	61.3	61.3	61.3
Cassava	39.0	39.0	39.0	39.0	39.0	39.0
Corn	27.9	27.9	27.9	27.9	27.9	27.9
Beans	21.0	21.0	21.0	21.0	21.0	21.0
Groundnuts	10.5	10.5	10.5	10.5	10.5	10.5
Rubber			148.2	277.8	751.9	858.4
Garden crops	18.2	21.6	21.6	21.6	21.6	21.6
Total	177.9	181.3	329.5	459.1	933.2	1,039.7
Less: Costs of production						
Food crops	94.5	94.5	94.5	94.5	94.5	94.5
Pasture/livestock	9.9	9.9	9.9	9.9	9.9	9.9
Garden/poultry	8.1	8.1	8.1	8.1	8.1	8.1
Rubber	49.8	39.1	69.1	68.9	56.4	53.6
Total	162.3	151.6	181.6	181.3	168.9	166.1
Net value of production	15.6	29.7	147.9	277.8	764.3	873.6
Add: Sale of poultry /b	11.6	11.6	11.6	11.6	11.6	11.6
Less: IPEDA tax /c	0.8	1.5	7.4	13.9	38.2	43.7
Subsistence /d	135.1	135.1	135.1	135.1	135.1	135.1
Net farm income	(108.7)	(95.3)	17.0	140.4	602.6	706.4

/a Constant 1978 financial prices.

/b As adapted from the appraisal report, and adjusted to constant 1978 values.

/c 5% of net value of production.

/d See Annex 1, Table 15.

Table 15: SIMULATED ECONOMIC RATE OF RETURN FULL FARM DEVELOPMENT - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III AND IV
(Rp '000)

Year	COSTS					BENEFITS			
	Investment /a	Recurrent /b	Crop production /c	Sub-sistence /d	Total	Food crops	Garden crops poultry /e	Rubber	Total
0	472.3		75.2		547.5				
1	535.0		150.4	76.5	761.9	115.0	10.8		125.8
2	390.1		150.4	154.6	695.1	198.5	18.8		217.3
3	102.9		150.4	200.8	454.1	198.5	22.3		220.8
4		99.8	150.4	198.2	448.4	198.5	27.5		226.0
5		99.8	150.4	204.2	454.4	198.5	29.8		228.3
6		99.8	150.4	175.8	426.0	198.5	71.0		269.5
7		99.8	150.4	175.5	425.7	198.5	33.2		231.7
8		99.8	150.4	204.6	454.8	275.2	33.2		308.4
9		99.8	150.4	203.3	453.5	275.2	33.2	87.2	395.6
10		99.8	150.4	234.6	484.8	275.2	33.2	174.4	482.8
11		99.8	150.4	229.2	479.4	275.2	33.2	278.0	586.4
12		99.8	150.4	234.4	484.6	275.2	33.2	327.0	635.4
13		99.8	150.4	239.7	489.9	275.2	33.2	972.8	681.2
14		99.8	150.4	216.0	466.2	275.2	33.2	412.6	721.0
15		99.8	150.4	226.9	477.1	275.2	33.2	438.2	746.8
16		99.8	150.4	229.0	479.2	275.2	33.2	534.1	842.5
17		99.8	150.4	231.0	481.2	275.2	71.0	624.0	970.2
18		99.8	150.4	232.9	483.1	275.2	33.2	723.8	1,032.2
19		99.8	150.4	223.7	473.9	275.2	33.2	829.5	1,137.9
20		99.8	150.4	221.9	472.1	275.2	33.2	885.1	1,193.5
21		99.8	150.4	220.5	470.7	275.2	33.2	933.6	1,242.0
22		99.8	150.4	219.1	469.3	275.2	33.2	965.2	1,273.6
23		99.8	150.4	219.1	469.3	275.2	33.2	990.3	1,298.7
24		99.8	150.4	219.1	469.3	275.2	33.2	1,003.9	1,312.3
25		99.8	150.4	219.1	469.3	275.2	33.2	1,010.4	1,318.8
Rate of return		6%							

/a Includes shadow foreign exchange adjustment and rubber development costs for Years 0 to 6.
/b Project charges, considered as investment costs until year 4.
/c See Annex 1, Table 15. Assumes settler is on site for six months in Year 0.
/d Includes rubber development, poultry, garden and pasture maintenance costs.
/e As valued in appraisal report.

Table 16: FARM BUDGET 2.0 HA - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III, AND IV /a
(Rp '000)

	Year 5	Year 8	Year 10	Year 12	Year 20	Year 25
Gross Value of Production						
Food crops	159.7	159.7	159.7	159.7	159.7	159.7
Rubber			148.2	277.8	459.8	427.3
Garden crops	18.2	21.6	21.6	21.6	21.6	21.6
Total	177 9	181.3	329.5	459.1	641.1	608.6
Less: Production costs						
Food crops	94.5	94.5	94.5	94.5	94.5	94.5
Poultry/garden	8.1	8.1	8.1	8.1	8.1	8.1
Rubber	49.8	39.2	40.1	29.1	24.5	24.5
Net value of production	25.5	39.5	186.8	327.4	514.0	481.5
Add: Sale of poultry /b	11.6	11.6	11.6	11.6	11.6	11.6
Less: IPEDA tax /c	1.3	2.0	9.3	16.4	25.7	24.1
Subsistence /d	135.1	135.1	135.1	135.1	135.1	135.1
Net farm income	(99.3)	(86.0)	54.0	187.5	364.8	333.9

/a Constant 1978 financial prices.

/b As adopted from the report.

/c 5% of net value of production.

/d See Annex 1, Table 15.

Table 17: SIMULATED ECONOMIC RATE OF RETURN 2.0 Ha - MODEL 3, IDENTIFICATION OF TRANSMIGRATION II, III AND IV (Rp'000)

Year	COSTS Investment /a	Recurrent /b	Crop production /c	Sub-sistence /d	Total	BENEFITS Food crops	Garden crops poultry /e	Rubber	Total
0	472.3		75.2		547.5				
1	513.6		150.4	76.5	740.5	115.0	10.8		125.8
2	102.9		150.4	144.7	398.0	198.5	18.8		217.3
3	102.9		150.4	190.9	444.2	198.5	22.3		220.8
4		54.9	150.4	188.3	393.5	198.5	25.5		226.0
5		54.9	150.4	194.3	399.5	198.5	29.8		228.3
6		54.9	150.4	165.9	371.2	198.5	33.2		231.7
7		54.9	150.4	165.6	370.9	198.5	33.2		231.7
8		54.9	150.4	194.7	400.0	275.2	33.2		308.4
9		54.9	150.4	193.4	398.7	275.2	33.2	87.2	395.6
10		54.9	150.4	195.7	401.0	275.2	33.2	174.4	482.8
11		54.9	150.4	184.7	390.0	275.2	33.2	278.0	586.4
12		54.9	150.4	184.7	390.0	275.2	33.2	327.0	635.4
13		54.9	150.4	184.7	390.0	275.2	33.2	372.8	681.2
14		54.9	150.4	184.7	390.0	275.2	33.2	412.6	721.0
15		54.9	150.4	184.7	390.0	275.2	33.2	438.2	746.8
16		54.9	150.4	184.7	390.0	275.2	33.2	479.6	788.0
17		54.9	150.4	184.7	390.0	275.2	33.2	501.4	809.8
18		54.9	150.4	184.7	390.0	275.2	33.2	519.4	827.8
19		54.9	150.4	184.7	390.0	275.2	33.2	533.0	841.4
20		54.9	150.4	182.9	388.2	275.2	33.2	541.2	849.6
21		54.9	150.4	181.5	386.8	275.2	33.2	545.0	853.4
22		54.9	150.4	180.1	385.4	275.2	33.2	539.6	848.0
23		54.9	150.4	180.1	385.4	275.2	33.2	530.3	838.7
24		54.9	150.4	180.1	385.4	275.2	33.2	516.7	825.1
25		54.9	150.4	180.1	385.4	275.2	33.2	503.0	811.4
Rate of return		3%							

/a Includes shadow foreign exchange adjustment.
/b Project charges, considered as investment costs until year 4.
/c See Annex 1, Table 15. Assumes settler is on site for six months in Year 0.
/d Includes rubber development, poultry and garden costs.
/e As valued in appraisal report and adjusted to constant 1978 values.

Table 18: INVESTMENT COSTS PER FAMILY - NES II

	Constant 1978 US$	% Foreign exchange
Settler housing	495	
Infrastructure	54	
Roads and bridges	353	
Subsistence	238	
Health	78	
Project management	187	
Other	840	
Rubber development /a		
Indirect costs	718	
Direct costs	2,979	
Total	5,937	65
Physical contingencies	594	
Total Costs	6,531	

/a Costs for development of 2 ha, cost for one ha approximately 50%. Costs are for six years after start of project until full rubber development, after which farmer assumes cost.

Table 19: FARM DEVELOPMENT AND CROP PRODUCTION - FIE[...]

	0 /a	1	2	3	4	5	6	7	8	9	10	11	
A. Land Clearing (ha)													
House lot	0.05												
Garden lot	0.15												
Field crop area	0.4	-	0.2	0.2	0.2	0.2	0.2	0.2	0.2	-			
Rubber	2.0												
Total developed	2.6	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.0			
undeveloped	2.4	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	1.0			
B. Field Food Crop Development (ha)													
Rice	-	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Cassava	-	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Groundnuts/beans 1:1 mixture	-	-	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Pasture/cover crop	-	-	0.2	0.4	0.5	0.7	0.9	1.0	1.0	1.0	1.0	1.0	
Fallow	-	-	-	-	-	-	-	0.1	0.3	0.3	0.3	0.3	
C. Yield Estimates (kg/ha) /b													
Rice	-	750	750	850	950	1,050	1,200	1,300	1,300	1,300	1,300	1,300	1
Cassava (wet)	-	-	7,000	8,000	8,500	9,000	9,500	10,000	11,000	12,000	12,000	12,000	12
Groundnuts (wet)	-	-	500	500	800	1,000	1,200	1,500	1,500	1,500	1,500	1,500	1
Beans	-	-	200	250	300	350	400	450	450	450	450	450	
Rubber	-	-	-	-	-	-	300	500	800	900	900	900	
D. Crop Production (kg)													
Rice	-	-	300	340	380	525	600	650	650	650	650	650	
Cassava: field crop area	-	-	2,800	3,200	3,400	4,500	4,750	5,000	5,500	6,000	6,000	6,000	6
Groundnuts	-	-	100	100	160	200	240	300	300	300	300	300	
Beans	-	-	40	50	60	70	80	90	90	90	90	90	
Total	-	-	3,240	3,690	4,000	5,295	5,670	6,040	6,540	7,040	7,040	7,040	7
Rubber - First ha	-	-	-	-	-	-	300	500	800	900	1,000	1,100	1
Second ha	-	-	-	-	-	-	300	500	800	900	1,000	1,100	1

/a Land clearing done by PTP IV or its contractors.

/b The following crops are planted in the family garden:

Crop	Area (ha)	Unit	Unit range
Fruit Trees			
Banana		bunches	5
Papaya		fruit	50
Pineapple		fruit	10
Citrus		fruit	100
Rambutan		fruit	25
Jack fruit		fruit	10
Vegetables			
Cassava	0.03	kg	180-360
Sweet potato	0.02	kg	80-200
Rice	0.10	kg	75-130
Peanuts/beans	0.10	kg	2-4.5/5-15
Cash Crops			
Coconuts		nuts	75
Coffee		kg	5
Cloves		kg	2

M DEVELOPMENT AND CROP PRODUCTION - FIELD FOOD CROPS - NES II

7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.2	0.2	-																
3.8	4.0	4.0																
1.2	1.0	1.0																
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
[illegible]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
[illegible]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
,000	11,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000
,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450	450
500	800	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
,000	5,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
,040	6,540	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040	7,040
500	800	900	1,000	1,100	1,200	1,250	1,300	1,400	1,500	1,600	1,600	1,600	1,600	1,600	1,500	1,400	1,300	1,250
500	800	900	1,000	1,100	1,200	1,250	1,300	1,400	1,500	1,600	1,600	1,600	1,600	1,600	1,500	1,400	1,300	1,250

Table 20: PRODUCTION COSTS FOR UPLAND CROPS PER HECTARE - NES II

Crop	Activity	Materials and unit costs	Total financial costs (Rp)	Total economic costs (Rp) 1978	Total economic costs (Rp) 1985
Rice	Land preparation				
	Planting	Seed: 80% of 65 kg/ha = 50 kg @ Rp 150	7,500	15,000	15,000
	Weeding & maintenance				
	Fertilizers: labor				
	Urea	150 kg @ Rp 70	10,500	15,945	19,185
	TSP	75 kg @ Rp 70	5,250	7,463	8,933
	MOP	50 kg @ Rp 48	2,400	2,400	2,400
	Pest & disease control	Chemicals	3,000	3,000	3,000
	Harvest (incl. post-harvest work)				
	Total cost		28,650	43,808	48,518
Cassava	Land preparation				
	Preparation of cuttings & planting	Cuttings: 1.25 ton @ Rp 2,200/ton	2,750	2,730	2,750
	Weeding & maintenance				
	Fertilizers: labor				
	SA	100 kg @ Rp 70	7,000	7,700	7,700
	TSP	45 kg @ Rp 70	3,150	4,478	5,360
	MOP	70 kg @ Rp 48	3,360	3,360	3,360
	Pest & disease control	Chemicals	1,500	1,500	1,500
	Harvest & transport				
	Total cost		17,760	19,788	20,670
Groundnuts	Land preparation				
	Planting	Seed: 75% of 70 kg/ha=66.5 kg @ Rp 120	7,980	7,980	7,980
	Weeding & maintenance				
	Fertilizers: labor				
	SA	75 kg @ Rp 77	5,775	5,775	5,775
	TSP	65 kg @ Rp 70	4,550	6,468	7,742
	SOP	40 kg @ Rp 52	1,480	1,480	1,480
	Pest & disease control	Chemicals		1,000	1,000
	Harvest (incl. post-harvest work)				
	Total cost		20,760	22,703	23,977
Beans	Land preparation				
	Planting	Seed: 75% of 40 kg/ha = 30 kg @ Rp 200	6,000	6,000	6,000
	Weeding & maintenance				
	Fertilizers: labor				
	SA	75 kg @ Rp 77	5,775	5,775	5,775
	TSP	45 kg @ Rp 70	3,150	4,478	5,360
	SOP	60 kg @ Rp 52	3,120	3,120	3,120
	Pest & disease control	Chemicals	1,500	1,000	1,000
	Harvest (incl. post-harvest work)				
	Total cost		19,545	20,373	21,255
Sweet potato	Land preparation				
	Preparation of cuttings and planting	Cuttings: 400 kg @ Rp 15	6,000	6,000	6,000
	Weeding & maintenance				
	Fertilizers: labor				
	SA	90 kg @ Rp 77	6,930	6,930	6,930
	TSP	40 kg @ Rp 85	2,800	3,980	4,764
	SOP	60 kg @ Rp 52	3,120	3,120	3,120
	Pest & disease control	Chemicals	1,000	1,000	1,000
	Harvest (incl. post-harvest work)				
	Total cost		19,850	21,030	21,814
Pasture/ cover crop	Land preparation				
	Planting	Seed: 6kg @ Rp 900	5,400	5,400	5,400
	Weeding & maintenance				
	Lalang control	Chemicals: 55 1 @ Rp 25+ 1 1 @ Rp 255 3	1,630	1,630	1,630
	Fertilizers: labor				
	TSP	200 kg @ Rp 70	14,000	19,900	23,820
	Harvest/transport				
	Total		21,030	26,830	30,850

Table 21: SMALLHOLDERS RUBBER FIELD ESTABLISHMENT EX-JUNGLE: COSTS PER HA (Rp) - NES II

Year 0

Description	Labor Est.	Labor Fam.		Rp
Foreman	13		A. Materials	
Chain saw operators	24		Crawler: 10 h x Rp 7,500	75,000
Burning, stacking	40		Chain saw: 80 h x Rp 200	16,000
Surveying	2		Crawler (road): 0.5 h x Rp 7,500	3,750
Roads	15		Grader: 0.3 h x Rp 1,500	450
Terraces	21		Lining pegs: 250 x Rp 2	500
Lalang eradication (10%)	2		Stumps: 500 x Rp 68.50	34,250
Lining	6		Polybag stumps: 50 x Rp 126	6,300
Holing/manuring	18		Dalapon: 3 kg x Rp 1,350	4,050
Planting/supplying	11		Kerosene: 25 l x Rp 25	625
Preweeding		25	Alang2 oil: 1 l x Rp 255	255
LCC sowing /a		6	Solar: 30 l x Rp 25	750
LCC upkeep		80	Tools	2,500
Circle weeding		36	Sprayer	150
Lalang control	6			
Pruning	3		Fertilizers and LCC	
Sundries	6		Rock phosp. 420 kg x Rp 32.50	13,650
			P.J.: 6 kg x Rp 1,250	7,500
Foreman	13		C.P.: 6 kg x Rp 800	4,800
Labor	154	147	C.M.: 6 kg x 700	3,500
			Transport	
			20 km x Rp 75	1,500
			Seed transportation	1,375
			Total A	176,905
			B. Labor	
			Foreman: 13 x Rp 1,000	13,000
			Estate: 154 x Rp 650	100,100
			Total B	113,100
			Total A + B	290,005

/a LCC = Leguminous cover crop.

P.J. = Pueraria javanica
C.P. = Calopogonium phaseoloides
C.M. = Centrosema muconoides

Year 1

Description	Labor Est.	Labor Fam.		Rp
Foreman	5		A. Materials, etc.	
Roads/drains maintenance	4		Fertilizers:	
Terrace maintenance	3		Urea: 75 kg x Rp 70	5,250
Circle weeding		36	Rock ph.: 150 kg x Rp 32.50	4,875
Interrow 1st semester		34	MOP: 50 kg x Rp 48	2,400
Interrow 2nd semester		12	Kies: 50 kg x Rp 57	2,850
Lalang/mikania control		12		
Pest/disease control	2		Chemicals	2,000
Manuring	6		Alang2 oil: 4 l x Rp 255	1,020
Pruning		6	Solar: 120 l x Rp 25	3,000
Sundries	2			
			Tools	1,500
Foreman	5			
Labor	17	90	Transport: 10 km x Rp 75	750
			Total A	23,645
			B. Labor	
			Foreman: 5 x Rp 1,000	5,000
			Estate: 17 x Rp 650	11,050
			Total B	16,050
			Total A + B	39,695

Year 2

Description	Labor Est.	Labor Fam.
Foreman	3	
Roads/drains maintenance	4	
Terrace maintenance	4	
Weeding: removing creepers		8
Weeding: chemical	8	
Weeding: interrow		12
Lalang control	6	
Pest/disease control	6	
Manuring		6
Pruning		2
Sundries	2	
Foreman	3	
Labor	30	28

	Rp
A. Materials, etc.	
Fertilizers:	
Urea: 96 kg x Rp 70	6,720
Rock ph.: 168 kg x Rp 32.50	5,460
MOP: 60 kg x Rp 48	2,880
Kies: 48 kg x Rp 57	2,736
Alang2 oil: 2 l x Rp 255	510
Solar: 60 l x Rp 25	1,500
Chemicals	1,500
Paracol: 0.4 l x Rp 3,100	1,240
Tools/sprayer	3,000
Transport: 10 km x Rp 75	750
Total A	26,296
B. Labor	
Foreman: 3 x Rp 1,000	3,000
Estate: 30 x Rp 650	19,500
Total B	22,500
Total A + B	48,796

Year 3

Description	Labor Est.	Labor Fam.		Rp
Foreman	3		A. Materials, etc.	
Roads/drains maintenance	4		Fertilizers:	
Terrace maintenance	2		Urea: 118 kg x Rp 70	8,260
Weeding	8	20	Rock ph.: 188 kg x Rp 32.50	6,110
Pest/disease control	6		MOP: 71 kg x Rp 48	3,408
Manuring	6		Kies: 47 kg x Rp 57	2,679
Lalang control		6		
Sundries	2		Alang2 oil: 2 l x Rp 255	510
			Solar: 60 l x Rp 25	1,500
Foreman	3		Chemicals	1,500
Labor	28	26	Paracol: 0.4 l x Rp 3,100	1,240
			Tools/sprayer	3,000
			Transport: 12 km x Rp 75	900
			Total A	29,107
			B. Labor	
			Foreman: 3 x Rp 1,000	3,000
			Estate: 28 x Rp 650	18,200
			Total B	21,200
			Total A + B	50,307

Year 4

Description	Labor Est.	Labor Fam.		Rp
Foreman	2		A. Materials, etc.	
Roads/drains maintenance	4		Fertilizers:	
Terrace maintenance	2		Urea: 124 kg x Rp 70	8,680
Weeding	8	20	Rock ph.: 180 kg x Rp 32.50	5,850
Pest/disease control	4		MOP: 68 kg x Rp 48	3,264
Manuring	6		Kies: 45 kg x Rp 57	2,565
Lalang control		6		
Sundries	2		Alang2 oil: 2 l x Rp 255	510
			Solar: 60 l x Rp 25	1,500
Foreman	2		Chemicals	1,500
Labor	26	26	Paracol: 0.4 l x Rp 3,100	1,240
			Tools/sprayer	3,000
			Transport: 12 km x Rp 75	900
			Total A	29,009
			B. Labor	
			Foreman: 2 x Rp 1,000	2,000
			Estate: 26 x Rp 650	16,900
			Total B	18,900
			Total A + B	47,909

Year 5

Description	Labor Est.	Labor Fam.		Rp
Foreman	2		A. Materials, etc.	
Roads/drains maintenance	4		Fertilizers:	
Weeding	8	20	Urea: 129 kg x Rp 70	9,030
Lalang control		6	Rock ph.: 129 kg x Rp 32.50	4,193
Pest/disease control	2		MOP: 86 kg x Rp 48	4,128
Manuring	6		Kies: 43 kg x Rp 57	2,451
Sundries	2			
			Alang2 oil: 2 l x Rp 255	510
			Solar: 60 l x Rp 25	1,500
Foreman	2		Chemicals	1,500
Labor	22	26	Paracol: 0.4 l x Rp 3,100	1,240
			Tools/sprayer	3,000
			Transport: 12 km x Rp 75	900
			Total A	28,452
			B. Labor	
			Foreman: 2 x Rp 1,000	2,000
			Estate: 22 x Rp 650	14,300
			Total B	16,300
			Total A + B	44,752

Years 6-30

Description	Labor Est.	Labor Fam.		Rp
Foreman	1		A. Materials, etc.	
Roads/drains maintenance	4		Fertilizers:	
Weeding	6		Urea: 154 kg x Rp 70	10,780
Slashing		2	Rock ph.: 154 kg x Rp 32.50	5,005
Lalang control		3	MOP: 103 kg x Rp 48	4,944
Pest/disease control	4		Kies: 52 kg x Rp 57	2,964
Manuring	3			
Sundries	2		Alang2 oil: 2 l x Rp 255	255
			Solar: 30 l x Rp 25	750
Foreman	1		Chemicals	3,000
Labor	19	5	Gramoxone: 2 l x Rp 2,200	4,400
			Tools/sprayer	1,800
			Leaf analysis	250
			Transport: 13.3 km x Rp 75	1,000
			Total A	35,148
			B. Labor	
			Foreman: 1 x Rp 1,000	1,000
			Estate: 19 x Rp 650	12,350
			Total B	13,350
			Total A + B	48,498

Table 22: FAMILY LABOR AVAILABILITY AND LABOR REQUIREMENTS OF A FIVE HA FARM - NES II

		1		2		3		4		5		6		7		8		9	
A. Family Labor Availability	Age																		
Husband	32	1.0		1.0		1.0		1.0		1.0		1.0		1.0		1.0			
Wife	26	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5			
Child	8	-		0.1		0.2		0.2		0.2		0.3		0.4		0.5			
Child	6	-		-		-		0.1		0.2		0.2		0.2		0.3			
Child	4	-		-		-		-		-		0.1		0.2		0.2			
Total family labor limits		1.5		1.6		1.7		1.8		1.9		2.1		2.3		2.5			
Total man-days per family (1 labor unit = 300 man-days)		450		480		510		540		570		630		690		750		750	
B. Annual Labor Requirements /a (md)		ha	md	ha	md	ha	md	ha	md	ha	md	ha	md	ha	md	ha	md	ha	md
Land clearing (188 md/ha)		-	-	0.2	38	0.2	38	0.2	38	0.2	38	0.2	38	0.2	38	0.2	38	-	-
Rice (100 md/ha)		0.4	20	0.4	40	0.4	40	0.5	45	0.5	50	0.5	50	0.5	50	0.5	50	0.5	50
Cassava (78 md/ha)		0.5	16	0.5	39	0.5	39	0.6	42	0.6	47	0.6	47	0.6	47	0.6	47	0.6	47
Groundnuts/beans 1:1 mixture (92 md/ha)		-	-	0.4	37	0.4	37	0.4	37	0.5	46	0.5	46	0.5	46	0.5	46	0.5	46
Sweet potato (100 md/ha)		0.1	4	0.1	10	0.1	10	0.1	10	0.1	10	0.1	10	0.1	10	0.1	10	0.1	10
Pasture/cover crop (80 md/ha)		-	-	0.2	7	0.4	23	0.5	36	0.7	48	0.9	62	0.1	76	1.0	80	1.0	80
Trees/vegetables/poultry (100 md/ha)		0.05	3	0.05	5	0.05	5	0.05	5	0.05	5	0.05	5	0.05	5	0.05	5	0.05	5
Subtotal			43		176		192		213		244		258		272		276		238
Rubber		2.0	-	2.0	-	2.0	-	2.0	-	2.0	-	2.0	286	2.0	286	2.0	286	2.0	286
Subtotal			43		176		192		213		244		544		558		562		524
Off-farm: NES rubber area (Riau)			285		285		285		285		285		-		-		-		-
Total			328		461		477		498		529		544		558		562		524
Family labor surplus			122		19		33		42		41		86		132		188		226

/a Growing seasons of the crops do not coincide with the calendar year.

Table 23: LABOR ANALYSIS OF A SMALLHOLDER 5 HA FARM MODEL - NES II

Year	Activity	Md/ha	Ha	Md	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Land clearing	188	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rice	100	0.4	20	-	-	-	-	-	-	-	-	-	12	4	4
	Cassava	78	0.5	16	-	-	-	-	-	-	-	-	-	13	1	2
	Groundnuts/beans	92	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sweet potato	100	0.1	4	-	-	-	-	-	-	-	-	-	-	2	2
	Pasture/cover crop	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Trees/vegetables/poultry	100	0.05	3	-	-	-	-	-	-	-	-	1	1	1	-
	Subtotal			43	-	-	-	-	-	-	-	-	1	26	8	8
	Rubber		2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total			43	-	-	-	-	-	-	-	-	1	26	8	8
2	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.4	40	4	2	14	-	-	-	-	-	-	12	4	4
	Cassava		0.5	39	1	2	1	2	1	1	-	10	5	13	1	2
	Groundnuts/beans		0.4	37	-	-	4	8	4	14	7	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		0.2	7	-	-	-	-	-	-	-	-	2	2	1	2
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			176	6	5	20	13	7	30	23	18	8	27	9	10
	Rubber		2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total			176	6	5	20	13	7	30	23	18	8	27	9	10
3	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.4	40	4	2	14	-	-	-	-	-	-	12	4	4
	Cassava		0.5	39	1	2	1	2	1	1	-	10	5	13	1	2
	Groundnuts/beans		0.4	37	-	-	4	8	4	14	7	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		0.4	23	1	2	1	-	2	-	1	2	4	4	2	4
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			192	7	7	21	13	9	30	24	20	10	29	10	12
	Rubber		2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total			192	7	7	21	13	9	30	24	20	10	29	10	12
4	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.5	45	4	2	14	-	-	-	-	-	-	15	5	5
	Cassava		0.6	42	1	2	1	2	1	1	-	10	5	15	2	2
	Groundnuts/beans		0.4	37	-	-	4	8	4	14	7	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		0.5	36	2	4	1	1	4	1	1	4	6	5	3	4
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			213	8	9	21	14	11	31	24	22	12	35	13	13
	Rubber		2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total			213	8	9	21	14	11	31	24	22	12	35	13	13

Year	Activity	Md/ha	Ha	Md	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.5	50	5	3	17	-	-	-	-	-	-	15	5	5
	Cassava		0.6	47	2	2	2	2	1	1	-	12	6	15	2	2
	Groundnuts/beans		0.5	46	-	-	5	10	5	17	9	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		0.7	48	3	4	2	1	5	2	1	4	8	8	4	6
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			244	11	10	27	16	13	35	26	24	15	38	14	15
	Rubber		2.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total			244	11	10	27	16	13	35	26	24	15	38	14	15
6	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.5	50	5	3	17	-	-	-	-	-	-	15	5	5
	Cassava		0.6	47	2	2	2	2	1	1	-	12	6	15	2	2
	Groundnuts/beans		0.5	46	-	-	5	10	5	17	9	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		0.9	62	4	6	2	2	6	2	2	6	10	10	5	7
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			258	12	12	27	17	14	35	27	26	17	40	15	16
	Rubber		2.0	286	24	23	24	24	24	24	24	24	24	23	24	24
	Total			544	36	35	51	41	38	59	51	50	41	63	39	40
7	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.5	50	5	3	17	-	-	-	-	-	-	15	5	5
	Cassava		0.6	47	2	2	2	2	1	1	-	12	6	15	2	2
	Groundnuts/beans		0.5	46	-	-	5	10	5	17	9	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		1.0	76	5	7	3	3	8	3	3	8	11	11	6	8
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			272	13	13	28	18	16	36	28	28	18	41	16	17
	Rubber		2.0	286	24	23	24	24	24	24	24	24	24	23	24	24
	Total			558	37	36	52	42	40	60	52	52	42	64	40	41
8	Land clearing		0.2	38	-	-	-	-	-	15	15	8	-	-	-	-
	Rice		0.5	50	5	3	17	-	-	-	-	-	-	15	5	5
	Cassava		0.6	47	2	2	2	2	1	1	-	12	6	15	2	2
	Groundnuts/beans		0.5	46	-	-	5	10	5	17	9	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		1.0	80	6	8	3	3	9	3	3	9	11	11	6	8
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			276	14	14	28	18	17	36	28	29	18	41	16	17
	Rubber		2.0	286	24	23	24	24	24	24	24	24	24	23	24	24
	Total			562	38	37	52	42	41	60	52	53	42	64	40	41
9	Land clearing		-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rice		0.5	50	5	3	17	-	-	-	-	-	-	15	5	5
	Cassava		0.6	47	2	2	2	2	1	1	-	12	6	15	2	2
	Groundnuts/beans		0.5	46	-	-	5	10	5	17	9	-	-	-	-	-
	Sweet potato		0.1	10	1	-	1	3	1	-	-	-	-	-	2	2
	Pasture/cover crop		1.0	80	6	8	3	3	9	3	3	9	11	11	6	8
	Trees/vegetables/poultry		0.05	5	-	1	-	-	1	-	1	-	1	-	1	-
	Subtotal			238	14	14	28	18	17	21	13	21	18	41	16	17
	Rubber		2.0	286	24	23	24	24	24	24	24	24	24	23	24	24
	Total			524	38	37	52	42	41	45	37	45	42	64	40	41

Table 24: FARM BUDGET, FULL FARM DEVELOPMENT - NES II /a
(Rp '000)

	Year 5	Year 8	Year 10	Year 12	Year 20	Year 25
Gross Value of Production						
Food crops	94.2	123.3	125.8	125.8	125.8	125.8
Garden crops	38.0	38.0	38.0	38.0	38.0	38.0
Poultry /b	16.2	16.2	16.2	16.2	16.2	16.2
Rubber	-	740.8	926.0	1,111.2	1,111.2	628.2
Total	148.4	918.3	1,106.0	1,291.2	1,291.2	828.2
Less: Crop production costs						
Rubber	-	97.0	97.0	97.0	97.0	97.0
Food crops	53.0	67.0	67.0	67.0	67.0	67.0
Poultry/Garden /c	8.8	8.8	8.8	8.8	8.8	8.8
Net value of production	86.6	745.5	933.2	1,118.4	1,118.4	655.4
Less: IPEDA Tax /d	4.3	37.3	46.7	55.9	55.9	32.8
Subsistence /e	135.1	135.1	135.1	135.1	135.1	135.1
Add: Off-farm income /b	252.3					
Net farm income	199.5	573.1	751.4	927.4	927.4	487.5

/a Constant 1978 financial prices.

/b As valued in Appraisal Report.

/c As costed in Appraisal Report

/d 5% of net value of production.

/e See Annex 1, Table 15.

Table 25: SIMULATED ECONOMIC RATE OF RETURN FULL FARM DEVELOPMENT - NES II
(Rp '000)

	COSTS				BENEFITS			
Year	Investment /a	Crop production /b	Subsistence /c	Total	Food crops	Garden crops poultry /d	Rubber	Total
0	2,630.1	7.9	75.2	2,705.3		21.3		21.3
1	263.1	48.2	150.4	421.6	60.5	27.2		87.7
2	311.3	53.6	150.4	509.9	68.0	32.9		100.9
3	319.3	60.0	150.4	523.6	81.5	41.9		123.4
4	306.5	64.3	150.4	516.9	106.3	48.8		135.1
5	290.3	176.4	150.4	505.0	158.8	54.2	327.0	540.0
6		182.6	150.4	326.9	175.6	54.2	545.0	774.8
7		182.6	150.4	333.0	181.2	54.2	872.0	1,107.4
8		182.6	150.4	333.0	186.8	54.2	981.0	1,222.0
9		182.6	150.4	333.0	186.8	54.2	1,090.0	1,331.0
10		182.6	150.4	333.0	186.8	54.2	1,199.0	1,440.0
11		182.6	150.4	333.0	186.8	54.2	1,308.0	1,549.0
12		182.6	150.4	333.0	186.8	54.2	1,362.6	1,603.6
13		182.6	150.4	333.0	186.8	54.2	1,417.0	1,658.8
14		182.6	150.4	333.0	186.8	54.2	1,526.0	1,767.0
15		182.6	150.4	333.0	186.8	54.2	1,635.0	1,876.0
16		182.6	150.4	333.0	186.8	54.2	1,744.0	1,985.0
17		182.6	150.4	333.0	186.8	54.2	1,744.0	1,985.0
18		182.6	150.4	333.0	186.8	54.2	1,744.0	1,985.0
19		182.6	150.4	333.0	186.8	54.2	1,744.0	1,985.0
20		182.6	150.4	333.0	186.8	54.2	1,744.0	1,985.0
21		182.6	150.4	333.0	186.8	54.2	1,744.0	1,985.0
22		182.6	150.4	333.0	186.8	54.2	1,635.0	1,985.0
23		182.6	150.4	333.0	186.8	54.2	1,526.0	1,767.0
24		182.6	150.4	333.0	186.8	54.2	1,417.0	1,658.0
25		182.6	150.4	333.0	186.8	54.2	1,362.6	1,663.6
Rate of return		12%						

/a Includes shadow foreign exchange adjustment and rubber development costs for years 0 to 6.
/b Includes garden crops and poultry cows and rubber costs after year 6.
/c See Annex 1, Table 15. Assumes settler is on site for six months in Year 0.
/d As valued in appraisal report.

Table 26: SUMMARY LABOR ANALYSIS 2.0 HA - NES II /a
(Man-days)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Year 1													
Supply									37.5	37.5	37.5	37.5	150
Demand									1.0	26.0	8.0	8.0	43
Surplus/(Deficit)									36.5	11.5	29.5	29.5	107
Year 2													
Supply	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	480
Demand	6.0	5.0	20.0	13.0	7.0	15.0	8.0	10.0	6.0	25.0	8.0	8.0	131
Surplus/(Deficit)	34.0	35.0	20.0	27.0	33.0	25.0	32.0	30.0	34.0	15.0	32.0	32.0	349
Year 3													
Supply	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	42.5	510
Demand	6.0	5.0	20.0	13.0	7.0	15.0	8.0	10.0	6.0	25.0	8.0	8.0	131
Surplus/(Deficit)	36.5	37.5	22.5	29.5	38.5	27.5	34.5	32.5	36.5	17.5	34.5	34.5	379
Year 4													
Supply	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	540
Demand	6.0	5.0	20.0	13.0	7.0	15.0	8.0	10.0	6.0	30.0	10.0	9.0	139
Surplus/(Deficit)	39.0	40.0	25.0	32.0	38.0	30.0	37.0	35.0	39.0	15.0	35.0	36.0	401
Year 5													
Supply	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	570
Demand	8.0	6.0	25.0	15.0	8.0	18.0	10.0	12.0	7.0	30.0	10.0	9.0	158
Surplus/(Deficit)	39.5	41.5	22.5	32.5	39.5	29.5	37.5	35.5	40.5	17.5	37.5	39.5	412
Year 6													
Supply	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	52.5	630
Demand	20.0	17.5	37.0	27.0	20.0	30.0	22.0	24.0	19.0	41.5	22.0	21.0	325
Surplus/(Deficit)	32.5	35.0	15.5	25.5	32.5	22.5	30.5	28.5	33.5	11.0	30.5	31.5	305
Year 7													
Supply	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	690
Demand	20.0	17.5	37.0	27.0	20.0	30.0	22.0	24.0	19.0	41.5	22.0	21.0	325
Surplus/(Deficit)	37.5	40.0	20.5	30.5	37.5	27.5	35.5	33.5	38.5	16.0	35.5	36.5	365
Year 8													
Supply	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	62.5	750
Demand	20.0	17.5	37.0	27.0	20.0	30.0	22.0	24.0	19.0	41.5	22.0	21.0	325
Surplus/(Deficit)	42.5	45.0	25.5	35.5	42.5	32.5	40.5	38.5	43.5	21.0	40.5	41.5	375

/a Labor supply and demand figures are the same as shown in Tables 22 and 23.

Table 27: FARM BUDGET 2.0 HA - NES II /a
(Rp '000)

	Year 5	Year 8	Year 10	Year 12	Year 20	Year 25
Gross Value of Production						
Food crops	94.2	123.3	125.8	125.8	125.8	125.8
Garden crops	38.0	38.0	38.0	38.0	38.0	38.0
Poultry /b	16.2	16.2	16.2	16.2	16.2	16.2
Rubber	-	370.4	463.0	555.6	555.6	324.1
Total	148.4	547.9	643.0	735.6	735.6	504.1
Less: Crop production costs						
Rubber	-	48.5	48.5	48.5	48.5	48.5
Food crops /b	53.0	53.0	53.0	53.0	53.0	53.0
Poultry/Garden	8.8	8.8	8.8	8.8	8.8	8.8
Net value of production	86.6	437.6	532.7	625.3	625.3	393.8
Less: IPEDA Tax /c	4.3	21.9	26.6	31.3	31.3	19.7
Subsistence /d	135.1	135.1	135.1	135.1	135.1	135.1
Add: Off-farm income /b	252.3					
Net farm income	199.5	280.6	371.0	458.9	458.9	239.0

/a Constant 1978 financial prices.

/b As presented in Appraisal Report.

/c 5% of net value of production.

/d See Annex 1, Table 15.

Table 28: SIMULATED ECONOMIC RATE OF RETURN 2.0 Ha - NES II
(Rp '000)

Year	COSTS				BENEFITS			
	Investment /a	Crop production /b	Subsistence /c	Total	Food crops	Garden crops poultry /d	Rubber	Total
0	1,865.5		75.2	1,940.7				
1	185.6	7.9	150.4	343.9		21.3		21.3
2	182.6	42.9	150.4	375.9	60.5	27.2		87.7
3	186.6	42.9	150.4	379.9	68.0	32.9		100.9
4	180.2	49.2	150.4	373.5	81.5	41.9		123.4
5	172.1	49.2	150.4	371.7	106.3	48.8	327.0	155.1
6		54.7	150.4	205.1	158.8	54.2	545.0	376.5
7		103.2	150.4	253.6	175.6	54.2	872.0	502.3
8		103.2	150.4	253.6	181.2	54.2	981.0	671.4
9		103.2	150.4	253.6	186.8	54.2	1,090.0	734.5
10		103.2	150.4	253.6	186.8	54.2	1,199.0	786.0
11		103.2	150.4	253.6	186.8	54.2	1,308.0	840.5
12		103.2	150.4	253.6	186.8	54.2	1,362.6	895.0
13		103.2	150.4	253.6	186.8	54.2	1,417.0	922.3
14		103.2	150.4	253.6	186.8	54.2	1,526.0	949.5
15		103.2	150.4	253.6	186.8	54.2	1,635.0	1,004.0
16		103.2	150.4	253.6	186.8	54.2	1,744.0	1,058.5
17		103.2	150.4	253.6	186.8	54.2	1,744.0	1,113.0
18		103.2	150.4	253.6	186.8	54.2	1,744.0	1,058.5
19		103.2	150.4	253.6	186.8	54.2	1,744.0	1,113.0
20		103.2	150.4	253.6	186.8	54.2	1,744.0	1,058.5
21		103.2	150.4	253.6	186.8	54.2	1,744.0	1,113.0
22		103.2	150.4	253.6	186.8	54.2	1,635.0	1,058.5
23		103.2	150.4	253.6	186.8	54.2	1,526.0	1,004.0
24		103.2	150.4	253.6	186.8	54.2	1,417.0	949.5
25		103.2	150.4	253.6	186.8	54.2	1,362.6	922.3
Rate of return		10%						

/a Includes shadow foreign exchange adjustment and rubber development costs for years 0 to 6.
/b Includes garden crops and poultry cows and rubber costs after year 6.
/c See Annex 1, Table 15. Assumes settler is on site for six months in Year 0.
/d As valued in appraisal report.

INDONESIA

TRANSMIGRATION II PROJECT

A. COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Results of Farm Budget Analysis /a

	Gross farm income /b	Less: Production cost /c	Less: IPEDA tax /d	Net farm income before subsistence	Per capita farm income before subsistence /e		Less: Per capita subsistence		Per capita income after subsistence	
	(Rp'000)				(Rp'000)	(US$)	(Rp'000)	(US$)	(Rp'000)	(US$)
Transmigration I										
Full Farm Development										
Year 5	253.8	35.1	7.6	711.1	42.2	102	27.0	65	15.2	37
8	414.7	171.2	11.0	232.5	46.5	112	27.0	65	19.5	47
10	707.9	82.8	27.8	597.3	119.5	288	27.0	65	92.5	223
12	867.5	172.5	31.1	664.1	132.8	320	27.0	65	105.8	255
20	1,776.7	101.2	80.1	1,595.4	319.1	769	27.0	65	292.1	704
25	1,738.2	101.2	80.7	1,556.3	311.3	750	27.0	65	284.5	685
2.0 Ha Farm Development										
Year 5	254.7	35.1	7.7	211.9	42.4	102	27.0	65	15.4	37
8	432.2	48.6	18.0	365.6	73.1	176	27.0	65	46.1	111
10	705.9	48.6	29.2	628.1	125.6	303	27.0	65	98.6	238
12	821.2	48.6	34.9	737.7	147.5	356	27.0	65	120.5	291
20	827.5	48.6	35.2	743.7	148.7	358	27.0	65	121.7	293
25	627.0	48.6	27.7	550.7	110.1	265	27.0	65	83.1	202
Ident. of Trans. II, III and IV										
Full Farm Development										
Year 5	189.5	162.3	0.8	26.4	5.3	13	27.0	65	(21.7)	(52)
8	192.9	151.6	1.5	39.7	27.9	19	27.0	65	(19.1)	(46)
10	341.1	181.6	7.4	152.1	30.4	73	27.0	65	3.4	8
12	470.7	181.3	13.9	275.5	55.1	133	27.0	65	28.1	68
20	944.8	168.9	38.2	737.7	147.5	356	27.0	65	120.5	291
25	1,051.3	166.1	43.7	841.7	168.3	406	27.0	65	141.3	341
2.0 Ha Farm Development										
Year 5	189.5	152.4	1.3	35.8	7.2	17	27.0	65	(19.8)	(48)
8	192.9	141.8	2.0	49.1	9.8	24	27.0	65	(17.8)	(41)
10	341.1	142.7	9.3	189.1	37.8	91	27.0	65	10.8	26
12	470.7	131.1	16.4	323.2	64.6	156	27.0	65	37.6	91
20	652.7	127.1	25.7	499.9	100.0	241	27.0	65	73.0	176
25	620.2	127.1	24.1	469.0	93.8	226	27.0	65	66.8	161
NES II										
Full Farm Development										
Year 5	400.7	61.8	4.3	334.6	66.9	161	27.0	65	42.9	96
8	918.3	162.8	37.3	708.2	141.6	341	27.0	65	114.6	276
10	1,106.0	172.8	46.7	886.5	177.3	427	27.0	65	150.3	362
12	1,291.2	172.8	55.9	1,062.5	212.5	512	27.0	65	185.5	447
20	1,291.2	172.8	55.9	1,062.5	212.5	512	27.0	65	185.5	447
25	828.2	172.8	32.8	622.6	124.5	300	27.0	65	97.5	235
2.0 Ha Farm Development										
Year 5	400.7	61.8	4.3	334.6	66.9	161	27.0	65	42.9	96
8	547.9	110.3	21.9	415.7	83.1	200	27.0	65	56.1	135
10	643.0	110.3	26.6	506.1	101.2	244	27.0	65	74.2	179
12	735.6	110.3	31.3	594.0	118.8	286	27.0	65	91.8	221
20	735.6	110.3	31.3	594.0	118.8	286	27.0	65	91.8	221
25	504.1	110.3	19.7	374.1	74.8	180	27.0	65	47.8	115

/a Constant 1978 financial prices.

/b Includes poultry, garden, and off-farm income.

/c Includes pasture and poultry costs.

/d 5% of net value of production.

/e See Annex 1, Table __.

INDONESIA

TRANSMIGRATION II PROJECT

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Results of Net Present Value Analysis
(Rp '000)

	Transmigration I		Ident. of Trans. II, III and IV		NES II	
Interest rates	Full farm development	2.0 ha development	Full farm development	2.0 ha development	Full farm development	2.0 ha development
2%	-	-	2,122	576	-	-
4%	-	-	685	(203)	-	-
8%	3,127	1,205	(817)	(1,025)	2,044	670
10%	1,696	415	(1,188)	-	1,382	(150)
11%	1,144	101	(1,318)	-	738	(169
12%	677	(169)	-	-	187	(710)
15%	(347)	(782)	-	-	(1,033)	(1,338)
17%	-	-	-	-	(1,587)	-

INDONESIA

TRANSMIGRATION II PROJECT

A COMPARATIVE ANALYSIS OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Results of Simulated Economic Analysis
(%)

		Transmigration I		Ident. of Trans. II, III and IV		NES II	
		Full farm development	2.0 ha development	Full farm development	2.0 ha development	Full farm development	2.0 ha development
Best estimate		14	12	6	3	12	10
Benefits	+20	16	14	9	7	14	12
	+10	15	13	7	5	13	11
	-10	12	10	4	1	11	8
	-20	11	8	1	(2)	9	7
Costs	+20	12	9	2	(1)	10	7
	+10	13	10	4	1	11	8
	-10	15	13	7	6	13	11
	-20	17	15	9	8	15	12
Rubber yields	+20	16	13	8	6	14	12
	+10	15	12	7	5	13	11
	-10	13	11	5	3	11	9
	-20	12	10	4	2	10	8
Investment costs	+15	13	10	5	4	11	9
	-15	15	13	7	5	14	11
Crop production costs	+15	14	11	5	3	12	10
	-15	15	12	7	5	13	10
Benefits +10: Investment costs	+10	15	12	7	6	13	11
	-10	16	14	8	6	14	12
Benefits +10: Crop prod. costs	+10	15	13	7	5	13	11
	-10	16	13	8	7	14	11
Benefits -10: Investment costs	+10	12	9	3	1	10	8
	-10	13	11	4	2	12	9
Benefits -10: Crop prod. costs	+10	12	10	3	0	11	8
	-10	13	10	4	2	11	9

INDONESIA

TRANSMIGRATION II

A COMPARISON OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Comparison of Existing and Theoretical Farm Models

Introduction

1. An unfortunate aspect of this analysis is that the Bank's involvement in land settlement projects in Indonesia is fairly recent, and there is not a great amount of historical project data available for comparison with the theoretical models. Howver, the three models developed for existing reports and projects (see Annex 3) do lend well for comparison with the theoretical models as a contrast in general approaches towards land settlement.

2. The theoretical and existing models are compared using the following variables:

(a) Farm Family Labor Supply. Because the farm labor analysis per month and per year is dependent on the farm family labor supply assumptions, the latter variable has been compared between the models;

(b) Per Family Investment Costs;

(c) Farm Budget Analysis;

(d) Simulated Economic Rate of Return.

Farm Model Comparison

3. Farm Family Labor Supply. The availability of farm family labor is a major constraint on the amount of land a farmer can plant for food crops; generally, it is believed a farmer can successfully crop about 1.0 ha of food crops without any draft power. This factor has been one consideration that has led to previous emphasis on perennial crops being grown at the main farm crop rather than growing food crops being grown on anything more than a subsistence basis.

4. The constraint of family labor supply does become apparent for the theoretical food crop model in the development of a farmer's reserve land. However, this constraint lessens somewhat when one compares the basic labor supply assumptions utilized for the analysis of the theoretical models with the same developed for the existing models (see Table 1).

5. With respect to family labor with units available for working on the farm, all the models are fairly equal. All have a gradual increase in available family labor units up to 2.0 or better by the time the family has been settled on site for eight or nine years. The difference between the models occurs through the number of man-days a family labor unit can work during the year. The theoretical models assume that this figure is 240 days; the existing models assume this to be 300 days or better (in the case of Transmigration I, this figure is 360 days).

Table 1: FARM FAMILY LABOR SUPPLY COMPARISON

	Comparison of alternative cropping strategies for land settlement	Transmigration I	Identity Trans. II, III, & IV	NES II
Family Labor Units				
Year 1	1.5	1.25	1.5	1.5
2	1.6	1.50	1.6	1.6
3	1.7	1.50	1.6	1.7
4	1.8	1.50	1.7	1.8
5	1.9	1.50	1.8	1.9
6	2.1	1.50	1.9	2.1
7	2.3	1.60	2.1	2.3
8	2.5	1.75	2.2	2.5
9	2.5	2.00	2.5	2.5
Man-days/labor unit	240	360	300	300
Available Labor/Year in Man-days				
Year 1	360	450	450	450
2	384	540	480	480
3	408	540	510	510
4	432	540	540	540
5	456	540	570	570
6	504	540	630	630
7	552	570	690	690
8	600	630	750	750
9	600	720	750	750
Available Labor/Month in Man-days				
Year 1	30.0	37.5	37.5	37.5
2	32.0	45.0	40.0	40.0
3	34.0	45.0	40.0	42.5
4	36.0	45.0	42.5	45.0
5	38.0	45.0	45.0	47.5
6	42.0	45.0	47.5	52.5
7	46.0	47.5	52.5	57.5
8	50.0	52.5	55.0	62.5
9	50.0	60.0	62.5	62.5

6. The man-days per family labor unit are such that ech of the existing models has at least 3.0 man-days of additional labor per month over the same for the theoretical models. Using the per month labor figures for the existing models as labor supply, and the labor demand developed for the theoretical models (see Annex 2, Appendix 1), the per-month labor deficits for the theoretical models would be eliminated completely. Thus, within the context of this analysis, the supply of farm family labor does not appear to be a constraint on the choice of a cropping strategy for land settlement projects.

7. Per Family Investment Costs (Table 2). Per family investment costs are presented in terms of basic infrastructure (housing, roads and bridges, etc.) and rubber development costs. As can be seen, the basic infrastructure provided by the various projects, is basically the same with respect to cost and reports for all the models. The significant additional per family cost comes from rubber development as part of the project. The significance of this becomes apparent in the discussion of the farm models.

Table 2: COMPARATIVE PER FAMILY INVESTMENT COSTS /a

	Trans-migration I 1976 US$	Identity Trans. II, III, IV 1976 US$	NES II 1978 US$	A comp. anal. of alt. crop. for land set.
Recruitment/transport	300	241	-	750
Local site management	70	780	187	280
Infrastracture/road	1,310	960	407	1,225
House	500	170	495	400
Cow	290	608	-	-
Subsistence package	340	-	238	-
Other	-	-	1,636	235
Total	2,805	2,764	2,963	2,890
Rubber development	1,865/b	830/c	2,979/d	(925)/e
Total 1976 US$	4,670	3,594		
Conversion to 1978 US$				
Local	1,233	1,233		
Foreign exchange	1,160	1,160		
Total 1978 US$	5,577	4,334	5,942	2,890 (3,815)/e

/a Excludes basic crop production costs.

/b Rubber development costs for 1 ha block planted rubber for years 1-6.

/c Rubber development costs for 1.0 ha for first six years.

/d Direct costs only for years 0 to 6; cost is for 2.0 ha of rubber.

/e Additional costs associated with developing rubber as reserve land.

8. Farm Budget Analysis (Table 3). In general, the rubber models, both existing and theoretical, yield a low per capita income return in the early years of settlement. The theoretical food crop and coconut models yield a reasonably high per capita income; however, full development rubber model incomes are higher than the same for the food crop models. From the evidence presented in these models, it appears that there is a certain trade-off, i.e., a project subsidizes farmers to grow rubber and realize a very high full development income, or farmers grow food crops and/or coconuts and are more able to finance themselves future farm development and achieve a full development income below the rubber models but above the poverty level.

9. The theoretical coconut model with its variations has throughout the analysis a very high per capita income. The costs necessary for on-farm development are less than the same for rubber and about the same as for food crops. The disadvantage of coconuts is that marketing can be a severe constraint unless there is a reasonably efficient marketing organization provided by a project such as the estate operation provided for rubber. The high farm incomes are very dependent upon this consideration.

Table 3: FARM BUDGET COMPARISON /a

	Transimgration I		Identity of Transimgration II,, III, & IV		UES II		A comparsion analysis of alternative cropping strategies for land settlement					
							Modle 1		Model 2		Model 3	
	Rp'000	US$	Rp'000	US$	Rp'000	US$	Rp'000	US$	Rp'000	US$	Rp'000	US$
Base 2.0 ha												
Year 5	15.4	37	(19.8)	(48)	92.9	96	45.9	111	60.3	145	(5.0)	12
10	98.6	238	10.8	29	74.2	179	60.0	145	113.5	274	69.9	168
25	83.1	202	66.8	161	47.8	115	60.0	245	113.5	274	96.3	232
Full farm development /b												
Year 5	15.2	37	(21.7)	(52)	42.9	96						
10	92.5	223	3.4	8	150.3	362						
25	284.5	685	141.3	346	97.5	235						
Farm size (ha)	5.0		4.0		5.0							
Base 2.0 & 1.0 ha coconuts												
Year 5							38.5	92	60.3	145	(10.4)	(25)
10							93.5	225	147.3	355	101.3	245
25							133.2	321	161.0	388	141.9	342
2.0 ha coconuts												
Year 5							38.5	92	54.9	132	(10.4)	(25)
10							93.0	229	144.6	349	101.3	244
25							230.5	555	207.0	499	191.6	462
1.0 ha rubber												
Year 5							25.7	62	43.2	105	(22.1)	(53)
10							50.6	159	118.4	285	74.0	178
25							176.3	425	230.0	554	213.3	514
2.0 ha rubber												
Year 5							25.7	62	43.5	106	(22.1)	(53)
10							50.6	122	112.6	271	65.2	157
25							285.7	688	397.4	837	328.5	791
1.0 ha each rubber & coconuts												
Year 5							30.1	72	46,0	111	(20.3)	49
10							84.9	205	130.6	315	84.1	203
25							191.4	462	242.8	585	222.7	437

/a Net per capita farm income after subsistence.
/b For existing models only.

10. Simulated Economic Analysis (Table 4). The rates of return for the theoretical rubber model (Model 3) and for Transmigration I and NES II ruber model for the base 2.0 ha are all within the 10-12% range. The model from the Identification of Transmigration II, III and IV does not have a viable rate of return for consideration as an option. These rates of return support the idea that rubber is a reasonable crop to use as a base for land settlement projects. However, they also reflect the high costs associated with developing rubber.

11. For full farm development, the theoretical rubber model also has rates of return similar to Transmigration I and NES II when rubber is developed on reserve land, but the return is higher when coconuts are developed on reserve land. This difference reflects the high maintenance cost of establishing rubber on reserve land.

12. The rates of return for the theoretical 2.0 ha food crop and coconut models, and for the various full farm development options, are all much higher than the same for the rubber models. This fact brings out again the idea advanced in the discussion of the farm budgets that the family financing his own reserve land develop represents a significant savings to the economy, as there is no need to subsidize rubber production during the early years of a project. By the farmer establishing food crops or other perennial tree crops and quickly rise above subsistence, in the context of transmigration projects, a large capital investment savings is realized over subsidizing rubber production.

Table 4: RESULTS OF SIMULATED ECONOMIC ANALYSIS

	Transmig. I	Identific. of Transmig. II, III & IV	NES II	A comparison of alternative crop strategies for land settlement Model 1	Model 2	Model 3
Rates of Return (%)						
Base 2.0 ha	12	3	10			
Full farm development	14	6	12			
Farm Size (ha)	5	4	5			
Base 2.0 ha				16	21	11
With:						
1.0 ha coconuts				-	-	-
2.0 ha coconuts				24	26	17
1.0 ha rubber				26	28	20
2.0 ha rubber				17	21	24
1.0 ha rubber and				18	21	15
1.0 ha coconuts				21	24	17

Net Present Value	10%	12%	15%	17%	20%
Model 1					
Base 2.0 ha	1,035	600	123	(113)	(389)
With 1.0 ha coconuts	4,000	2,891	1,707	1,140	512
2.0 ha coconuts	6,013	4,384	2,677	1,874	1,002
1.0 ha rubber	2,012	1,207	370	(21)	(442)
2.0 ha rubber	2,760	1,705	633	146	(367)
1.0 ha rubber and 1.0 ha coconuts	4,400	3,027	1,606	947	240
Model 2					
Base 2.0 ha	3,138	2,222	1,232	750	208
With 1.0 ha coconuts	6,092	4,502	2,806	1,994	1,074
2.0 ha coconuts	8,109	5,998	3,778	2,730	1,586
1.0 ha rubber	4,112	2,828	1,479	843	150
2.0 ha rubber	4,869	3,333	1,748	1,014	230
1.0 ha rubber and 1.0 ha coconuts	6,522	4,672	2,735	1,827	346
Model 3					
Base 2.0 ha	265	(309)	(900)	(1,173)	(1,463)
With 1.0 ha coconuts	3,233	1,984	683	81	(568)
2.0 ha coconuts	5,246	3,477	1,654	815	(77)
1.0 ha rubber	1,507	555	(910)	(845)	(1,098)
2.0 ha rubber	2,253	1,050	(148)	(630)	(1,224)
1.0 ha rubber and 1.0 ha coconuts	3,921	2,397	845	139	(602)
Transmigration I					
Base 2.0 ha	415	(169)	(782)	-	-
Full farm development	1,696	677	(347)	-	-
Ident. of Transmigration II, III, & IV					
Base 2.0 ha	-	-	-	-	-
Full farm development	(1,188)	-	-	-	-
NES II					
Base 2.0 ha	(150)	(710)	(1,338)	-	-
Full farm development	1,382	187	(1,033)	(1,587)	-

Conclusions

13. From the results of this analysis it would appear that using either food crops or other tree crops, rather than rubber as a cropping strategy for land settlement, yields a much higher return on investment. The following conclusions would appear relevant using the variables of comparison between the models:

(a) Farm Family Labor. Using the available labor supply assumptions of the existing models, family labor would not be a constraint in the growing of food crops;

(b) Investment Costs. Investment costs for a project based on food crops or other tree crops are significantly lower than the same for a project based on rubber, even when additional investment costs necessary for developing rubber on reserve land in the food crop and other tree crop models are considered;

(c) Farm Budget. Although food crops and perennial tree crops as a farm cropping system have lower full development farm incomes than rubber as a farm cropping system, all farm incomes are significantly above the national poverty level. In addition, the food crop approach quickly puts a farmer above subsistence and does not require the subsidy that rubber does;

(d) Simulated Economic Analysis. Utilizing food crops as the base cropping strategy for a land settlement project yields a higher economic return than does rubber and also meets the GOI objective of increasing domestic food production.

INDONESIA

TRANSMIGRATION II

A COMPARISON OF ALTERNATIVE CROPPING STRATEGIES FOR LAND SETTLEMENT

Optimal Food Crop Combinations

Introduction

1. Prior to formulating the food crop model (Model 1) used for the analysis it was necessary to estimate an optimal cropping combination between rice, corn, and cassava. These are the staple crops grown by Indonesian farmers and would be the crops receiving central focus in a food crop oriented land settlement project.

2. Of these crops,/1 rice is the one crop most preferred as a wet season crop by farmers. However, rice is a very labor intensive crop, and requires a large amount of physical inputs to grow well in podzolic soils. Corn is not as labor intensive a crop as rice, but will not grow in podzolic soils without appropriate inputs. Cassava, of the three, requires the lowest amounts of labor and inputs to grow well; however, it is also the crop least preferred by farmers.

3. In estimating the optimal onfarm combination of these crops on a transmigrant's farm there are several constraining factors. A transmigrant

/1 It is assumed for the analysis that these are upland crops.

family has a limited labor supply and thus any cropping strategy should be designed in such a way that a family is minimally dependent on casual hired labor to successfully crop their farm area. Since the Transmigration II project is proposing to give each family 2.0 ha of clean-cleared land for food cropping, the family labor constraint becomes an important factor in estimating the farm cropping system, particularly for the land areas that can potentially be planted to rice and corn. In addition, the farm cropping strategy should not be dependent on one of the three staple crops, as any pest problem or delay in input delivery would greatly decrease crop yields and the ability of a farmer to provide subsistence for his family./2 Some combination of the three staple crops must be grown on farm to minimize the consequences of crop failure of one of the crops.

/2 The problem of delays in input delivery is one which has hampered farm development in the Bank's Transmigration I project.

4. The purpose of this annex, then, is to estimate what combination of these crops maximizes per farmer returns within the constraints outlined above. to help estimate an "optimal" on farm combination of the three staple crops, four farm models have been analyzed (see Table 1). The models are designed to measure any incremental benefits at the margin from a farmer growing rice as the primary farm crop (Model 2), corn as the primary farm crop (Model 3), and cassava as the primary farm crop (Model 4); Model 1, the mixed food crop model (0.5 ha each of rice, corn, and cassava) is a comparative base between the crop specific models. The four models are compared using the following variables:

(a) Farm family labor supply/demand balance;

(b) Farm budget analysis;

(c) Simulated economic rate of return;

(d) Risk factors and marketing constraints.

Table 1: ALTERNATIVE 2.0 Ha FOOD CROP MODELS

Block	Area (ha)	Model 1	Model 2	Model 3	Model 4
A	0.3	W Mung bean 0.15 W Rice bean 0.15 D Groundnut 0.3	W Rice 0.3 D Mung bean 0.3	W Cassava 0.3 D. Mung bean 0.3	W Cassava 0.3 D Mung bean 0.3
B	0.5	W Cassava 0.25 W Rice 0.25 D Corn 0.25	W Rice 0.5 D Groundnut 0.25 D Corn 0.25	W Rice 0.5 D Corn 0.5	W Cassava 0.25 W Rice 0.25 D Groundnut 0.25
C	0.5	W Cassava 0.25 W Rice 0.25 D Corn 0.25	W Cassava 0.25 W Corn 0.25 D Rice bean 0.25	W Corn 0.5 D Rice bean 0.25 D Groundnut 0.25	W Cassava 0.25 W Rice 0.25 D Corn 0.25
D	0.45	Tobacco 0.5 } Coconuts 0.1 } Ginger 0.05 } Citrus 0.1 } Chillies 0.05 } Pepper 0.05 } Pineapples 0.05}	Same	Same	Same.
Houselot		0.25	0.25	0.25	0.25
Crop specific areas (Ha)		Rice 0.5 Cassava 0.5 Corn 0.5	Rice 0.8 Corn 0.5 Cassava 0.25	Corn 1.0 Rice 0.5 Cassava 0.3	Cassava 0.8 Rice 0.5 Corn 0.25

W - Wet season crop
D - Dry season crop

5. The following assumptions have been made for this Annex: (i) All basic labor supply, labor demand, yield assumptions utilized are the same as presented in Annex 1; (ii) it is assumed the settler arrives on site in May/June of Year 1 and receives at arrival on site 2.0 ha of mechanically clean-cleared land; (iii) no assumptions have been made concerning fall farm development beyond the farmers initially cleared area; and (iv) all costs and benefits are expressed in constant 1978 values.

Results of Analysis

6. Farm Family Labor Supply/Demand balance (Tables 5-8). Table 2 shows total labor requirements and any labor deficit per year for the four models in the early years of settlement; family labor supply is assumed the same as presented in Annex 1, Table 1. As can be seen, Models 2 and 3, with rice and corn, respectively, as the main farm crops, have significant labor deficits during a family's early years on a project site./1

/1 The farm models have been designed with the intention that the farm family is responsible for providing as much as possible of on-farm labor.

Table 2: LABOR REQUIREMENTS AND DEFICITS/YEAR
(man-days)

Year	Model 1	Model 2	Model 3	Model 4
1	5.9	10.2	6.0	4.7
2	5.0	19.2	27.4	5.0
3	2.4	11.8	22.0	1.9
4	0.4	4.4	16.0	-
5	-	2.3	13.1	-
6	-	-	8.6	-
7	-	-	3.3	-
Total	13.7	47.9	96.4	11.6

7. Given that there is a limited supply of casual labor available in most land settlement projects, the extreme labor deficits of Models 2 and 3 pose a grave problem to a settler family. Should a family be unable to hire enough casual labor to meet the labor deficit, it is unlikely they will be able to crop to the degree of intensity specified in the models. This, naturally, will reduce on-farm production and income, as the main labor deficit months are the wet season planting months. As labor supply is scarce, there is a high wage rate for casual labor (the Rp 600/manday used here is the current casual labor wage rate in the Rimbo Bujang and Situng land settlement projects in Sumatra), amounting to a significant additional crop production cost to the farm family (see Table 13-16: Farm Budgets).

8. The labor deficits for Models 1 and 4 are not considered to be a significant deterrent to on-farm production. The highest per month deficit is only about five mandays, which should easily be offset by hiring newly arrived migrants or local casual labor. Should these sources not be available, the labor deficit is not large enough to have a significant effect on onfarm production.

9. <u>Farm Budgets and Incomes</u> (Tables 13 to 16). The summary results of the farm budget analysis are shown in Table 3. With respect to net farm income, Models 2 and 3 (rice and corn, respectively as the primary farm crops) have the highest per capita net farm incomes, assuming the family is able to hire casual labor or otherwise alleviate the labor shortages shown in Table 2. Models 1 and 4 (mixed food crops and cassava as the primary farm crop)

have lower net per capita incomes; however, they also have lower physical input requirements and crop production costs.

10. The relationship between crop production costs and net per capita farm incomes is interesting, specifically when the fact that the net farm income has already had the cost of basic nutritional subsistence for one year subtracted. If one examines the above relationship in terms of index numbers, with Model 1 figures equalling 100% in Year 5 the indices of crop production costs to Model 1 are 120% for Model 2, 132% for Model 3, and 85% for Model 4, while the net per capita farm income indices are, respectively, 105%, 99%, and 98%. For year 10 the indices are, respectively, for crop production costs 117%, 119%, 89%, 109%, and net per capita farm incomes, 109%, 108%, 106%. Thus, for Models 2 and 3, the increase in net per capita farm incomes over the same for Model 1 are achieved at increases in crop production costs higher than the income increases, while the same between Models 1 and 4 is basically equal.

Table 3: RESULTS OF FARM BUDGET ANALYSIS

	Unit Model	Year 5 /a				Year 10-16			
		1	2	3	4	1	2	3	4
Gross Value of production	'000 Rp	419.5	440.4	434.0	400.0	593.9	544.4	538.0	504.0
Less: Production costs /c	'000 Rp	54.9	65.7	72.4	46.9	58.6	68.4	69.7	52.1
Net Value of Production	'000 Rp	364.6	374.7	361.6	353.1	435.3	47.6	468.3	451.9
Per Capita Net Value of Production /d	'000 Rp	72.9	74.9	72.3	70.6	87.1	95.2	93.7	90.4
	US$ /f	176	181	174	170	210	229	226	223
Less: Per capita subsistence /e	'000 Rp	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
	US$/f	65	65	65	65	65	65	65	65
Net Per Capita Farm Income	'000 Rp	45.9	47.9	45.3	43.6	60.1	68.2	66.7	63.4
	US$ /f	111	116	109	105	145	164	161	158

/a Project completion; all crops have started yielding.

/b Full farm development: all crops achieving maximum yields.

/c Includes cost of hired labor and Ipeda tax (5% of net value of production).

/d Assumes family size of 5 people.

/e See Annex 1, Table 15.

/f Converted to US$ at official exchange rate of US$1.00 = Rp 415.

11. Per capita farm incomes after the cost of subsistence has been subtracted are all above the absolute poverty line (US$95 per capita in 1975 constant prices). Thus, the incremental increases in incomes disussed in para. 9 become less significant when one considers the amount of disposable income available to families after nutritional subsistence has been accounted for. This is

especially true if the incremental cost (and physical input) increases are considered in terms of a project of 40,000 families (the approximate size of Transmigration II) and that the settler families have several has of reserve land that can be developed to gain increases in farm income. By utilization cropping system similar to Model 1 rather than those presented in models 2 and 3, significant social benefits can be achieved at a cost saving of about US$30 per family (or US$1.2 million for a project of 40,000 families).

12. Simulated Economic Rate of Return (Tables 17 to 20). The results of the simulated economic analysis are shown in Table 4. The results show that the best estimate returns from all four models are about the same, ranging from a rate of return of __% for Model 4 to Model __.

13. Sensitivity analysis was estimated to discern the effects of yield decreases in the primary on-farm crops and of drought or pest problems on crop yields./1 When the yield of the primary farm crop is decreased by 25%, the

/1 For the decrease in yields of primary farm crops (rice, corn, and cassava), the yield of each crop in Model 1 was decreased to serve as a comparative base for the crop specific models.

overall rate of return for each model decreases by only 1%, showing the crop diversification of a Sumatra garden (as proposed for Transmigration II) offers a farmer the opportunity to provide subsistence for his family without being dependent on one crop alone. When a drought or pest effect is estimated, the rates of return decrease more markedly, but are all equal to or above the 12% mark considered to be the minimum rate of return for projects in Indonesia.

Table 4: RESULTS OF SIMULATED ECONOMIC ANALYSES

Model: Rates of Return (%)	1	2	3	4
Best estimate	17%	18%	18%	15%
Sensitivity				
Rice yields - 25%	16%	17%	-	-
Corn Yields - 25%	16%	-	16%	-
Cassava Yields - 25%	16%	-	-	14%
Drought/pests once in four years, 50% decrease in yields	13%	14%	14%	12%
Net Present Value (Rp)				
10%	1,183	1,488	1,401	862
12%	728	943	909	163
15%	229	394	369	23
17%	(18)	121	100	(196)
20%	(302)	(192)	(207)	(415)

Additional Considerations

14. In addition to the quantifiable comparisons between the models, there are other nonquantifiable variables that have been considered in selecting an "optimal" food crop model. The primary non-quantifiable variables are risk factors involved in cropping podzolic soils, and marketing constraints.

15. Risk Factors. Recent evidence from research projects in Lampung shows that the podzolic soils of Sumatra can support sustained food cropping provided there are timely and appropriate supplies of agricultural inputs available to the farmers. The appropriate delivery of fertilizers, agrochemicals are necessary for successfully sustained crop cropping, and planting materials at appropriate times of the years. Should these inputs not reach the farmer in either sufficient quantities or at inappropriate times in the planting cycle, the farmer runs the risk of severely reduced crop yields, or of total crop loss.

16. Four farm models developed in this annex all offer a farmer some protection against the above risk factors and potential crop failure in that each model has the farmer growing cassava, a crop that grows well on podzolic soils with a minimum amount of physical inputs. Here Model 4 has the best "safety net," as the primary farm crop is cassava. Models 1, 2, and 3 are more sensitive to timely input delivery for crop success, although the area planted to cassava in Model 1 is large enough for a farmer to provide his family with subsistence should the above factors occur.

17. Models 2 and 3 are particularly sensitive to timely deliveries of fertilizers and pesticides. Corn, the main crop of Model 3, simply does not grow in podzolic soils without fertilizers. Rice also does poorly without fertilizer, and, without proper insecticides is very sensitive to pest infestations, particularly ________ (the brown plant hopper), Model 1 is also sensitive to the above problems, but offsets them to a large degree by the amount of cassava grown on-farm.

18. Marketing Constraints. Reliance on cassava as the primary farm crop can lead to an additional problem for the farmer; that of marketing any surplus produce./1 The domestic market price and demand for cassava and low, and the main market is an export market for processed cassava (tapioca) requiring reasonably sophisticated marketing arrangements. These take time to develop,

/1 This constraint is discussed in detail in studies by Davis and ________.

with the result that a farmer can easily end up with a large surplus of cassava with a limited market and a low farm income during the early years of a project (this is the current situation in the Rimbo Bujang and Sitiung projects in Sumatra).

19. The basic food crops such as rice and corn can always find a ready local market with a reasonable return. This is combined with the fact that these two crops do not require as high a degree of processing as does cassava in order to yield a reasonable return. Thus, with respect to marketing constraints a farmer, after on-farm consumption, will have more of a marketable surplus of rice and corn from Models 1, 2, and 3 than from Model 4, thus having a better opportunity to maximize onfarm earnings.

Conclusions

20. In light of the results of this analysis, the following conclusions can be drawn using the four measures developed for comparison of the four models (see para. 4):

(a) Farm Family Labor Supply/Demand Balances. Models 1 and 4 require less labor for farm development in a settler family's early years on site than do Models 2 and 3. Given that land settlement projected are generally located in areas that are not densely populated and thus have a limited supply of casual labor, it would seem that the former models would better enable a settler family to realize projected farm development and income than the latter two models as the family is only minimally dependent on hiring casual labor to assist with farm development;

(b) Farm Budget Analysis. Models 2 and 3 have the highest full development farm incomes. However, the cost of achieving these higher incomes is higher relative to the same costs for Models 1 and 4, and the incremental increases in income that result are outweighed by the incremental costs. When consideration is taken of the fact that all four models have full development farm incomes above the national absolute poverty level after the cost of subsistence has been subtracted, the income increments realized in Models 2 and 3 above Models 1 and 4 exhibit diminishing returns to scale in view of the increased incremental costs;

(c) Simulated Economic Rate of Return. The food crop models with more area planted to rice and corn than to cassava (Models 1, 2, and 3) have higher returns than does the cassava model (Model 4). However, all the models yield rates of return higher than 12%, the Bank cut-off rate for projects in Indonesia;

(d) Risk Factors and Marketing Constraints. The cropping design of Model 1 provides a subsistence crop option should rice and corn fail (Models 2 and 3), while also avoiding the potential marketing constraints of reliance on cassava as the primary farm crop (Model 4);

22. This analysis recognizes that there are an infinite number of possible cropping combinations that can occur on a transmigrant's farm. However, within the guidelines set forth in this annex, Model 1 (mixed food crops) appears to be the most reasonably potential on-farm cropping pattern for a transmigrant family. The Model yields an acceptable farm income and rate of return, while minimizing the constraints discussed above in paras. 21 (a) and (d).

Table 5: SUMMARY LABOR ANALYSIS - MODEL 1
(man-days)

	Year	1	2	3	4	5	6	7	8
Jan.	Total Labor casual/family labor		7.1	1.0	0.9	0.9	2.8	2.8	2.8
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Feb.	Total Labor casual/family labor		21.4	21.6	21.6	22.1	22.1	22.1	22.1
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Mar.	Total Labor casual/family labor		28.8	29.4	29.3	30.5	32.5	32.5	32.5
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Apr.	Total Labor casual/family labor		17.8	18.0	18.0	18.5	18.5	18.5	18.5
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
May	Total Labor casual/family labor		20.8	21.4	21.4	21.4	23.4	23.4	23.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Jun.	Total Labor casual/family labor		18.3	18.9	18.9	18.9	18.9	18.9	18.9
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Jul.	Total Labor casual/family labor		19.9	22.4	18.4	18.4	18.4	20.4	20.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Aug.	Total Labor casual/family labor		22.3	14.9	19.9	19.9	19.9	19.9	19.9
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Sep.	Total Labor casual/family labor	25.0	26.1	25.5	25.5	27.5	27.5	27.5	27.5
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Oct.	Total Labor casual/family labor	35.8	36.1	36.4	36.4	36.4	36.4	36.4	36.4
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	5.8	4.1	2.4	0.4	-	-	-	-
Nov.	Total Labor casual/family labor	30.1	33.0	33.1	33.1	35.1	35.1	35.1	35.1
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	0.1	0.9	-	-	-	-	-	-
Dec.	Total Labor casual/family labor	21.1	18.4	18.6	18.6	18.6	18.6	18.6	18.6
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Year	Total Labor casual/family labor	112.0	268.0	264.2	260.0	266.2	274.1	274.1	274.1
	Family labor casual/family labor	120	384	408	432	456	504	552	600
	Hired labor casual/family labor	5.9	5.0	2.4	0.4	-	-	-	-

Table 6: SUMMARY LABOR ANALYSIS - MODEL 2
(man-days)

		Year 1	2	3	4	5	6	7	8
Jan.	Total Labor casual/family labor		12.1	6.0	5.8	5.8	7.9	7.9	7.9
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Feb.	Total Labor casual/family labor		28.5	28.7	28.7	29.2	29.2	29.2	29.2
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Mar.	Total Labor casual/family labor		37.5	38.1	38.1	39.3	41.3	41.3	41.3
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor		5.5	4.1	2.1	1.3	-	-	-
Apr.	Total Labor casual/family labor		24.4	24.5	24.6	25.1	25.1	25.1	25.1
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
May	Total Labor casual/family labor		36.8	37.4	37.4	13.4	13.4	13.4	39.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor		4.8	3.3	1.3	-	-	-	-
Jun.	Total Labor casual/family labor		12.8	13.4	13.4	13.4	13.4	13.4	13.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Jul.	Total Labor casual/family labor		13.6	16.1	12.1	12.1	14.1	14.1	14.1
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Aug.	Total Labor casual/family labor		12.8	12.4	12.4	12.4	12.4	12.4	12.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Sep.	Total Labor casual/family labor	36.5	37.6	37.0	37.0	39.0	39.0	39.0	39.0
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	6.5	5.6	3.0	1.0	1.0	-	-	-
Oct.	Total Labor casual/family labor	31.3	31.6	31.9	31.9	31.9	31.9	31.9	31.9
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	1.3	-	-	-	-	-	-	-
Nov.	Total Labor casual/family labor	32.4	35.3	35.5	35.5	37.5	37.5	37.5	37.5
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	2.4	3.3	1.4	-	-	-	-	-
Dec.	Total Labor casual/family labor	16.7	14.0	14.2	14.2	14.2	14.2	14.2	14.2
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Year	Total Labor casual/family labor	116.9	284.9	395.2	291.1	297.3	305.3	305.3	305.3
	Family labor casual/family labor	120	384	408	432	456	504	552	600
	Hired labor casual/family labor	10.2	19.2	11.8	4.4	2.3	-	-	-

Table 7: SUMMARY LABOR ANALYSIS - MODEL 3
(man-days)

	Year	1	2	3	4	5	6	7	8
Jan	Total labor casual/family labor		17.1	11.0	10.9	12.9	12.9	12.9	12.9
	Family labor/casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Feb	Total labor casual/family labor		19.4	19.6	19.6	20.1	20.1	20.1	20.1
	Family labor casual/family abor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Mar	Total labor casual/family labor		45.5	46.1	46.1	47.3	49.3	49.3	49.3
	Family labor casual/family labor		32.0	34.0	36.0	38.0.	42.0	46.0	50.0
	Hired labor casual/family labor		13.5	12.1	10.1	9.3	7.3	3.3	3.3
Apr	Total labor casual/family labor		28.9	29.0	29.1	29.6	29.6	29.6	29.6
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor		8.8	7.4	5.4	3.3	1.3	1.3	50.0
Jun	Total labor casual/family labor		16.8	17.4	17.4	17.4	17.4	17.4	17.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Jul	Total labor casual/family labor		18.6	21.1	17.1	17.1	19.1	19.1	19.1
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Aug	Total labor casual/family labor		14.3	13.9	13.9	13.9	13.9	13.9	13.9
	Family labor casual/family labor		30.0	32.0	34.0	36.0	38.0	42.0	50.0
Sep	Total labor casual/family labor	36.0	37.1	36.5	36.5	38.5	38.5	38.5	38.5
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	6.0	5.1	2.5	.5	.5	.0	.0	.0
Oct	Total labor casual/family labor	29.2	29.5	29.8	29.8	29.8	29.8	29.8	29.8
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Nov	Total labor casual/family labor	28.7	31.5	31.7	31.7	33.7	33.7	33.7	33.7
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Dec	Total labor casual/family labor	17.1	14.4	14.6	14.6	14.6	14.6	14.6	14.6
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Year	Total labor casual/family labor	111.0	313.9	312.1	308.0	314.2	320.2	320.2	320.2
	Family labor casual/family labor	120.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0
	Hired labor casual/family labor	6.0	27.4	22.0	16.0	13.1	8.6	3.3	-

Table 8: SUMMARY LABOR ANALYSIS - MODEL 4
(man-days)

	Year	1	2	3	4	5	6	7	8
Jan	Total labor casual/family labor		7.1	1.0	.9	.9	2.8	2.8	2.8
	Family labor/casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Feb	Total labor casual/family labor		16.4	16.6	16.6	17.1	17.1	17.1	17.1
	Family labor casual/family abor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Mar	Total labor casual/family labor		34.0	34.6	34.6	35.8	37.8	37.8	37.8
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor		2.0	0.6	.0	.0	.0	.0	.0
Apr	Total labor casual/family labor		18.4	18.5	18.6	19.1	19.1	19.1	19.1
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
May	Total labor casual/family labor		26.8	27.4	27.4	27.4	29.4	29.4	29.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Jun	Total labor casual/family labor		12.8	13.4	13.4	13.4	13.4	13.4	13.4
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Jul	Total labor casual/family labor		13.6	14.1	12.1	12.1	14.1	14.1	14.1
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Aug	Total labor casual/family labor		29.3	28.9	28.9	28.9	28.9	28.9	28.9
	Family labor casual/family labor		32.0	34.0	36.0	38.0	42.0	46.0	50.0
Sep	Total labor casual/family labor	23.5	24.6	24.0	24.0	24.0	26.0	26.0	26.0
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Oct	Total labor casual/family labor	34.7	35.0	35.3	35.3	35.3	35.3	35.3	35.3
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
	Hired labor casual/family labor	4.7	3.0	1.3	.0	.0	.0	.0	.0
Nov	Total labor casual/family labor	26.7	29.5	29.7	29.7	29.7	29.7	29.7	29.7
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Dec	Total labor casual/family labor	16.1	13.4	13.6	13.6	13.6	13.6	13.6	13.6
	Family labor casual/family labor	30.0	32.0	34.0	36.0	38.0	42.0	46.0	50.0
Year	Total labor casual/family labor	101.0	260.9	260.1	254.1	260.3	268.2	268.2	268.2
	Family labor casual/family labor	120.0	384.0	408.0	432.0	456.0	504.0	552.0	600.0
	Hired labor casual/family labor	4.7	5.0	1.9	-	-	-	-	-

Table 9: FARM PRODUCTS AND INPUTS - MODEL 1

	Units	Year 1	2	3	4	5	6	7	8	9 onward
Cropping intensity			127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50
Production										
Rice	kg		400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00
Cassava	kg		4,000.00	5,000.00	5,500.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Corn (dry)	kg		300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00
Rice bean (wet)	kg	90.00	112.50	127.50	150.00	150.00	150.00	150.00	150.00	150.00
Mung bean (wet)	kg	52.50	60.00	75.00	90.00	90.00	90.00	90.00	90.00	90.00
Groundnut	kg		180.00	225.00	270.00	300.00	300.00	300.00	300.00	300.00
Tobacco	kg		40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00
Ginger	kg		225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00
Chillies	kg		50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00
Pineapples	fruit		600.00	710.00	840.00	930.00	930.00	930.00	930.00	930.00
Citrus	fruit		0.00	0.00	0.00	0.00	1,600.00	2,240.00	2,800.00	3,200.00
Pepper	kg		30.00	40.00	45.00	50.00	50.00	50.00	50.00	50.00
Coconut	nut		0.00	0.00	0.00	0.00	990.00	1,276.00	1,496.00	1,760.00

	Units	Year 1	2	3	4	5	6	7	8 onward
Material Inputs									
Urea	kg	175.00	143.00	143.00	143.00	143.00	143.00	143.00	143.00
TSP	kg	232.50	200.50	200.50	200.50	200.50	200.50	200.50	200.50
Insecticide	lt	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
Rice seed	kg	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Corn seed	kg	10.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Cassava cuttings	kg	625.00	625.00	625.00	625.00	625.00	625.00	625.00	625.00
Chillies seed	kg	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ginger seed	kg	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coconut seedlings	seedling	22.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mung bean seed	kg	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25
Rice bean seed	kg	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Groundnut seed	kg	-	21.00	21.00	21.00	21.00	21.00	21.00	21.00
Pineapple tops	kg	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Citrus seedlings	seedlings	16.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tobacco seed	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pepper cuttings	kg	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ANNEX 5

Table 10: FARM PRODUCTS AND INPUTS - MODEL 2

Cropping intensity	Unit	Year 2	3	4	5	6	7	8	9 and on
Production									
Rice	kg	640.00	760.00	1,000.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Cassava	kg	2,000.00	2,500.00	2,750.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00
Corn (dry)	kg	150.00	187.50	250.00	250.00	250.00	250.00	250.00	250.00
Corn (wet)	kg	150.00	187.50	250.00	250.00	250.00	250.00	250.00	250.00
Rice bean (dry)	kg	150.00	187.50	250.00	250.00	250.00	250.00	250.00	250.00
Mung bean (dry)	kg	105.00	120.00	150.00	180.00	180.00	180.00	180.00	180.00
Groundnut	kg	150.00	187.50	222.50	250.00	250.00	250.00	250.00	250.00
Tobacco	kg	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00
Ginger	kg	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00
Chillies	kg	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00
Pineapples	fruit	600.00	710.00	840.00	930.00	930.00	930.00	930.00	930.00
Citrus	fruit	.0	.0	.0	.0	1,600.00	2,240.00	2,800.00	3,200.00
Pepper	kg	30.00	40.00	44.50	50.00	50.00	50.00	50.00	50.00
Coconut	nut	.0	.0	.0	.0	990.00	1,276.00	1,496.0	1,760.00
	Year	1	2	3	4	5	6	7	8 and on
Material inputs									
Urea	kg	192.50	160.50	160.50	160.50	160.50	160.50	160.50	160.50
TSP	kg	270.00	238.00	238.00	238.00	238.00	238.00	238.00	238.00
Insecticide	lt	2.40	2.40	2.40	2.40	2.40	2.40	2.40	2.40
Rice seed	kg	48.00	48.00	48.00	48.00	48.00	48.00	48.00	48.00
Corn seed	kg	10.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Cassava cuttings	kg	312.50	312.50	312.50	312.50	312.50	312.50	312.50	312.50
Chillies seed	kg	.40	.00	.00	.00	.00	.00	.00	.00
Ginger seed	kg	12.50	.00	.00	.00	00	.00	.00	.00
Coconut seedlings	seedling	22.50	.00	.00	.00	.00	.00	.00	.00
Mung bean seed	kg	-	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Rice bean seed	kg	-	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Groundnut seed	kg	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
Pineapple tops	tops	300.00	.00	.00	.00	.00	.00	.00	.00
Citrus seedlings	seedling	16.00	.00	.00	.00	.00	.00	00	.00
Tobacco seed	kg	.00	.00	.00	.00	.00	.00	.00	.00
Pepper cuttings	kg	1.00	.00	.00	.00	.00	.00	.00	.00

ANNEX 5

Table 11: FARM PRODUCTS AND INPUTS - MODEL 3

	Unit	Year 2	3	4	5	6	7	8	9 and on
Cropping intensity		152.50	152.50	152.50	152.50	152.50	152.50	152.50	152.50
Production									
Rice	kg	400.00	475.00	625.00	750.00	750.00	750.00	750.00	750.00
Cassava	kg	2,400.00	3,000.00	3,300.00	3,600.00	3,600.00	3,600.00	3,600.00	3,600.00
Corn (dry)	kg	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00
Corn (wet)	kg	300.00	375.00	500.00	500.00	500.00	500.00	500.00	500.00
Rice bean (dry)	kg	150.00	187.50	212.50	250.00	250.00	250.00	250.00	250.00
Mung bean (dry)	kg	105.00	120.00	150.00	180.00	180.00	180.00	180.00	180.00
Groundnut	kg	150.00	187.50	222.50	250.00	250.00	250.00	250.00	250.00
Tobacco	kg	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00
Ginger	kg	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00
Chillies	kg	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00
Pineapples	fruit	600.00	710.00	840.00	930.00	930.00	930.00	930.00	930.00
Citrus	fruit	.0	.0	.0	.0	1,600.00	2,240.00	2,800.00	3,200.00
Pepper	kg	30.00	40.00	44.50	50.00	50.00	50.00	50.00	50.00
Coconut	nut	.0	.0	.0	.0	990.00	1,276.0	1,496.0	1,760.00
		Year 1	2	3	4	5	6	7	8 and on
Material inputs									
Urea	kg	215.00	183.00	183.00	183.00	183.00	183.00	183.00	183.00
TSP	kg	292.50	260.50	260.50	260.50	260.50	260.50	260.50	260.50
Insecticide	lt	2.65	2.65	2.65	2.65	2.65	2.65	2.65	2.65
Rice seed	kg	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Corn seed	kg	20.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Cassava cuttings	kg	375.00	375.00	375.00	375.00	375.00	375.00	375.00	375.00
Chillies seed	kg	.40	.00	.00	.00	.00	.00	.00	.00
Ginger seed	kg	12.50	.00	.00	.00	00	.00	.00	.00
Coconut seedlings	seedling	22.50	.00	.00	.00	.00	.00	.00	.00
Mung bean seed	kg	-	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Rice bean seed	kg	-	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Groundnut seed	kg	17.50	17.50	17.50	17.50	17.50	17.50	17.50	17.50
Pineapple tops	tops	300.00	.00	.00	.00	.00	.00	.00	.00
Citrus seedlings	seedling	16.00	.00	.00	.00	.00	.00	00	.00
Tobacco seed	kg	.00	.00	.00	.00	.00	.00	.00	.00
Pepper cuttings	kg	1.00	.00	.00	.00	.00	.00	.00	.00

Table 12: FARM PRODUCTS AND INPUTS - MODEL 4

	Unit	Year 2	3	4	5	6	7	8	9 and on
Cropping intensity		127.50	127.50	127.50	127.50	127.50	127.50	127.50	127.50
Production									
Rice	kg	200.00	237.50	312.50	375.00	375.00	375.00	375.00	375.00
Cassava	kg	6,400.00	8,000.00	8,800.00	9,600.00	9,600.00	9,600.00	9,600.00	9,600.00
Corn (dry)	kg	150.00	187.50	250.00	250.00	250.00	250.00	250.00	250.00
Rice bean (wet)	kg	150.00	187.50	212.50	250.00	250.00	250.00	250.00	250.00
Mung bean (dry)	kg	105.00	120.00	150.00	180.00	180.00	180.00	180.00	180.00
Groundnut	kg	150.00	187.50	222.50	250.00	250.00	250.00	250.00	250.00
Tobacco	kg	40.00	50.00	62.50	75.00	75.00	75.00	75.00	75.00
Ginger	kg	225.00	300.00	400.00	500.00	500.00	500.00	500.00	500.00
Chillies	kg	50.00	62.50	80.00	90.00	90.00	90.00	90.00	90.00
Pineapples	fruit	600.00	710.00	840.00	930.00	930.00	930.00	930.00	930.00
Citrus	fruit	.0	.0	.0	.0	1,600.00	2,240.00	2,800.00	3,200.00
Pepper	kg	30.00	40.00	44.50	50.00	50.00	50.00	50.00	50.00
Coconut	nut	.0	.0	.0	.0	990.00	1,276.0	1,496.0	1,760.00

	Unit	Year 1	2	3	4	5	6	7	8 and on
Material inputs									
Urea	kg	140.00	108.00	108.00	108.00	108.00	108.00	108.00	108.00
TSP	kg	217.50	185.50	185.50	185.50	185.50	185.50	185.50	185.50
Insecticide	lt	2.15	2.15	2.15	2.15	2.15	2.15	2.15	2.15
Rice seed	kg	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Corn seed	kg	–	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Cassava cuttings	kg	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00
Chillies seed	kg	.40	.00	.00	.00	.00	.00	.00	.00
Ginger seed	kg	12.50	.00	.00	.00	00	.00	.00	.00
Coconut seedlings	seedling	22.00	.00	.00	.00	.00	.00	.00	.00
Mung bean seed	kg	–	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Groundnut seed	kg	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Pineapple tops	tops	300.00	.00	.00	.00	.00	.00	.00	.00
Citrus seedlings	seedling	16.00	.00	.00	.00	.00	.00	.00	.00
Tobacco seed	kg	.00	.00	.00	.00	.00	.00	.00	.00
Pepper cuttings	kg	1.00	.00	.00	.00	.00	.00	.00	.00

Table 13: FARM BUDGET - MODEL 1 /a
(Rp '000)

Year	3	5	7	9 onward
Gross value of production	294.9	419.5	472.3	493.9
Less: Costs of production	35.7	35.7	35.7	35.7
Net value of production	259.2	383.8	436.6	458.2
Less: Hired labor /b	1.4			
Subsistence /c	135.1	135.1	135.1	135.1
Ipeda tax /d	13.0	19.2	21.8	22.9
Net farm income	109.7	229.5	279.7	300.2

/a Constant 1978 financial prices.

/b Valued at Rp 600/man-day.

/c See Annex 1, Table 15.

/d 5% of net value of production.

Table 14: FARM BUDGET - MODEL 2 /a
(Rp '000)

Year	3	5	7	9 and on
Gross value of production	316.7	440.4	522.8	544.4
Less: production costs	43.4	43.4	43.4	43.4
Net value of production	273.3	397.0	479.4	501.0
Less: hired labor /b	7.1	1.4		
Ipeda tax /c	13.7	19.9	24.0	25.0
subsistence /d	135.1	135.1	135.1	135.1
Net farm income	117.4	240.3	320.3	340.9

/a Constant 1978 financial prices.

/b Valued at Rp 600/man-day.

/c 5% of net value of production.

/d See Annex 1, Table 15.

Table 15: FARM BUDGET - MODEL 3 /a
(Rp '000)

Year	3	5	7	9 and on
Gross value of production	315.7	434.0	516.4	538.0
Less: production costs	45.0	45.0	45.0	45.0
Net value of production	270.7	389.0	471.4	493.0
Less: hired labor /b	13.2	7.9	2.0	
subsistence /c	135.1	135.1	135.1	135.1
Ipeda /d	13.5	19.5	23.6	24.7
Net farm income	108.9	226.5	310.7	333.2

/a Constant 1978 financial prices.

/b Valued at Rp 600/man-day.

/c See Annex 1, Table 15.

/d 5% of net value of production.

Table 16: FARM BUDGET - MODEL 4 /a
(Rp '000)

Year	3	5	7	9
Gross value of production	295.5	400.0	482.4	304.0
Less: production costs	28.3	28.3	28.3	28.3
Net value of production	267.2	371.7	454.1	475.7
Less: hired labor /b	1.1	-	-	-
subsistence /c	135.1	135.1	135.1	135.1
Ipeda tax /d	13.4	18.6	22.7	23.8
Net farm income	117.6	218.0	296.3	316.8

/a Constant 1978 finnacial prices.

/b Valued at Rp 600/day.

/c See Annex 1, Table 15.

/d 5% of net value of production.

Table 17: SIMULATED ECONOMIC RATE OF RETURN - MODEL 1
(Rp '000)

	Costs				
Year	Investment /a	Crop production	Subsistence /b	Total	Benefits
1	1,322.1	78.7	75.2	1,476.0	28.5
2	28.3	59.2	150.4	237.9	233.9
3	28.3	59.2	150.4	237.9	296.2
4	28.3	59.2	150.4	237.9	413.6
5	28.3	59.2	150.4	237.9	466.4
6		59.2	150.4	209.6	505.3
7		59.2	150.4	209.6	518.9
8		66.2	150.4	216.6	626.7
9-25		66.2	150.4	216.6	636.7

Rate of return: 17%

Net present value discount factor:	10%	12%	15%	17%	20%
	1,183	728	229	(18)	(302)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 18: SIMULATED ECONOMIC RATE OF RETURN - MODEL 2
(Rp '000)

Year	Costs				Benefits
	Investment /a	Crop production	Subsistence /b	Total	
1	1,322.1	89.7	75.2	1,487.0	
2	28.3	72.1	150.4	250.8	272.8
3	28.3	72.1	150.4	250.8	338.9
4	28.3	72.1	150.4	250.8	423.6
5	28.3	72.1	150.4	250.8	498.4
6		72.1	150.4	222.5	572.0
7		72.1	150.4	222.5	583.7
8		80.6	150.4	231.0	671.7
9-25		80.6	150.4	231.0	690.2

Rate of return: 18%

Net present value discount factor:	10%	12%	15%	17%	20%
	1,488	943	394	121	(192)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 19: SIMULATED ECONOMIC RATE OF RETURN - MODEL 3
(Rp '000)

	Costs				
Year	Investment /a	Crop production	Subsistence /b	Total	Benefits
1	1,322.1	90.9	75.2	1,487.0	
2	28.3	73.9	150.4	252.6	272.8
3	28.3	73.9	150.4	252.6	347.2
4	28.3	73.9	150.4	252.6	434.2
5	28.3	73.9	150.4	252.6	495.6
6		73.9	150.4	224.3	549.8
7		73.9	150.4	224.3	570.8
8		82.9	150.4	233.3	667.6
9-25		82.9	150.4	233.3	686.1

Rate of return: 18%

Net present value discount factor:	10%	12%	15%	17%	20%
	1,401	909	339	100	(207)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.

Table 20: SIMULATED ECONOMIC RATE OF RETURN - MODEL 4
(Rp ´000)

Year	Costs				Benefits
	Investment /a	Crop production	Subsistence /b	Total	
1	1,322.1	68.7	75.2	1,476.0	
2	28.3	49.1	150.4	227.8	257.7
3	28.3	49.1	150.4	227.8	299.9
4	28.3	49.1	150.4	227.8	350.3
5	28.3	49.1	150.4	227.8	394.8
6		49.1	150.4	227.8	459.1
7		55.0	150.4	199.5	480.1
8		55.0	150.4	205.4	558.4
9-25		55.0	150.4	205.4	578.9

Rate of return: 15%

Net present value discount factor:	10%	12%	15%	17%	20%
	862	163	23	(196)	(115)

/a Includes shadow foreign exchange adjustment.

/b See Annex 1, Table 15.