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THE WORLD BANK  
Washington, D.C.

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The Chenery Files - Correspondence

Apr. 2, 1971 - May 24, 1972

The World Bank Group  
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Correspondence of Economic Adviser Hollis B. Chenery - Correspondence 01

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WORLD BANK GROUP

ROUTING SLIP		DATE March 18, 1976	
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<input checked="" type="checkbox"/>	APPROPRIATE DISPOSITION		NOTE AND RETURN
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	INFORMATION		PREPARE REPLY
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REMARKS			
<p>In cleaning out some old files in Mr. Chenery's office, I have found the attached original incoming letters which we no longer need. If they are useful to you, please file. Otherwise, discard.</p>			
FROM		ROOM NO.	EXTENSION
N. Freeman		E1239	3667

NOV 20 1973

COUNCIL ON FOREIGN RELATIONS, INC.

THE HAROLD PRATT HOUSE | 58 EAST 68TH STREET, NEW YORK, N.Y. 10021 | TEL. (212) 535-3300 | CABLE: COUNFOREL, NEW YORK

*HBC See second page  
Shell 1 day  
- unless meeting  
held in D.C.?*

November 15, 1973

*Redlined (by telephone)*

Dr. Hollis B. Chenery  
International Bank for Reconstruction  
and Development  
1818 H Street, N.W. - Room A1221  
Washington, D. C. 20433

Dear Hollis:

We are pleased to invite you to join a small Council group on Southeast Asia this year. This area has been less frequently in the headlines in recent months than in years past, but important developments are taking place in several countries and in the area's relations with the outside world. We think that a discussion of such matters as trends within key countries, the evolving pattern of relationships in the region, and policies of the major external powers by an interested and knowledgeable group at the Council can be most useful.

This group will represent a new type of activity for the Council. A number of such groups, which we are calling Current Issue Review Groups, are being organized this year on an experimental basis. They are designed to achieve two major objectives: more than other Council groups they will be able to respond rapidly to current international developments, and to make it possible for many more members to share in small group interchanges at the Council. Each Current Issue Review Group will include in its membership some specialists on the subject involved as well as interested Council members whose expertise and perspectives are different. Selection of members will draw heavily upon the replies received to Bayless Manning's letter of June 21 inviting expressions of interest from members wishing to participate in small group activity at the Council.

Normally, meetings of the group will be opened by someone with particular knowledge of the topic, but active participation of all members of the group will be emphasized. The work of the group will not be rigidly or elaborately programmed and the group will in considerable degree set its own agenda. In addition to meeting occasionally for self-generated discussion, it may come together on an ad hoc basis when special Council guests of interest are available or when important events relating to Southeast Asia occur. Each group will evolve a pattern of its own, and its success will be largely dependent on the ideas and enthusiasm it generates among its own members. William J. Barnds, Senior Research Fellow at the Council, will help shape the agenda and make the necessary arrangements for the meetings.

NO

The first meeting of the Current Issue Review Group on Southeast Asia will be a dinner session on December 12, 1973 from 4:45 to 9:15 p.m. at the Harold Pratt House. At that time we shall discuss the situation in Vietnam at the end of 1973 -- nearly a year after the cease-fire agreements -- and the outlook for the future. George Carver of the Central Intelligence Agency will open the discussion. Lionel Landry, Executive Vice-President of the Asia Society, will chair the meeting.

Please let us know as soon as possible whether you would like to join the group, and if so, whether or not you are able to attend the first meeting. We hope very much that you will find it possible to be with us.

Sincerely yours,

*William J. Barnds*

William J. Barnds  
Senior Research Fellow

*Richard H. Ullman*

Richard H. Ullman  
Director of Studies

*Assessed by plan*



INSTITUTO DE INGENIERIA  
CIUDAD UNIVERSITARIA  
MEXICO, D. F.

*Stamp*  
*Do you have this?*  
*No*  
*copy sent to  
lgorelse 5/25/72*  
MAY 24 1972

May 17, 1972

MAY 23 1972

Dr. Hollis Chenery  
International Bank for  
Reconstruction and Development  
1818 H St. N.W.  
Washington, D.C. 20433  
U.S.A.

Dear Dr. Chenery:

Following Mr. Leopoldo Solis' suggestion, we sent to you on March 28, 1972, a proposal for research on the subject of mechanisms for generation of employment, which we discussed with you briefly on your visit to Mexico City last April.

We are very interested on doing research along the lines described in that proposal, and would appreciate if you give us an indication of the chances of its approval.

Yours very truly

Daniel Ruiz Fernández  
Director



INSTITUTO DE INGENIERIA  
CIUDAD UNIVERSITARIA  
MEXICO, D. F.

*Grant - DR c*  
*(See comments in my memo on records.)*

March 28, 1972

APR 5 1972

Mr. Hollis Chenery  
International Bank for  
Reconstruction and Development  
1818 H St. N.W.  
Washington, D.C. 20433  
U.S.A.

Dear Mr. Chenery:

At the suggestion of Mr. Leopoldo Solís, we are submitting to BIRF the attached proposal for a study of mechanisms for generation of employment in Mexico.

The proposed research would be conducted by an interdisciplinary group of this Institute according to the schedule and budget included in the proposal.

Yours truly

Daniel Ruiz Fernández  
Director

c.c.p. Lic. Leopoldo Solís, Director de Estudios  
Económicos, Secretaría de la Presidencia



*DRN* DRN/cqg.

PROPOSAL FOR  
A STUDY OF THE MECHANISMS FOR GENERATION OF EMPLOYMENT

1. Introduction

Models of economic development that emphasize concepts like consumption-per-capita, income-per-capita, etc., tend to overlook the process by which wealth concentrates in the hands of national and international minority groups, and by which the relative impoverishment of the majorities increases. This becomes clear when observing the apparently contradictory situation of some countries of the third world which exhibit high "indexes" of economic development while experiencing at the same time an increasing polarization and conflicts between its social strata.

This proposal for studying different mechanisms for the generation of employment parts from the conviction that the difficulties in solving some of the problems that our society confronts depend a great deal on the rigidity of the conceptual framework that is used to formulate them. For example when the problem of generation of employment is formulated from a financial point of view in a country like Mexico, where capital is expensive, qualified labor is scarce and non-qualified labor is super-abundant, the possible solutions might be restricted from the very beginning to those which, according to past experience, would take many years in having a significant impact in the problem of unemployment. Further-





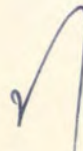
more, in some instances one may be running the risk of making the situation even worse, since it is generally recognized that the problems of unemployment and underemployment are not accidental events, but they are rather the products of the type of economic and social structure of the countries in which they occur.

Under the above considerations, it seems plausible to assume that the potentiality of the contribution of applied research to the solution of the problems mentioned above might depend directly on the flexibility of the conceptual framework that is used to formulate and study such problems.

In the study that is being proposed here, we inted to explore ways of reaching such flexibility. It is for this reason that we are not proposing a specific list of mechanisms for the generation of employment to be investigated, but rather the steps that we inted to follow in order to arrive to the definition of such mechanisms.

## 2. Objective and Methodology

The objective of this study is to define and explore some mechanisms for the generation of employment. In order to achieve the flexibility that we desire for approaching and formulating the problem, we inted to follow two basic tactics:



a) to base this work on theoretical elements extracted from the various scientific disciplines that have dealt with the phenomenon we call "development", and

b) formulate the problem in such a way as to incorporate in the decisions the subject to whom the problem of underemployment affects the most: the underemployed himself.

In order to implement the first tactic, we will count the collaboration of senior researchers in economics, sociology, anthropology and operations research, who will work on the elaboration of a common model of the problem that might constitute the language of the group.

In order to implement the second tactic, the problem will be formulated in such a way as to minimize the use of resources that are not easily accessible for underemployed, placing more emphasis in the resources that are within his reach. This constraints lead us to a statement of the problem at the level of the local communities. Hence, we intend to explore ways of working in small population nuclei, searching for ways of establishing methods for data recollection referring to both, the local natural resources and the resource represented by the organization of the local community.

Besides the gathering of information relevant to the natural and organizational resources in the communities, we intend to explore in this study different alternatives for inducing an

efficient combination of these resources, at a local level. We intend to approach this by organizing small social promotion groups which will move to the selected localities, and try to initiate in them a certain productive activity, organizing for this purpose a local "Committee for Promotion", with which we will study and experiment different possibilities with regards to the efficient combination of the resources mentioned. We will use, as a basis, the theoretical elements previously selected by the researchers group.


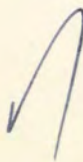
With this in mind, the project will be focussed at the experimental exploration of alternative responses to each of the three following questions:

a) How to form and organize the "local promotion committee" in the communities in which the work will be done

b) What type of productive activity should the promoter recommend, as consultant to the community

c) In which way should the promoter groups be formed and integrated.



The alternatives to be explored will have to meet certain essential characteristics that will define the approach to this project. Thus, for the first question, the alternatives to be explored for the integration and organization of the local promotion committee will be based on the use of several elements of the existing community organizational patterns.



For the second question, we will study those alternatives that will emphasize the use of hand labor, which means that the demand on the initial financial investment will be low. Besides the fact that these characteristics will adjust to the general conditions of the country, that is: the lack of technicians and equipment, and the surplus of nonqualified hand labor, they also constitute the necessary conditions to make the promotion program applicable to a number of communities.

An additional characteristic of the alternatives that will be explored for the second question will be the continuity; that is, we will investigate types of activities that will have a high probability of initiating an occupational process for the community, as we consider that an eventual job, being an isolated fact for the community, might create frustration and alienation in the community.

For the third question, different forms of organizing the group of promoters will be explored. They will have a communication system which will enable them to organize efficiently their experiences, to transmit them in such a way that they can be useful for other promoters, and to share with the group of promoters some of the most crucial decisions to be taken.



A model which will enable the evaluations of the efficiency of use of the available promotion resources (including organizational resources) will be elaborated.

The hypotheses on which such a model will be based will not only be submitted to field tests, but its own formulation will be made through an interaction process among theoretical elements and an empirical field study. For this purpose we will count on the collaboration of researchers with theoretical specialization in the anthropological and sociological field, as well as in the economic-ecological field. These specialists will in turn be assisted by a group of field researchers which will engage in testing the alternatives for action which will be proposed.

Once the fundamental hypotheses are explored, these same field researchers will participate in experimenting the alternatives in the communities previously selected for this purpose.

### 3. Project Schedule

This project will be developed in two phases of three and four months respectively. The first phase will be devoted to the theoretical elaboration of the study, and will terminate with the statement of the specific hypotheses to be tested, and the design of the corresponding alternatives of action. The second phase will consist of the field work necessary to

carry out the selected alternatives and to test the hypotheses involved.

The first phase will be carried out in five different stages:

1) initiation of the theoretical work, survey of the literature, and pre-selection of the communities to work with (4 weeks)

2) observation research trips to the pre-selected communities (2 weeks)

3) elaboration of a preliminary conceptual framework and final selection of the communities (6 weeks)

4) conducting preliminary field tests of some of the theoretical concepts (3 weeks)

5) summary of Phase I (1 week)

The second phase will consist of:

6) conducting the promotion designed in Phase I in the chosen communities (12 weeks)

7) evaluation of the program and formulation of the report (6 weeks).

4. Budget

Project leader, 1/2 time: .....	3,948.00 US Cy
6 months of senior researcher time: .....	6,768.00 US Cy
Three Junior researchers, full time: ....	9,583.20 US Cy
Three Research assistants, full time: ...	4,356.00 US Cy
Salaries subtotal: ...	<u>24,655.20 US Cy</u>
Computer .....	1,120.00 US Cy
Trips .....	6,665.60 US Cy
Insurance .....	448.00 US Cy
Direct costs, subtotal: ...	<u>32,888.80 US Cy</u>
Indirect costs: ...	19,733.28 US Cy
Total: ...	<u><u>52,622.08 US Cy</u></u>

## OFFICE MEMORANDUM

TO: F I L E S

DATE: April 11, 1972

FROM: Hollis B. Chenery *HBC*SUBJECT: Research Prospects in Latin America

This memorandum covers observations on research groups of interest to the Bank in Chile, Costa Rica, and Mexico based on my visit to those countries between March 26 and April 7. Together with earlier notes on visits to Colombia, Peru, and Brazil in November, 1971, it completes a survey of the principal countries and research centers in Latin America apart from Argentina.

My earlier trip led to an extensive follow-up of the possibilities for collaboration in Brazil by Peter Clark of the DRC and to proposals to relate the next Bank economic report to research undertaken in that country. On the present trip I was fortunate to be accompanied by Pedro-Pablo Kuczynski and we explored similar possibilities in Costa Rica and Mexico.

In addition to individual country research, I had the opportunity to discuss the ECIEL program of research cooperation in each country and to confirm earlier judgments that the Bank should support this program to some degree. I have suggested to Joe Grunwald that he investigate the possibility of joint sponsorship by the Bank and IDB (in addition to the Ford Foundation) before coming to us with a formal proposal.

MEXICO

We visited three research groups of potential interest: the Solis group in the Ministry of the Presidency, the Nacional Financiera, and the Colegio de Mexico. The first two seem as well staffed as any I have encountered in Latin America, but the Colegio is rather unimpressive.

Solis Group. The policy functions of the Ministry of the Presidency are described in the last economic report on Mexico (pp. 3-5). The Ministry is now taking on many of the functions of a planning commission although its effectiveness remains to be tested. The DRC has been working closely with the long-term planning unit under Solis, and he speaks quite warmly of the results to date. However, these have been rather academic exercises so far, and Kuczynski and I feel that we should try to make them more operational both in the Mexican government and in the Bank.



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The posting of Roger Norton from the DRC to Mexico for a year should help in this effort. In addition to the DRC models, an alternative multi-sectoral model is being tested by Saul Trejo, and I think some reconciliation of Dinamico and this effort should be brought about.

Solis introduced us to the Director of the Institute of Engineering of the National University. According to Solis, the Institute has been working on various studies on the application of technology. They are studying employment-creating road construction techniques (along lines similar to those of our East Africa and Ivory Coast study) for which they would like Bank financial help. Although the project makes sense, the written outline sent to me will require a thorough revision before it can be considered by the Research Committee.

Nacional Financiera. The research division under Gerardo Bueno is working on a multi-sectoral model for industrial planning using the same original 1960 input-output table as the Solis group but with a different set of objectives and adjustments to the data. In some ways I found this work more interesting as a research project since it starts with an evaluation of the structural changes in the economy over the past 20 years. There seems to be very little connection between the two research groups despite their use of a similar methodology. I feel that we should be more engaged with Financiera than we have been and should ask the DRC to explore this possibility. Financiera has the advantage of a long-term involvement in industrial planning and greater operational responsibility than Presidencia.

Colegio de Mexico. The research program of the Center for Economic and Demographic Studies has been forwarded separately to the DRC. Two projects struck me as being worth further investigation: the study of urbanization and the work being done by Gerard Boon on technology and labor capital substitution (copies sent to Helen Hughes). Gus Ranis is also producing an interesting paper on technological choice.

#### COSTA RICA

The University of Costa Rica has a competent young research group of a dozen faculty members directed by Hernando Naranjo, (a recent Ph.D. from the University of Pennsylvania) that struck me as being as competent as any I have encountered in Latin America. They have collaborative projects with Reynolds of Stanford (flow of funds analysis)

April 11, 1972

and with Eckaus of M.I.T. (comparison of financial structure). They also have under way (i) an econometric model designed to simulate policy in the monetary, fiscal and foreign sectors, (ii) an unemployment survey, and (iii) a study of transport and urban problems. Requests have been submitted to the Central American department for support of the latter two projects and will be forwarded to the Research Committee. Bank assistance for the survey of unemployment would consist of helping them with methodology and financing about half of the cost of the first two six-monthly surveys, for which a useful beginning has been made with a survey of consumption in 3,200 households. The study of the demand for social services is somewhat more ambitious, and a more complete outline will be submitted in the next few weeks.

Since the birth rate has dropped very markedly in Costa Rica in the past ten years, I found the demographic research of particular interest. Kuczynski has a volume containing some of the preliminary results and this aspect might be investigated further in our next economic report.

Given its advanced social policies and the existence of a competent and a cooperative research group, Costa Rica seems to offer an exceptional opportunity for Bank collaboration on a range of topics. There would be advantages in concentrating several studies there so that we could study the interaction among different aspects of development, such as education, employment, population, fiscal policy, etc. I think we would also encounter less possibility of being accused of interference or empire-building on the research area here than in some of the larger and more nationalistic countries.

#### CHILE

Most of the research talent from the previous administration has been assembled in two research groups at the Catholic University under Cauas and Foxley. While there is some division of labor by subject matter between them (the Cauas group being more devoted to short-term analysis) the division seems to be largely on personal rather than academic grounds. The Ford Foundation thinks well of both groups and supports both. Peter Clark is in touch with Foxley and some further collaboration there would seem possible. I have invited Cauas -- who will be at M.I.T. for the next three weeks -- to visit the Bank to discuss research possibilities. Despite the financial and political difficulties of the government, I see no reason that we should not have close ties with the academic community,

April 11, 1972

particularly in areas such as income distribution and employment in which Chile is undertaking some interesting experiments. The Ford Foundation seems to be successfully working with governmental and academic groups of varying political views without too much difficulty and I think the Bank could well do the same.

cc: Messrs. E. Stern, L.M. Goreux, P.D. Henderson,  
E. Gutierrez, G. Alter, B. Balassa,  
D. Avramovic, P. Kuczynski, E.K. Hawkins,  
A. Churchill, P. Clark, J. Duloy

Mrs. Helen Hughes

## OFFICE MEMORANDUM

TO: Mr. L.M. Goreux

DATE: April 10, 1972

FROM: Hollis B. Chenery *HBC*SUBJECT: Mexico Volume

I agree with the general trend of Balassa's comments on the presentation of the Mexico results. I am particularly concerned, as he is, that this should not be regarded as a purely academic exercise and that the way in which the results are useful for policy should be brought out in non-technical terms. The use of Part I for this purpose is a good idea and while it would involve you in more work, I think it will be well worth it. You may wish to get someone who has not been involved in the project to help in drafting or commenting on the draft from the point of view of the less technical audience.

*I have just spoken to Laurel Taylor, who is apparently commenting along these lines.*

cc: Messrs. B. Balassa, E. Stern

Grundy, etc.

✓

Draft of Reader's Report on Multi-Level Planning: Case Studies in Mexico

By: Larry E. Westphal

This initial draft report is based on a <sup>APR 20 1972</sup> once-through reading of the entire volume and is for the most part concerned with comments of a general nature on the organization of the volume and the content and style of component chapters. More detailed comments on some of the individual chapters will come later. The comments here should be regarded as preliminary, for a careful re-reading of some chapters is required. These comments are given at this time to serve as the basis for discussion while I am in Washington on April 13 and 14.

There can be no doubt that the research reported in the volume is extremely significant and constitutes a fundamental contribution to the growing literature on "applied" development planning. Individually, each of the major models represents a significant advance. In particular, I would cite Manne's inclusion of labor in a meaningful way in an economy-wide, multi-sectoral programming model and the careful articulation of production and demand relationships in the agricultural sector in CHAC which permits meaningful policy analysis. In terms of its careful modeling of the agricultural sector and substantial potential for policy analysis, CHAC is the most economically meaningful and operationally useful planning model (either sectoral or multi-sectoral) with which I am familiar. When taken in total as a system of models, the whole is no doubt less than the sum of its parts. Several of the linkage experiments appear contrived and there is a good deal more of ad hoc-ery in linking the models than one would expect given the announced intention to construct a set of related multi-level planning models. With respect to multi-level planning, perhaps the most significant finding concerns the (insurmountable?) problems that arise in trying to formulate a compatible set of multi-level planning models. One apparent shortcoming in presenting the research findings is that these problems are not forcefully discussed in a single section; they are rather brought out in scattered references that suggest continuing debate. Kornai's contribution is the exception, for he deals explicitly with these problems; but I for one would like to see a more explicit discussion with respect to the models employed.

The over-all organization of the volume is somewhat puzzling. This appears in large measure due to the content of the introduction and the inclusion of Kornai's contribution in Part V rather than Part I. Thus the following comments really pertain to the introduction. It is never quite clear to the reader exactly what is the aim of the introduction (i.e. Part I): is it a reader's guide to the stable of models, a summary of findings regarding multi-level planning, a statement of methodology concerning the embedding of project appraisal in the economy wide planning problem, etc.? In my view it is an often confused tangle of all of these, which leaves the reader somewhat unsure of the significance and relationships among the various statements contained. If it is meant to be either a reader's guide or a statement of

findings, and particularly if it is meant to introduce the issue of multi-level planning, then I would judge that Kornai's piece belongs in Part I; burying his piece in Part V (which is thereby made a repository of miscellany) seems inappropriate in that it is the most forceful and honest overview of the problems of multi-level planning. The only possible problem in placing his piece in the introduction is its frank honesty which might lead some readers to put the volume down at that point. But, given the audience to which this volume appears to be addressed, I doubt that this would be a serious consideration.

The introduction also appears to be too clubby, i.e. it seems to be addressed more to those who worked on the volume than to its readers. This seems due to the penchant of the authors to use the models to address economic issues just as easily stated without reference to the specific models employed in the volume. For a summary of findings this may be appropriate, but for a methodological discussion it is not. The style of Part I also suggests that the volume's audience has not been clearly identified; Chapter I.2 in particular mixes quite simple and superficial statements of some issues with quite technical and sophisticated statements of others.

I would suggest that Part I be re-organized for the reasons cited above and for yet another. I have tried to read the introduction as one with no prior acquaintance with the models (having seen drafts along the way this was not easy) -- it is my distinct impression that the frequent references to specific details of the various models will serve to confuse the reader. One almost has to have read the entire volume to understand the overview! This might be taken as a suggestion that at least Chapter I.2 follow Part IV. I would draw a somewhat different conclusion, in keeping with the spirit of an overview: Chapter I.3 should precede Chapter I.2 to give the reader a chance to gain additional familiarity with the models prior to the discussion of their linkages.

I would therefore suggest the following re-organization: the sequence of chapters in Part I should be I.1, V.3, I.3, and I.2. Chapter I.1 should be re-written to 1) remove the second section on the models (moved to Chapter I.3) and 2) introduce the issue of interdependence in a more complete fashion, perhaps relying on a parable of the additional information gained moving up levels in the case a single project (canal lining?) and pointing to formal v. informal model linkages. Chapter I.3 needs a clearer and more forceful statement of the operational (or policy) content of each of the models.

A few specific comments: The term "suboptimization" is not one I would have chosen, and it seems never to be fully defined. Why not define interdependence at the outset in terms of the changes in efficiency prices induced by a change in resource allocation? In Chapter I.2, is something profound or general being suggested in that moving from a price to a demand schedule to shifts in the demand schedule somehow is equivalent to including a greater number of linkages? The discussion of data banks on p. 19 of Chapter I.3 seems out of place.

To whom is this volume addressed? From the way it is written it appears to be addressed to a rather narrow audience of planning specialists. Parts III and IV in particular rely heavily upon the reader's having the intellectual baggage of a nearly post-doctoral student in the field. This may well be the appropriate audience, so long as the editors are aware of the assumed level of competence necessary to read the volume. But it does seem a pity that at least the overview can not be written in such a way that it can be assigned in graduate courses on development or centralized planning, as could all of Part II as now written.

There follow general comments on the remaining chapters where there appear to be at least stylistic problems:

Within Part II, it seems strange that the Manpower Projections precede the formal statement of DINAMICO. This leads to a good deal of repetition, and, in any event, one has to read Chapter II.3 to judge the adequacy of and understand the bases for the manpower projections.

Chapter II.5 does not appear to merit being a chapter, though the comments there are highly relevant. As to Chapter II.6 -- EXPORTA is clearly the least well articulated model of the lot. And, the author's claim that the level of disaggregation is sufficient to warrant faith in and give operational meaning to the comparative advantage rankings seems unfounded. There are a number of problems in the specification of EXPORTA -- in several respects its specification seems seriously in error (eg. labor). And, EXPORTA is the only model not really integrated into the "model system"; it stands as a separate and, I would judge, rather poor model. On this basis I would argue that EXPORTA should not be included in the volume.

Chapter III.1 seems to do an inadequate job of comparing project appraisal in isolation with INTERCON and INTERCON with a more aggregate approach. Why didn't Manne formulate an aggregated version of INTERCON dropping the seasonal and regional disaggregation for purposes of comparison? His conclusions on pp. 39 - 41 seem to be "educated guesses" when more would be possible. For example, for a given demand within a region, why isn't the result of a project appraisal in isolation compared with the model's results.

In Chapter IV.3, I think that the laying out of the policy alternatives considered should be delayed until after the "basic 1968 and 1974 solutions" have been discussed.

In Chapter IV.4, at the beginning, BAJIO and BAJITO are used interchangeably without definition to the confusion of the reader.

In Chapter IV.3, pp. 22 - 26a, and in the discussion of results in Chapters IV.4 - 6, the style is choppy and the discussion very difficult to follow. The reader (this one at least) gets hopelessly tangled in the mire of case specifications and result differences.

In Chapter IV.3, the verbal discussion of policy interaction is a bit hard to follow and could be more forceful. In IV.4, for Solutions of type II -- do the domestic prices of the products change as the interest rate and wage rate change or are the product prices from a single run of CHACITO used? If the latter, a better explanation of the comparability between Solutions II and III seems needed.

Parts 1, 2, and 3 of Chapter V.2 are very hard to follow, particularly part 3 where it appears the author has been a bit too cryptic. I am not sure that the conclusions on p. 23 are warranted -- I could not find comparative solution times, etc. for solution by decomposition, by decomposition exploiting the structure of the model, and by solution without decomposition.



HARVARD UNIVERSITY  
CENTER FOR INTERNATIONAL AFFAIRS

DEVELOPMENT RESEARCH GROUP  
1737 CAMBRIDGE STREET  
CAMBRIDGE, MASSACHUSETTS 02138

April 3, 1972

Mr. Ian Bowen  
International Bank for Reconstruction  
& Development  
1818 H Street, NW  
Washington, D.C. 20433

Dear Mr. Bowen:

Attached please find my detailed comments on the Development Research Center manuscript, Multi-Level Planning: Case Studies in Mexico. I have not attempted to edit these notes, on the thought that somewhat repetitive observations on recurring problems will be of more use to the authors. Let me summarize my conclusions regarding the manuscript briefly here.

There is no doubt that the manuscript is publishable in its present form. There are too many tables and the same discussions of certain concepts (particularly the way the models treat unemployment) keep reappearing in different chapters, but this is nothing new in academic books. If one wanted to clear up these problems, a good, independent editor could do the job in a matter of days. At a guess, the manuscript could be cut at least 100 pages without loss of content.

But there is another way in which the manuscript, despite its many excellences, is less than the sum of its parts. It seems to me that all the models presented are relatively simple partial and general equilibrium constructs, the theory of which has been well known for quite some time (at least since Samuelson's 1953 article on "Prices of Factors and Goods in General Equilibrium"). Yet very little use is made of general equilibrium concepts in the discussion of the models and their interactions. A much more integrated description of the models could be achieved by tying them together from this point of view, perhaps through a series of editors' introductions on the similarities and differences of each succeeding chapter's

April 3, 1972

model with the others. This is now done in part through the introductory chapters in Part I. Even here, however, much that could be said is missing. (See the detailed comments.)

In summary, I certainly would have no overwhelming objections to the manuscript's publication as is. I do feel, however, that it could be substantially tightened up at not too much cost by a ruthless editor. And probably at substantial cost, the book could be improved by including an introductory chapter and chapter introductions written explicitly from an integrative, general equilibrium viewpoint. If the decision were mine, I would probably recommend the editing, leaving the talent which would be required for a thorough rewriting free for new research.

Sincerely,

Lance Taylor  
Assistant Professor of Economics

la

P.S. At Alan Manne's request, I have sent my marked-over copy of the manuscript to him at Stanford.

## Part I, General

These chapters provide a general introduction to the book. In the versions I have (dated March, 1972) the presentation is clear and reasonably succinct. I have a number of observations on content, which are given in detail in the following chapter-specific comments:

### Chapter I.2. The Problem of Interdependence

This discusses the desirability of setting up a hierarchy of planning models, of the type discussed in this book. The discussion is largely theoretical--the most severe problem, that of data collection and computabilization, is mentioned only in passing. In a book of this length, some hints to the statistical agencies as to how users want data to be organized would be a good addition. There are frequent mentions in this chapter of "prices," but it is often unclear whether market or shadow prices are meant (e.g. on p. 3 in the 3rd paragraph). Similar confusion attaches to references to a "price-quantity demand curve" on p. 4 (are cross-price terms considered?), to the discussion of capital inflows and capital goods prices on p. 5 (in a multi-capital model, capital gains due to price changes in each sector can in principle make own-rates of return different; they don't in DINAMICO, but in general knowing the supply curve of "foreign capital" is not enough), and to the concept of a "premium" on foreign exchange (the magnitude of which in DINAMICO partly stems from accounting conventions--see comments on chapter II.3 below). Also, the whole suboptimization concept might become clearer if the discussion began with the perfect competition property that prices are all one needs to define a "cut" between a sector and the rest of the economy, and then went on to consider the problems raised if the sector is a monopolist (as CHAC vis-a-vis the rest of the economy seems to be) has increasing returns, etc.

The discussion of decomposition procedures beginning around page 17 is quite clear; Figure 3 is new and useful. On the other hand, if the sole function of the model PACIFICO is to underpin this section (and this appears to be the case), brevity might well justify dropping both. If this discussion is retained, an attempt should be made to specify a bit more formally how one determines how many price vectors "have to be" transmitted in the first iteration of PACIFICO. It should also be mentioned that PACIFICO's speed may come from including the demand balances in the master program.

The discussion of merging ENERGETICOS and CHAC with DINAMICO is fairly clear. In the ENERGETICOS case, insensitivity comes from limited choice of technique in the energy model (elasticities of import and capital use with respect to the exchange and discount rates are on the order of hundredths) and fixed coefficients intermediate uses in DINAMICO. What causes the former, and what happens if the latter assumption is relaxed? Some discussion of what in principle a general equilibrium model like DINAMICO would want by way of information from a sector would help illustrate the DINAMICO/CHAC discussion. Trade theory suggests that all you need to know are a production function and the world price (or post-tariff price) as a function of the sector's output. These are precisely the data mentioned on p. 26.

### Chapter I.3. Characteristics of the Models

This runs over the main features of the models. It is complete and sophisticated in its discussion, but again marred by small slips and some repetition. On p. 3, for example, it is suggested that one would need a process analysis model to estimate capital-labor substitution in a sector. Why not just make a piecewise approximation to an econometric production function? On p. 4, lack of price sensitivity in demand functions is said to be a characteristic of "input-output" models. The work of Chenery-Raduchel and Johansen shows that "linear programming" is the appropriate modifier. On the same page, EXPORTA is implied to measure "comparative advantage." In some sense, this would be true if one accepts fixed input-output coefficients; if this Leontief assumption does not hold in Mexico, EXPORTA's trade predictions will err as badly as DINAMICO's. On p. 5, the "knife-edge" export behavior will stem from the production structure of the aggregate models--the transformation surface will be quite flat under constant returns with few variable factors (the labor supplies, capital and foreign exchange are variable in DINAMICO, but capital rents are determined as a residual) so that exports will move easily from upper to lower bounds in response to small price changes. This will be less of a problem in CHAC, where the larger number of region- and crop-specific factors will make for decreasing returns and a curved transformation surface.

On p. 6, explicit definition of a "gradualist" consumption path would help; the concept is still pretty new. Also the discussion of the "reservation wage" could be amplified by referring to some simple surplus labor model; on p. 16 for example it is by no means clear that efficiency wages are determined by reservation wages. This basically depends on the elasticity of substitution of the production function between the Galenson-Leibenstein (labor marginal product equals reservation wage) and product exhaustion (labor consumes all

product) points in the surplus labor set up.

On p. 13, CHAC doesn't approximate a competitive equilibrium any more than DINAMICO does. Both are constant returns models with a few specific distortions such as export bounds, savings constraint in base year prices, etc. DINAMICO maximizes a discrete Hamiltonian at each time point, which is the sum of producers' and consumers' surpluses in shadow prices; CHAC maximizes this sum in base year prices. Both models lead to a Pareto efficient allocation (subject to the ad hoc restrictions) which could be supported by perfect competition modified by taxes and subsidies. CHAC's social welfare function may pick out a resource allocation which is closer to the actual one than DINAMICO's, but both are on the contract curve, which is all that "competition" means.

On p. 20, the absence of relative price shifts allows equal own-rates of interest, since differential capital gains don't much affect the costate equations. This once again reflects the flatness of the transformation surface, resulting from constant returns and a relatively narrow range of factor proportions in the production functions. Moshe Syrquin finds essentially the same thing for Mexico in a neoclassical framework. (His results on labor absorption should also be compared with DINAMICO's). Flatness pops up again on p. 22--the exchange rate is inversely unit elastic with a general tariff increase. This means that little reallocation between traded and non-traded goods is possible (given the bounds on exports and the necessity to produce non-traded goods) or that the transformation surface is flat. The only way the price system can maintain non-specialization given this production set-up is via exchange rate changes which exactly compensate the cost increase (see my paper on optimal growth shadow pricing in Chile for more on this).

## Part II. Multi-Sectoral Models

This section presents results on two linear programming models of the Mexican economy--DINAMICO and EXPORTA. The bulk of the discussion is devoted to the former. It contains a number of innovations in the state of the art, and there is no question of merit of publication. However, the discussion of the model, based on a series of papers presented at conferences or published at different times, is far from succinct. About 155 manuscript pages are devoted to DINAMICO. With re-writing and consolidation of the various papers, this could easily be cut to 100 pages. Given the problems of multiple authorship, etc., this may not be feasible editorially, but it should definitely be considered as a possibility. In particu-

lar, there is a great deal of overlap in the discussions of DINAMICO's labor use specification in all the chapters, which could be consolidated. Also, some tables could be sacrificed with little narrative loss--complete presentation of results is always desirable, but it may have been carried too far in this case. Chapter-specific comments follow:

Chapter II.1. Manpower Projections

Sections 2 and 3 here are largely repeated in Chapter II.3, and section 7 could also be consolidated with later material. Some of the tables (particularly those giving coefficient arrays for the model) might be dropped. Also some of the tables (nos. 5 and 7, in particular) appear to be written in FORTRAN, and would benefit from the addition of explanatory material. The discussion of the economic issues involved in DINAMICO's labor specification is generally clear and interesting; I have few complaints. I do feel unhappy, however, about a lack of precision in all these chapters (e.g. p. 8) as to whether "prices" refer to shadow price, 1960 market prices, or whatever. In addition, it is not clear on p. 14 what base-year price system is used in calculating productivity changes, and whether there have been small enough price shifts over time to rule out worries about the Gerschenkron effect in the long run projections. Another pricing problem relates to wage rates: are sectoral wage differentials assumed to disappear within each skill class, or what? One finds in Chapter II.2 that they apparently are assumed out of existence; this might be brought forward. Finally, no reference is made to recent econometric work on elasticities of substitution between different labor types (Dougherty, Bowles), on the evolution of wage structures over time (Selowsky, Dougherty), and on future employment possibilities in Mexican manufacturing (Syrquin). Since these papers, based on a neoclassical framework, give results similar to the specification here, they might be mentioned as supporting evidence for the rather strong conclusions which are reached.

Chapter II.2. Numerical Data...

Once again, tables could be removed here. Five or six input-output tables for the Mexican economy (all cooked up from one 1960 study) are perhaps of interest to a country specialist, but to the general reader? In terms of the substantive discussion, prices once again get short shrift: are the input-output tables in purchasers' or producers' prices, for example? And what price system do the big entries in the "commerce" row of Table 7 imply? I also wonder why the RAS method was not applied in full, because a rows-only correction turned out to give a good fit "on the average" or what? Also, it is not

clear why this input-output row correction, which refers to intermediate uses of a sector's product, should be applied to consumption and capital uses as well. The discussion of factor rents in section 5 should be better tied in with the preceding chapter, in particular as regards the role played by the strong assumption of equal returns to the same skill in all occupations. This is clearly unrealistic, and leads to some of the computed spread of returns to capital. In any case, similar return spreads are observed in other models, e.g. Leif Johansen's Multi-Sectoral Study.

Chapter II.3. DINAMICO...

Why doesn't this chapter come first? Theoretical specification normally precedes data description, and some of the problems understanding what goes on in the first two chapters (even on row labelling in tables, etc.) could be avoided by putting this one first. As mentioned above, I think that there is unnecessary overlap between discussion of the labor force specification here and in chapter II.1. Also, the description of the high-cost export activities on p. 6 is elliptical. On p. 10, the problem of cross-sectoral wage differentials is again touched too lightly. More substantively, the interpretation of export costs in Table 4 and throughout the chapter is erroneous--a constant returns system (with outputs by sector necessarily assumed homogeneous) cannot produce "high cost" exports and other products simultaneously; costs of all sector products must be equalized, regardless of destination. Hence the "cost factor" 1.3 can only be interpreted as a misplaced marginal revenue factor of  $(1/1.3)$ . That is, manufactured exports can be produced and sold for a price of 1.0 in the foreign market (ignoring accounting difficulties with services and the time discounting of the "high costs") until an upper bound is reached. Then they can be sold for a price of  $(1/1.3)$ . The marginal cost of these exports is the domestic price of manufactured goods,  $P$ . The marginal revenue is  $(1/1.3)$  times the foreign exchange<sup>m</sup> shadow price  $P_f$ . Marginal revenue equals marginal cost is the gist of Table 10. As marginal revenue falls (1.3 increases to 1.5),  $P_f$  must rise in inverse proportion to keep near the same production point, which must occur with a flat transformation surface--any very small price shift would lead to specialization. This explains the editor's note to chapter II.5. But the problem is really even more complex, for the price of 1.0 on the first increment of exports must be a tariff-ridden price, since we are told repeatedly the Mexican exports require protection. Thus  $1.0 = (1+t_m)q_m$ , where  $t_m$  is the ad valorem tariff on the first incre-

ment of manufactured exports and  $q_m$  is the world price measured in pesos at the base year exchange<sup>m</sup> rate. Say  $t = 0.3$  and  $q_m = 0.77$ . Then the marginal export return of  $1/1.3$  really corresponds to a marginal revenue of  $(1.3)^{-2} = .59$ . Is this reasonable? Is it reasonable to assume that the Mexican government will allow its exporters' returns to fall to the marginal revenue level?

The opposite assumption, which is consistent with the treatment of non-marginal exports, is to assume that marginal exports will be given sufficient protection to maintain the price level. But this means that the marginal return to the exporter will be unity (lower world price  $q'_m$  is exactly compensated by a higher  $t'$  so that  $(1+t')q'_m = 1$ ) and the original distinction between the two types of exports is meaningless as far as the insulated domestic producer is concerned.

The appropriate resolution of the paradox would be to set the right world prices for the non-marginal exports and a lower price for the marginal ones--this would amount to basing the shadow price system on marginal world prices, instead of the present mixture (which at the margin goes to incorrect estimates of the world prices). Since domestic prices would be essentially maintained by the flat transformation surface when this correction is made, the foreign exchange shadow price would have to rise to compensate for the lower marginal revenues, behaving like some sort of optimal tariff. But this makes the foreign exchange shadow price look in effect like an appendage--it can be modified at will by putting an arbitrary multiplier on the foreign exchange constraint (one plus the general tariff) and moving it up and down. When  $P_f$  acts like this, all welfare judgments based on it are bound to be suspect.

On another point, I think some comment on p. 33 as to why the marginal propensity to save should stay constant in base-year prices would be appropriate. If we are worrying about foreign exchange allocations in shadow prices, then why not savings? There is no such thing as a volume index of savings (as opposed to a sector's output) and the economics of bringing it in is murky. Does the savings constraint have a role in determining own-rates of interest? How about the gradualist assumption? The already excellent discussion of own-rates might be amplified along these lines.

#### Chapter II.4. Economic Alternatives...

Few comments here. Typically for the author, the parametric variations are well chosen and clearly discussed. I do wonder again if all the tables are necessary. They're pretty



forbidding--are they likely to be studied by anybody? It is not clear to me what prices are used as a basis for section five's calculations. I also wonder where the money for the public investments at the top of p. 25 is coming from.

Chapter II.5. Comments...

These are not more vapid than the average set of comments from a conference. Not less vapid, either. The point in the editor's note is again not surprising, when one considers the above-mentioned flatness of transformation surfaces, on constant returns.

Chapter II.6. EXPORTA...

This is like DINAMICO, except that the labor constraints don't permit substitution among skill classes, so that unskilled labor is unemployed. The contrast in specification could be brought out in fewer words. More words and even tables could be added to describe and compare the patterns of exports selected by both models in their free-trade and tariff-ridden incarnations. Comparative advantage is frequently alluded to throughout these chapters, but its implications in terms of trade patterns are not spelled out concretely. Also the point on p. 17 regarding the labor-intensity of exports is intriguing. John Shehan of Williams has found the same thing for Mexico (no surprise--he probably used the same data), and if the phenomenon is real, it is certainly interesting and important as a contrast to the usual South American findings.

Part III. The Energy Sector

This part is a lot less repetitive than Part II, and the papers are clear and interesting (although again there are too many not-likely-to-be-read tables). In terms of organization, it might be preferable to make the first chapter of part V the first chapter here, as an introduction to planning with economies of scale--Chapter V.1 is constantly referred to, in any case. Also, more discussion of simple technological facts would enliven the presentation of the process analysis. For example, it is never stated why there are separate demands for peak power and energy--how many economists know the difference between power and energy? And in the ENERGETICOS chapter, one wonders why the Mexicans want to set up a steel plant in the first place--a plant of one million tons is scarcely going to be in a position to compete with the Japanese, or even the Americans, if its output is valued at world prices. Some discussion here would be illuminating.

### Chapter III.1. ...Electric Power Projects

I have few specific comments here: more discussion of simple technology and a real map of Mexico (here or elsewhere in the book) would be helpful. In addition, more explicit discussion of the different ways in which a merit order of existing plants is derived (endogenously in INTERCON, semi-exogenously in ENERGETICOS) would help the reader understand the differences between the two models. Finally, if there are any other studies of this type which do or don't demonstrate the same basic results as INTERCON (zero marginal capacity costs for off-peak periods, little annual or seasonal variation of marginal energy costs, etc.), a summary of them would be of interest. Do these pleasant findings come naturally from the specification of the model, or the particular Mexican data?

### Chapter III.2. ENERGETICOS...

Being neoclassical, I wonder why demand targets are set up for steel and petroleum products here--both are eminently tradable and their cost to Mexico is surely given by world prices. Or isn't it? Some discussion of the welfare loss resulting from autarchy would be of interest. On p. 27, it is not clear to me that choice of exploitation level has much freedom in the model, by the specification of oilfield costs. Why not just specify it exogenously? Also, the tables describing both the steel and petroleum specifications are mind-boggling. Is anyone (even a sector specialist) likely to go through them? For economists at least, graphical presentation of cost curves, etc., resulting at different levels of operation would be infinitely clearer. Graphical presentation of the economic results of the exercise, which finally begin to appear on p. 33 and are tied up in Tables 12 and 13 would help. These show that both investment and import demands for the energy sector are very inelastic with respect to exchange rate and discount rate changes. How much of this is due to the exogenous demand specification, and how much of the consistency these results have with DINAMICO (next chapter) is due to the latter's fixed coefficients specification for intermediate inputs?

### Chapter III.3. Linking ENERGETICOS to DINAMICO

The discussion in section 1 of the interactions between big and little models is very nice. Why not put it at the front of the book? Again, the lack of sensitivity in the energy sector to changes in efficiency prices discussed in section 3 (and already implicit in Table 13 of last chapter) may be wrong on the derived demand side, if in the real world derived demands for energy in other sectors are sensitive to factor price shifts, as they would be under non-Leontief assumptions.

## Part IV. The Agricultural Sector

This is a fascinating section. In the world of programming models, the analysis here is based on two almost-new techniques--the inclusion of a fixed money wage for unskilled labor and the explicit maximization of surplus in base-year, not shadow, prices. The authors make good use of both of these to tell interesting stories about Mexican agriculture. Although their specification is weak in some other places, which are discussed below, their innovations carry them a long way. This and Part III are the best ones in the book. Perhaps programming models are best applied to micro-studies after all...

### Chapter IV.1. CHAC...

This chapter describes in general terms the structure of the agricultural model. It is generally quite clear, but like other chapters in this book, too long. Section 2 could probably be dropped without great loss, and perhaps Section 3 also. On the other hand, addition of a map would again be helpful.

In terms of specific comments, I think that the model is not so much surplus labor (p. 4a) as Keynesian, with a fixed money wage for the farmers and a demand curve which is more sensitive to price increases than income increases. Most of the results in Table 6 of Chapter IV.3 would be derived from an aggregatemodel like this, I suspect. In any case, surplus labor models have usually assumed that the real wage is fixed, which is closer to the version of CHAC where an agricultural income constraint is imposed. Also, on p. 5 it is true that any programming model will approximate a market equilibrium in shadow prices. This may be a silly equilibrium because of an unrealistic aggregate demand function, etc., but it is still there. CHAC probably approaches base-year equilibrium more closely. On the other hand, it is a partial analysis because cross-price elasticities (both within the agricultural sector and between agriculture and other sectors) are ignored, along with income effects.

On p. 9 and elsewhere, more explicit discussion of migration activities would help. There is no wage responsiveness in interregional migration (as there probably would be in the real world) and the supply function just reduces to an upper bound. Explicit mention of this would help.

On p. 15, an explanation of how water supply is costed would help, since this is always a complicated business. Also, on p. 16 I wonder why the draft animal constraint is regional--as the authors point out, you can't drive mules around from district to district all that rapidly. On p. 21, the position of the "heavy line" in the figure is not obvious.

On p. 24, is it reasonable to assume Mexico is a price taker on all its crops, or does it face declining demand curves in export markets? For the stuff exported to the U.S. I should assume the latter. Also the paragraph on the bottom of the page should be rewritten--demand elasticities affect resource allocation but capital-labor substitution still takes place only in production. Like all practical models, CHAC is recursive in the sense that demand and production parameters enter the supply-demand balances, but only production parameters enter the cost-minimization equations.

On p. 27, a figure with "little triangles" would please the traditionalists. It would also show that in the example chosen, producers' surplus is zero at the equilibrium, which might help illustrate what is going on. Also, surplus maximization may first have been proposed by Samuelson in a programming context. But in describing market equilibrium (and finding optimal policies, as in peak load pricing and setting bridge tolls) it is as old as the hills in economics. See the review article in the 12/71 EJ.

On p. 31, why weren't capital recovery factors used to value investments? And on p. 53, competitive imports of agricultural goods enter only the cost function, but are not restricted in any other way. Are the prices CIF or post-tariff? (This will affect the whole price structure of the model.) And are price controls the only way the Mexican government manipulates imports, or should quotas be considered also?

#### Chapter IV.3. CHAC Results...

On p. 7, did choice of technique enter the Thorbecke-Stoutjeskijk exercise? If so, was it as narrow as Mexico's? And on p. 10, some discussion of the regional impact of seasonal unemployment would be of interest. I gather it must differ greatly from North to South. On p. 11a, the profitability measure is not really Bruno's, since he subtracted import costs of production from the denominator. As far as I can see, CHAC treats all production inputs as non-tradable by policy fiat, since otherwise the costs of certain inputs such as chemicals and machine services should clearly be evaluated at world, not Mexican, prices. The main point of Bruno-type analysis is to underline that many apparently profitable import-substituting and export projects are really quite costly when their hidden intermediate import costs are taken into account. This may not be a problem in Mexican agriculture, but it is not even considered in the discussion here. Also, the Table 2 analysis is based on an assumption of completely elastic export demands. Again, is this reasonable? Finally, the explanation of col. 6 of Table 1 ought to be moved forward from Table 2, and amplified.

On p. 25, it should be noted that CHAC is partial equilibrium with respect to the budget, and ignores income effects. For example, an increase in sector income will surely have some positive effects on the budget which are not considered here. Dani Schydrowsky thinks export subsidies can be self-financing in Argentina because of this effect. Could the same be true in Mexico?

#### Chapter IV. 4. ...Agricultural District

At the beginning of this chapter, the word BAJITO is introduced before it is defined, and there is general confusion between the models BAJIO and BAJITO. There is a more serious omission of any discussion of the institutional structure of the Mexican farms. Is land agglomeration ruled out legally, for example? The results make some farm types look more profitable than others. If this is the case, why doesn't all agriculture shift in this direction between 1968 and 1974? If not, why not? On p. 6, are the prices from CHAC shadow, or of the endogenous equilibrium variety?

#### Chapter IV.5. Investment and Employment Alternatives...

The analysis is nice, especially in the discussion of Figures 1 and 2 (although "right" should replace "left" in line 16 of p. 7). More substantively, the whole analysis of section 5 is conditional on fixed product prices. This means that in the profit functions implicit in the production side of the model--which adjust product and factor prices to a competitive resource allocation via changes in technique--many degrees of freedom will have been used up by this exogenous price specification. This may have something to do with the low substitution elasticities between labor and capital, although only simulations under varying product prices would tell. Also some independent verification of the big possibilities for machine-mule substitution on small dryland farms would be reassuring.

#### Chapter IV.6. Linking...

This is quite a clear chapter; I have few comments. Talking about the "decentralized nature of reality" on p. 2 is slightly grandiose, and on p. 3 it seems to me that something like an export demand curve is also an important input from CHAC to DINAMICO (or at least Part I says so). Once again on p. 9, DINAMICO will be maximizing a Hamiltonian--a measure of surplus in shadow prices--in each time period; CHAC just does the same in something closer to base-year prices. Also, on p. 9 it should be stated explicitly that the fixed money wage disappears in DINAMICICHAC linkages; this should be underlined throughout. On p. 12, third line from the bottom, DCE must mean ACE, and CD must mean AC in the last line. I

think that Table 3 should definitely be consolidated into half the columns--it's hard to read now. Finally, declining demand curves could easily capture the international marketing difficulties mentioned on p. 31.

#### Part V. Decomposition Algorithms and Multi-Level Planning

I wonder why this Part is included at all. The first chapter on integer programming would be better as the first chapter in Part III; the other two have little to do with Mexico. The chapter on decomposition techniques is (even more than the others) a computer exercise. It says interesting things about how to set up a model to use the Dantzig-Wolfe algorithm, but that would look better in Econometrica than in this book. And the Kornai chapter, illuminating as the memoirs of a disillusioned decomposer, doesn't have much to do with preceding Parts either--despite superficial Mexican references. Given that the book is likely to cost over \$30 at its present length, is it necessary to include these?

##### Chapter V.1. A Mixed Integer Algorithm...

Few comments here--a nice chapter. But on p. 2, did Gately find anything specific or not in his comparison of IPE and branch-and-bound? If not, why mention it?

##### Chapter V.3. Thoughts on Multi-Level Planning...

These are interesting, but are they technical enough for the book? Also, it looks as if the footnote on p. 24, although well taken in spirit, is in direct contrast with the results on the efficiency of the master program's requesting multiple solutions from sub-programs in PACIFICO.

## OFFICE MEMORANDUM

TO: Mr. Louis Goreux

DATE: March 29, 1972

FROM: Bela Balassa

SUBJECT: Mexico Volume

1. I have read the latest version of Part I of the Mexico volume with interest. I provide some general comments and suggestions concerning approach, organization and style below. Detailed comments are given in my copies of the individual chapters in the margin.

2. The first question to be answered is what audience one should aim at. I would suggest that the summary chapters of Part I need to be made understandable to nonspecialists who wish to form a judgment as to the usefulness of multisectoral models in general and of the Mexican model in particular. The group includes departmental directors and chief economists at the Bank as well as high-level civil servants in the economics-planning field in developing countries. This is an important audience as it comprises those who decide on whether such models should be built and, if built, whether and how they should be utilized in practical work. Part I should also help people in the Bank to evaluate the usefulness of the DRC.

3. In its present form, Part I does not meet the described objective. In particular, there is the danger that after the first paragraph many potential readers in the above group may put down the volume with a sigh "again technical gobbledegook". At the same time, I do not see unsurmountable obstacles to rewriting Part I in a language that is understandable to nonspecialists. Your original description of the research project represented a move in this direction.

4. I would go a step further and suggest that Part I be made self-contained and it be made available for a wider audience separately from the book. This makes it desirable that, apart from a description of the objectives of the work, the assumptions underlying the various models, and their interconnections, Part I should include a detailed discussion of the experience gained from the study, its practical applicability, as well as recommendations for the building of multisectoral models in developing countries.

#### Chapter I.1. Introduction

5. In Section 1 of Ch.I.1, one should pose the problem to be investigated: the relationship among economy-wide, sector and project approaches and the costs and benefits of alternative combinations of models at various levels of aggregation. In the same section, issues relating to "upward" and "downward" linkages could be discussed in general terms. The section may incorporate some of the material from pp.1-2, 6, and 26-28 of Ch.I.2 and pp.25-26 of Ch.I.3 but without reference to the Mexican study itself.

6. In Section 2 it should be explained what considerations have led to the choice of the models that have been estimated for Mexico. One could then provide a short description of the various models although in somewhat greater

detail than in the present version. I would suggest incorporating some of the material of Section 3, giving attention to EXPORTA and PACIFICO, and emphasizing the interdependence of the models. In turn, I.3 could be usefully shortened and several passages containing evaluation and conclusions deleted

Chapter I.2. Characteristics of the Models

7. Ch.I.2 and 1.3 pose difficult problems of organization. For one thing, the question arises if one should examine the interdependence of the models before these are described in detail. For another, there is the question if the discussion of the characteristics of the models should be organized according to the particular topics (supply-demand balances, capital and objective function) or by taking the models one by one.

8. It would seem more logical to provide a detailed description of the models before their interdependence is analyzed. In this way the reader will have a better understanding of the individual models before he gets to the discussion of interdependence. Correspondingly, I would suggest that Ch.I.2 be devoted to a description of the characteristics of the models and Ch.1.3 should deal with the problem of interdependence. In turn, the discussion of the problem of labor employment and the use of the models could be shifted to Ch.I.4 that would provide an evaluation of the results.

9. Furthermore, I see some advantages in discussing the characteristics of the models as part of a detailed description of the models themselves rather than according to particular topics as is done now. It seems to me that the present arrangement presupposes more knowledge of the individual models on the reader's part than he actually has at this point. Also, the arrangement I propose would permit considering other characteristics of the models in addition to those presently discussed (e.g., the assumptions made in regard to export supply and import substitution functions in DINAMICO) and provide a better understanding of the structure of the models.

10. In the discussion, attention should be given to those features of the models that represent an advance over earlier work. One should also describe in detail the assumptions made but without as yet passing a judgment on their reasonableness. There is finally a certain amount of technical jargon that would need to be weeded out or to be put into footnotes.

Chapter I.3. The Problem of Interdependence

11. If, following my suggestions, the general issues relating to interdependence are transferred to the introduction, this chapter could concentrate on the discussion of linkages in the Mexican study. Section 2 is fine in its present form but I would be less sanguine on the validity of cardinal inter-personal utility comparisons.

12. Section 3.1 could be made less technical and I suggest deleting the rather involved discussion of investment strategies for ENERGETICOS (pp.16-19). Also, it would seem useful to avoid going back and forth between PACIFICOS and ENERGETICOS. As to the effects of the latter on the national economy, the discussion is unduly concentrated on the growth rate of GDP to the neglect of sectoral output and investment patterns. A change in the price of electricity will influence not only the cost of aluminum but also Mexico's



comparative advantage in metals, and thus its foreign trade. At any rate, a less than 1% increase in GDP may conceivably lead to higher growth rates via an increase in savings and investment. The discussion on pp.23-24 could also be made less technical while the lessons to be drawn from the DINAMICAL linkage experiment should come in the next chapter.

#### Chapter I.4. Evaluation

13. The suggested new chapter could begin with a discussion of the findings of the various models, with emphasis given to the sensitivity of the results to the assumptions made. Differences in the data base and in the assumptions underlying the individual models may also be discussed here. Differences in the treatment of exports in DINAMICO and EXPORTA and in the assumptions made concerning unemployment in DINAMICO and CHAC are of especial interest. The discussion of the latter problem, presently included in Chapter 1.3, needs improvements in various respects.

14. First of all, one can hardly explain differences in the assumptions made concerning unemployment in DINAMICO and CHAC by reference to "conceptual differences" (I.3, p.14) and "a difference in aims" (I.3, p.16). Thus, can we say that "the authors of CHAC are mainly interested in estimating the number of redundant agricultural workers from the primal" while the authors of DINAMICO are concerned with the values of the efficiency wages generated from the dual solution and that these values "appear quite reasonable" (Ch.1.3, p.16)? To my mind, one cannot divorce the primal solution from the dual and if one gives realistic results so does the other. Thus, if there is large disguised unemployment in Mexican agriculture, the efficiency price of labor will equal the reservation wage and the result obtained in DINAMICO cannot be considered "reasonable". As I indicated in my report on "Economic Research in the Bank" (January 1971), I regard the neglect of unemployment and disguised unemployment a failing of DINAMICO.

15. As to CHAC, it is not correct to say that surplus labor in agriculture necessarily means that the group is engaged in unrecorded subsistence activities. On family farms, which are widespread in Mexico, surplus labor finds expression in individual family members working less than their potential man-hours. As they do not expect to get employment elsewhere, they will "spread" the work and divide the proceeds among themselves. In this way, they will be compensated according to their average productivity while marginal productivity on the family farm is zero in the sense that the withdrawal of a single family member would not lead to a reduction in output.

16. A separate section should be devoted to the use of the models. Some of the material from Section 5 of Ch.I.3 could be utilized here in an expanded form while removing extraneous material such as inconsistencies in the basic data and the implications of changing the assumptions. A related question concerns the practical applicability of the models. My understanding is that CHAC finds application in Mexico; in turn, I doubt that the efficiency prices of the unskilled labor and that of foreign exchange obtained in DINAMICO could be employed in project evaluation.

17. One should further seek an answer to the question to what extent the exercise has increased our knowledge on the relationships of the project, sector, and the national economy in general and in Mexico in particular.

Thus, one should indicate the potential usefulness of extending the work to later periods, the lessons learned as regards multisectoral models, and the advice that can be given on the building of such models in other developing countries.

c.c. Messrs. Chenery  
Stern

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THE UNIVERSITY OF TEXAS AT AUSTIN  
COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES  
AUSTIN, TEXAS 78712

*Department of Economics*

April 14, 1972

Dr. Louis Goreux  
Development Research Center of the International  
Bank for Reconstruction and Development  
1818 H Street, Northwest  
Washington, DC 20433

Dear Louis:

Thank you for the opportunity to read the manuscript of the book which you are editing with Alan. It was both an enjoyable and an enlightening experience.

In accordance with your request, I have devoted most of my time in reading the manuscript and in these comments to the first three chapters. Those three chapters cover the major topics which I believe should be covered. However, I would be in favor of giving them a different overall tenor; namely, the tenor of describing a series of experiments which you have performed and that the book is then a report on these experiments. With that format, you would be free to describe both your failures and successes and to point explicitly to the kinds of results which you have obtained from the set of experiments which you conducted.

Since I have already talked over these comments with you on the phone, in this letter I will simply list the comments numbering them one by one.

1. In the first chapter I would prefer that when you discuss the objective of the book that rather than talking about whether or not sub-optimization makes a difference that you discuss when suboptimization makes a difference.
2. I think it would be useful to indicate that while the models were prepared with an eye towards studying their linkages that the models were indeed prepared separately and then that the linkages were constructed afterwards, in several cases.

Dr. Louis Goreux  
Page 2  
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3. In your chapter on interdependence I would describe each of the experiments which were conducted, the difficulties encountered in doing so, the implications of the experiment for development planning, and the advice which you would give to others who are interested in conducting similar experiments.

4. I would reverse the order of your chapters 2 and 3; thereby, providing a description of the various models first and a discussion of the interdependence of the models second.

5. I don't fully understand why you have included the section on alternative demand assumptions in the chapter on interdependence. N

6. I would prefer that you include a discussion of your failures as well as of your successes. For example, did you encounter some difficulties in the use of the Dantzig-Wolfe decomposition procedures with CHAC?

7. In your chapter where you describe the characteristics of the models, I would be inclined to break Tables 1 and 2 into 4 tables and to describe them independently.

8. I would add a sixth part to the book which goes over again and discusses in greater depth your major results which are discussed in the interdependence chapter. The division of labor between the third chapter and part six would be that the third chapter would provide an introduction to these results and then the sixth part would assume that the reader had read the rest of the book and was in a position to understand the finer points which emerge from your experiments in interdependence.

9. I would discuss more than you have done in the first chapters the data collection interdependencies among your models and the benefits gained from complementarities in data collection among the models.

10. In one of the chapters by Duloy and Norton, I am uneasy about the result of saying that the shadow prices from 1968 are in some sense better than the existing prices. Let me say that a different way. They solve BAJIO in three ways: first, with BAJIO prices, second, with CHACITO prices, and third with BAJIO in CHACITO. They seem to imply that the marginal efficiency of capital schedules which come from the second or third of these options are some sense the correct ones. But in fact, the prices which correspond to the second and third options would occur only if the optimum plan they have described took place. Otherwise, the BAJIO prices might hold and in that case, those investment schedules would not hold.

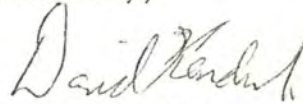
Dr. Louis Goreux  
Page 3  
April 14, 1972

11. I would have found the chapter on ENERGITICOS easier to read and understand if there had been an algebraic description of that model as there was for the earlier two models.

12. I would have preferred having a few words at the beginning of the chapter on INTERCON on why you wanted separate constraints in the model for peak power and for energy.

In general, I found the manuscript very interesting and think that it will be an important contribution to the literature in this field. H

Sincerely,



David Kendrick

DK/ny

cc: Professor Alan Manne

DATE: April 10, 1972

To : Alan Manne and Roger Norton

FROM : B. F. Johnston *BJJ*

SUBJECT: Comments on the Agricultural chapters in the book on  
Multi-Level Planning in Mexico

I have gone through these chapters in haste--though not as hastily as I had intended. I find your treatment of agriculture within a programming framework extremely interesting--but also disturbing in some respects. I will not spend time discussing the many things that I liked about the treatment of agriculture except to say that the use of the sum of producers' and consumers' surpluses as your maximand seems to have been an excellent device, and I particularly like the way that the analysis points up the importance of the effective demand constraint on the agricultural sector.

My principal concern is a very general one that will not seem very constructive, but I hope that I can persuade you to add some qualifications to your discussion of the policy implications of the model. This book represents such an ingenious and impressive application of programming techniques to problems of multi-level and sectoral planning that it is going to receive a great deal of attention--quite possible even more attention in India than Mexico. And as it now stands I believe that it is likely to encourage some very unfortunate conclusions in the Indian context.

The problem is pointed up sharply by a major conclusion of chapter VI.5 that "short cycle crops are not promising for labor absorption." If that is a valid general conclusion, the labor absorption problem for a country like India is obviously "hopeless." That conclusion is, of course, heavily influenced by the initial structure of Mexican agriculture and the fact that the range of coefficients included in the model and the policy variables that you examine do not permit major changes in the sectorwide capital/labor ratio. Within the context of a more comprehensive view of the variables that can be influenced by a country's agricultural strategy, there is certainly the possibility of great variation in the capital/labor and output/labor ratios that characterize the production of short cycle crops. And in an economy like India, short cycle crops probably account for something like 80 per cent of value added in agriculture. Moreover, experience in Japan and Taiwan suggests very strongly that a labor-intensive expansion path for the agricultural sector is economically efficient--e.g., in the fact that increases in factor productivity have accounted for such a large part of the increases in farm output. (Peter Timmer's recent analysis of alternative milling technologies in Indonesia provides quantitative evidence of the superiority of highly labor-intensive technologies in rice milling, an industry that lends itself to a more straightforward analysis than assessing the economic efficiency of alternative expansion paths for the agricultural sector.)

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There are two reasons why I believe that the implications of your analysis are much more disturbing in the Indian context than in Mexico. First of all, agricultural development in Mexico has progressed to a point where it is probable, as you assume, that policymakers would not give serious consideration to policy instruments other than the sort of limited interventions that you have examined. Secondly, Mexico's economic transformation has reached the point where labor absorption within the agricultural sector is much less important than in India where the degree of structural transformation is still very limited. In absolute terms India's industrial sector has of course made very significant progress within the last two decades, but I will hazard the guess that the 1970 census data will indicate that the share of the labor force in agriculture has changed very little from the 70 per cent shown in the 1950 and 1960 censuses. As you know much better than I, there are problems in interpreting the 1970 Mexican census data. But I know of no reason to doubt the earlier census estimates that indicate that agriculture's share in the labor force declined from 65 per cent in 1940 to 58 per cent in 1950 and to 54 per cent in 1960. And I find Keesing's guess that the comparable figure for 1970 is about 46 per cent very plausible.

A specific recommendation that I would offer is that you should revise your discussion of prospective changes in the labor force (p. 23 of chapter VI.6) to take account of the fact that the relative weights of agriculture and nonagriculture in the labor force have changed so substantially that extrapolation of historical rates of growth is inappropriate. Unless there has been an offsetting reduction in the rate of growth of nonfarm employment, the change in sector weights would lead one to expect a considerable decline in the rate of increase in the farm labor force. In fact, Mexico may have even reached the "structural transformation turning point" where the absolute size of the farm work force begins to decline.

I am intrigued by the fact that the agricultural chapters apparently do not mention the Puebla Project. One interesting implication of your discussion of the effective demand constraint, and the fact that exports of maize and wheat are an expensive operation for Mexico, is that the government presumably does not have a very strong incentive to try to multiply Puebla Projects. (Incidentally, Eric Ojala's paper for the FRI December conference indicates that world demand prospects for sorghum are much less attractive than was suggested by earlier FAO projections. You might want to qualify the enthusiasm for sorghum that is expressed somewhere in the ms.)

The final point that I want to make is that it is vitally important for late developing countries like India to emphasize Puebla-type projects based on the progressive modernization of labor-intensive, small-scale farms with only limited reliance on "external" inputs--mainly fertilizer--rather than encouraging a more capital-intensive expansion path for a subsector

Alan Manne and Roger Norton

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of relatively large and highly commercialized farm units. The mix of policies and programs required to implement a unimodal strategy requires an effort to influence variables additional to those affected by the policy instruments that you examine--e.g., the orientation of research, extension and farmer training programs, the level and type of investment in infrastructure, and the size distribution of operational units. It is sometimes claimed that redistributive land reform is a sine qua non for modifying the size distribution of operational holdings in agriculture. Japan and Taiwan's successful postwar land reforms are sometimes cited in support of that contention, but actually the prewar experience, which is more relevant, demonstrates that agricultural development can be based on uniformly small operational units even though the size distribution of land in terms of ownership is highly skewed. That is a long story and Kilby and I discuss it at some length in the monograph on Agricultural Strategies, Rural-Urban Interactions, and the Expansion of Income Opportunities that we have prepared for the OECD Development Centre. All that I want to say in this already long memo is that I hope that you will point out that countries facing a really serious problem of labor absorption in agriculture should design agricultural strategies with explicit consideration of several objectives and give serious attention to a more inclusive set of policy instruments. I realize that such an approach does not lend itself to treatment by an optimizing model. The effects of an excise tax on tractors and combine harvesters could presumably be examined within the CHAC framework, but I suspect that, given the way that alternative technologies are specified in the model, the trade-off between employment and efficiency would be exaggerated as compared to the options that exist in an agricultural economy that still faces a choice between a unimodal and a bimodal expansion path.

BFJ/mj

cc: C. W. Reynolds  
C. P. Timmer  
D. Keesing



MR. CHENERY

## OFFICE MEMORANDUM

APR 25 1972

TO: Mr. Louis M. Goreux

DATE: April 11, 1972

FROM: Ian Bowen

SUBJECT: Multi-Level Planning: Case Studies in Mexico

Here are Professor Taylor's comments. May we discuss them  
at your convenience?

1 Enclosure (2 cys -- Mr. Goreux)

cc: Mr. Stern  
Mr. Lind

HARVARD UNIVERSITY  
CENTER FOR INTERNATIONAL AFFAIRS

DEVELOPMENT RESEARCH GROUP  
1737 CAMBRIDGE STREET  
CAMBRIDGE, MASSACHUSETTS 02138

April 3, 1972

Mr. Ian Bowen  
International Bank for Reconstruction  
& Development  
1818 H Street, NW  
Washington, D.C. 20433

Dear Mr. Bowen:

Attached please find my detailed comments on the Development Research Center manuscript, Multi-Level Planning: Case Studies in Mexico. I have not attempted to edit these notes, on the thought that somewhat repetitive observations on recurring problems will be of more use to the authors. Let me summarize my conclusions regarding the manuscript briefly here.

There is no doubt that the manuscript is publishable in its present form. There are too many tables and the same discussions of certain concepts (particularly the way the models treat unemployment) keep reappearing in different chapters, but this is nothing new in academic books. If one wanted to clear up these problems, a good, independent editor could do the job in a matter of days. At a guess, the manuscript could be cut at least 100 pages without loss of content.

But there is another way in which the manuscript, despite its many excellences, is less than the sum of its parts. It seems to me that all the models presented are relatively simple partial and general equilibrium constructs, the theory of which has been well known for quite some time (at least since Samuelson's 1953 article on "Prices of Factors and Goods in General Equilibrium"). Yet very little use is made of general equilibrium concepts in the discussion of the models and their interactions. A much more integrated description of the models could be achieved by tying them together from this point of view, perhaps through a series of editors' introductions on the similarities and differences of each succeeding chapter's

Mr. Ian Bowen

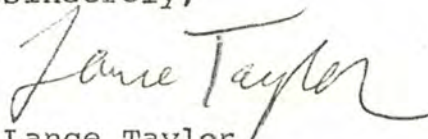
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April 3, 1972

model with the others. This is now done in part through the introductory chapters in Part I. Even here, however, much that could be said is missing. (See the detailed comments.)

In summary, I certainly would have no overwhelming objections to the manuscript's publication as is. I do feel, however, that it could be substantially tightened up at not too much cost by a ruthless editor. And probably at substantial cost, the book could be improved by including an introductory chapter and chapter introductions written explicitly from an integrative, general equilibrium viewpoint. If the decision were mine, I would probably recommend the editing, leaving the talent which would be required for a thorough rewriting free for new research.

Sincerely,



Lance Taylor  
Assistant Professor of Economics

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P.S. At Alan Manne's request, I have sent my marked-over copy of the manuscript to him at Stanford.

## Part I, General

These chapters provide a general introduction to the book. In the versions I have (dated March, 1972) the presentation is clear and reasonably succinct. I have a number of observations on content, which are given in detail in the following chapter-specific comments:

### Chapter I.2. The Problem of Interdependence

This discusses the desirability of setting up a hierarchy of planning models, of the type discussed in this book. The discussion is largely theoretical--the most severe problem, that of data collection and computabilization, is mentioned only in passing. In a book of this length, some hints to the statistical agencies as to how users want data to be organized would be a good addition. There are frequent mentions in this chapter of "prices," but it is often unclear whether market or shadow prices are meant (e.g. on p. 3 in the 3rd paragraph). Similar confusion attaches to references to a "price-quantity demand curve" on p. 4 (are cross-price terms considered?), to the discussion of capital inflows and capital goods prices on p. 5 (in a multi-capital model, capital gains due to price changes in each sector can in principle make own-rates of return different; they don't in DINAMICO, but in general knowing the supply curve of "foreign capital" is not enough), and to the concept of a "premium" on foreign exchange (the magnitude of which in DINAMICO partly stems from accounting conventions--see comments on chapter II.3 below). Also, the whole suboptimization concept might become clearer if the discussion began with the perfect competition property that prices are all one needs to define a "cut" between a sector and the rest of the economy, and then went on to consider the problems raised if the sector is a monopolist (as CHAC vis-a-vis the rest of the economy seems to be) has increasing returns, etc.

The discussion of decomposition procedures beginning around page 17 is quite clear; Figure 3 is new and useful. On the other hand, if the sole function of the model PACIFICO is to underpin this section (and this appears to be the case), brevity might well justify dropping both. If this discussion is retained, an attempt should be made to specify a bit more formally how one determines how many price vectors "have to be" transmitted in the first iteration of PACIFICO. It should also be mentioned that PACIFICO's speed may come from including the demand balances in the master program.

The discussion of merging ENERGETICOS and CHAC with DINAMICO is fairly clear. In the ENERGETICOS case, insensitivity comes from limited choice of technique in the energy model (elasticities of import and capital use with respect to the exchange and discount rates are on the order of hundredths) and fixed coefficients intermediate uses in DINAMICO. What causes the former, and what happens if the latter assumption is relaxed? Some discussion of what in principle a general equilibrium model like DINAMICO would want by way of information from a sector would help illustrate the DINAMICHAC discussion. Trade theory suggests that all you need to know are a production function and the world price (or post-tariff price) as a function of the sector's output. These are precisely the data mentioned on p. 26.

### Chapter I.3. Characteristics of the Models

This runs over the main features of the models. It is complete and sophisticated in its discussion, but again marred by small slips and some repetition. On p. 3, for example, it is suggested that one would need a process analysis model to estimate capital-labor substitution in a sector. Why not just make a piecewise approximation to an econometric production function? On p. 4, lack of price sensitivity in demand functions is said to be a characteristic of "input-output" models. The work of Chenery-Raduchel and Johansen shows that "linear programming" is the appropriate modifier. On the same page, EXPORTA is implied to measure "comparative advantage." In some sense, this would be true if one accepts fixed input-output coefficients; if this Leontief assumption does not hold in Mexico, EXPORTA's trade predictions will err as badly as DINAMICO's. On p. 5, the "knife-edge" export behavior will stem from the production structure of the aggregate models--the transformation surface will be quite flat under constant returns with few variable factors (the labor supplies, capital and foreign exchange are variable in DINAMICO, but capital rents are determined as a residual) so that exports will move easily from upper to lower bounds in response to small price changes. This will be less of a problem in CHAC, where the larger number of region- and crop-specific factors will make for decreasing returns and a curved transformation surface.

On p. 6, explicit definition of a "gradualist" consumption path would help; the concept is still pretty new. Also the discussion of the "reservation wage" could be amplified by referring to some simple surplus labor model; on p. 16 for example it is by no means clear that efficiency wages are determined by reservation wages. This basically depends on the elasticity of substitution of the production function between the Galenson-Leibenstein (labor marginal product equals reservation wage) and product exhaustion (labor consumes all

product) points in the surplus labor set up.

On p. 13, CHAC doesn't approximate a competitive equilibrium any more than DINAMICO does. Both are constant returns models with a few specific distortions such as export bounds, savings constraint in base year prices, etc. DINAMICO maximizes a discrete Hamiltonian at each time point, which is the sum of producers' and consumers' surpluses in shadow prices; CHAC maximizes this sum in base year prices. Both models lead to a Pareto efficient allocation (subject to the ad hoc restrictions) which could be supported by perfect competition modified by taxes and subsidies. CHAC's social welfare function may pick out a resource allocation which is closer to the actual one than DINAMICO's, but both are on the contract curve, which is all that "competition" means.

On p. 20, the absence of relative price shifts allows equal own-rates of interest, since differential capital gains don't much affect the costate equations. This once again reflects the flatness of the transformation surface, resulting from constant returns and a relatively narrow range of factor proportions in the production functions. Moshe Syrquin finds essentially the same thing for Mexico in a neoclassical framework. (His results on labor absorption should also be compared with DINAMICO's). Flatness pops up again on p. 22--the exchange rate is inversely unit elastic with a general tariff increase. This means that little reallocation between traded and non-traded goods is possible (given the bounds on exports and the necessity to produce non-traded goods) or that the transformation surface is flat. The only way the price system can maintain non-specialization given this production set-up is via exchange rate changes which exactly compensate the cost increase (see my paper on optimal growth shadow pricing in Chile for more on this).

## Part II. Multi-Sectoral Models

This section presents results on two linear programming models of the Mexican economy--DINAMICO and EXPORTA. The bulk of the discussion is devoted to the former. It contains a number of innovations in the state of the art, and there is no question of merit of publication. However, the discussion of the model, based on a series of papers presented at conferences or published at different times, is far from succinct. About 155 manuscript pages are devoted to DINAMICO. With re-writing and consolidation of the various papers, this could easily be cut to 100 pages. Given the problems of multiple authorship, etc., this may not be feasible editorially, but it should definitely be considered as a possibility. In particu-

lar, there is a great deal of overlap in the discussions of DINAMICO's labor use specification in all the chapters, which could be consolidated. Also, some tables could be sacrificed with little narrative loss--complete presentation of results is always desirable, but it may have been carried too far in this case. Chapter-specific comments follow:

Chapter II.1. Manpower Projections

Sections 2 and 3 here are largely repeated in Chapter II.3, and Section 7 could also be consolidated with later material. Some of the tables (particularly those giving coefficient arrays for the model) might be dropped. Also some of the tables (nos. 5 and 7, in particular) appear to be written in FORTRAN, and would benefit from the addition of explanatory material. The discussion of the economic issues involved in DINAMICO's labor specification is generally clear and interesting; I have few complaints. I do feel unhappy, however, about a lack of precision in all these chapters (e.g. p. 8) as to whether "prices" refer to shadow price, 1960 market prices, or whatever. In addition, it is not clear on p. 14 what base-year price system is used in calculating productivity changes, and whether there have been small enough price shifts over time to rule out worries about the Gerschenkron effect in the long run projections. Another pricing problem relates to wage rates: are sectoral wage differentials assumed to disappear within each skill class, or what? One finds in Chapter II.2 that they apparently are assumed out of existence; this might be brought forward. Finally, no reference is made to recent econometric work on elasticities of substitution between different labor types (Dougherty, Bowles), on the evolution of wage structures over time (Selowsky, Dougherty), and on future employment possibilities in Mexican manufacturing (Syrquin). Since these papers, based on a neoclassical framework, give results similar to the specification here, they might be mentioned as supporting evidence for the rather strong conclusions which are reached.

Chapter II.2. Numerical Data...

Once again, tables could be removed here. Five or six input-output tables for the Mexican economy (all cooked up from one 1960 study) are perhaps of interest to a country specialist, but to the general reader? In terms of the substantive discussion, prices once again get short shrift: are the input-output tables in purchasers' or producers' prices, for example? And what price system do the big entries in the "commerce" row of Table 7 imply? I also wonder why the RAS method was not applied in full, because a rows-only correction turned out to give a good fit "on the average" or what? Also, it is not

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clear why this input-output row correction, which refers to intermediate uses of a sector's product, should be applied to consumption and capital uses as well. The discussion of factor rents in section 5 should be better tied in with the preceding chapter, in particular as regards the role played by the strong assumption of equal returns to the same skill in all occupations. This is clearly unrealistic, and leads to some of the computed spread of returns to capital. In any case, similar return spreads are observed in other models, e.g. Leif Johansen's Multi-Sectoral Study.

Chapter II.3. DINAMICO...

Why doesn't this chapter come first? Theoretical specification normally precedes data description, and some of the problems understanding what goes on in the first two chapters (even on row labelling in tables, etc.) could be avoided by putting this one first. As mentioned above, I think that there is unnecessary overlap between discussion of the labor force specification here and in chapter II.1. Also, the description of the high-cost export activities on p. 6 is elliptical. On p. 10, the problem of cross-sectoral wage differentials is again touched too lightly. More substantively, the interpretation of export costs in Table 4 and throughout the chapter is erroneous--a constant returns system (with outputs by sector necessarily assumed homogeneous) cannot produce "high cost" exports and other products simultaneously; costs of all sector products must be equalized, regardless of destination. Hence the "cost factor" 1.3 can only be interpreted as a misplaced marginal revenue factor of  $(1/1.3)$ . That is, manufactured exports can be produced and sold for a price of 1.0 in the foreign market (ignoring accounting difficulties with services and the time discounting of the "high costs") until an upper bound is reached. Then they can be sold for a price of  $(1/1.3)$ . The marginal cost of these exports is the domestic price of manufactured goods,  $P_m$ . The marginal revenue is  $(1/1.3)$  times the foreign exchange<sup>m</sup> shadow price  $P_f$ . Marginal revenue equals marginal cost is the gist of Table 10. As marginal revenue falls (1.3 increases to 1.5),  $P_f$  must rise in inverse proportion to keep near the same production point, which must occur with a flat transformation surface--any very small price shift would lead to specialization. This explains the editor's note to chapter II.5. But the problem is really even more complex, for the price of 1.0 on the first increment of exports must be a tariff-ridden price, since we are told repeatedly the Mexican exports require protection. Thus  $1.0 = (1+t_m)q_m$ , where  $t_m$  is the ad valorem tariff on the first incre-



ment of manufactured exports and  $q_m$  is the world price measured in pesos at the base year exchange<sup>m</sup> rate. Say  $t = 0.3$  and  $q_m = 0.77$ . Then the marginal export return of  $1/1.3$  really corresponds to a marginal revenue of  $(1.3)^{-2} = .59$ . Is this reasonable? Is it reasonable to assume that the Mexican government will allow its exporters' returns to fall to the marginal revenue level?

The opposite assumption, which is consistent with the treatment of non-marginal exports, is to assume that marginal exports will be given sufficient protection to maintain the price level. But this means that the marginal return to the exporter will be unity (lower world price  $q'_m$  is exactly compensated by a higher  $t'$  so that  $(1+t')q'_m = 1$ ) and the original distinction between the two types of exports is meaningless as far as the insulated domestic producer is concerned.

The appropriate resolution of the paradox would be to set the right world prices for the non-marginal exports and a lower price for the marginal ones--this would amount to basing the shadow price system on marginal world prices, instead of the present mixture (which at the margin goes to incorrect estimates of the world prices). Since domestic prices would be essentially maintained by the flat transformation surface when this correction is made, the foreign exchange shadow price would have to rise to compensate for the lower marginal revenues, behaving like some sort of optimal tariff. But this makes the foreign exchange shadow price look in effect like an appendage--it can be modified at will by putting an arbitrary multiplier on the foreign exchange constraint (one plus the general tariff) and moving it up and down. When  $P_f$  acts like this, all welfare judgments based on it are bound to be suspect.

On another point, I think some comment on p. 33 as to why the marginal propensity to save should stay constant in base-year prices would be appropriate. If we are worrying about foreign exchange allocations in shadow prices, then why not savings? There is no such thing as a volume index of savings (as opposed to a sector's output) and the economics of bringing it in is murky. Does the savings constraint have a role in determining own-rates of interest? How about the gradualist assumption? The already excellent discussion of own-rates might be amplified along these lines.

#### Chapter II.4. Economic Alternatives...

Few comments here. Typically for the author, the parametric variations are well chosen and clearly discussed. I do wonder again if all the tables are necessary. They're pretty

forbidding--are they likely to be studied by anybody? It is not clear to me what prices are used as a basis for section five's calculations. I also wonder where the money for the public investments at the top of p. 25 is coming from.

Chapter II.5. Comments...

These are not more vapid than the average set of comments from a conference. Not less vapid, either. The point in the editor's note is again not surprising, when one considers the above-mentioned flatness of transformation surfaces, on constant returns.

Chapter II.6. EXPORTA...

This is like DINAMICO, except that the labor constraints don't permit substitution among skill classes, so that unskilled labor is unemployed. The contrast in specification could be brought out in fewer words. More words and even tables could be added to describe and compare the patterns of exports selected by both models in their free-trade and tariff-ridden incarnations. Comparative advantage is frequently alluded to throughout these chapters, but its implications in terms of trade patterns are not spelled out concretely. Also the point on p. 17 regarding the labor-intensity of exports is intriguing. John Shehan of Williams has found the same thing fo Mexico (no surprise--he probably used the same data), and if the phenomenon is real, it is certainly interesting and important as a contrast to the usual South American findings.

Part III. The Energy Sector

This part is a lot less repetitive than Part II, and the papers are clear and interesting (although again there are too many not-likely-to-be-read tables). In terms of organization, it might be preferable to make the first chapter of Part V the first chapter here, as an introduction to planning with economies of scale--Chapter V.1 is constantly referred to, in any case. Also, more discussion of simple technological facts would enliven the presentation of the process analysis. For example, it is never stated why there are separate demands for peak power and energy--how many economists know the difference between power and energy? And in the ENERGETICOS chapter, one wonders why the Mexicans want to set up a steel plant in the first place--a plant of one million tons is scarcely going to be in a position to compete with the Japanese, or even the Americans, if its output is valued at world prices. Some discussion here would be illuminating.

Chapter III.1. ...Electric Power Projects

I have few specific comments here: more discussion of simple technology and a real map of Mexico (here or elsewhere in the book) would be helpful. In addition, more explicit discussion of the different ways in which a merit order of existing plants is derived (endogenously in INTERCON, semi-exogenously in ENERGETICOS) would help the reader understand the differences between the two models. Finally, if there are any other studies of this type which do or don't demonstrate the same basic results as INTERCON (zero marginal capacity costs for off-peak periods, little annual or seasonal variation of marginal energy costs, etc.), a summary of them would be of interest. Do these pleasant findings come naturally from the specification of the model, or the particular Mexican data?

Chapter III.2. ENERGETICOS...

Being neoclassical, I wonder why demand targets are set up for steel and petroleum products here--both are eminently tradable and their cost to Mexico is surely given by world prices. Or isn't it? Some discussion of the welfare loss resulting from autarchy would be of interest. On p. 27, it is not clear to me that choice of exploitation level has much freedom in the model, by the specification of oilfield costs. Why not just specify it exogenously? Also, the tables describing both the steel and petroleum specifications are mind-boggling. Is anyone (even a sector specialist) likely to go through them? For economists at least, graphical presentation of cost curves, etc., resulting at different levels of operation would be infinitely clearer. Graphical presentation of the economic results of the exercise, which finally begin to appear on p. 33 and are tied up in Tables 12 and 13 would help. These show that both investment and import demands for the energy sector are very inelastic with respect to exchange rate and discount rate changes. How much of this is due to the exogenous demand specification, and how much of the consistency these results have with DINAMICO (next chapter) is due to the latter's fixed coefficients specification for intermediate inputs?

Chapter III.3. Linking ENERGETICOS to DINAMICO

The discussion in section 1 of the interactions between big and little models is very nice. Why not put it at the front of the book? Again, the lack of sensitivity in the energy sector to changes in efficiency prices discussed in section 3 (and already implicit in Table 13 of last chapter) may be wrong on the derived demand side, if in the real world derived demands for energy in other sectors are sensitive to factor price shifts, as they would be under non-Leontief assumptions.

## Part IV. The Agricultural Sector

This is a fascinating section. In the world of programming models, the analysis here is based on two almost-new techniques--the inclusion of a fixed money wage for unskilled labor and the explicit maximization of surplus in base-year, not shadow, prices. The authors make good use of both of these to tell interesting stories about Mexican agriculture. Although their specification is weak in some other places, which are discussed below, their innovations carry them a long way. This and Part III are the best ones in the book. Perhaps programming models are best applied to micro-studies after all...

### Chapter IV.1. CHAC...

N This chapter describes in general terms the structure of the agricultural model. It is generally quite clear, but like other chapters in this book, too long. Section 2 could probably be dropped without great loss, and perhaps Section 3 also. On the other hand, addition of a map would again be helpful.

In terms of specific comments, I think that the model is not so much surplus labor (p. 4a) as Keynesian, with a fixed money wage for the farmers and a demand curve which is more sensitive to price increases than income increases. Most of the results in Table 6 of Chapter IV.3 would be derived from an aggregate model like this, I suspect. In any case, surplus labor models have usually assumed that the real wage is fixed, which is closer to the version of CHAC where an agricultural income constraint is imposed. Also, on p. 5 it is true that any programming model will approximate a market equilibrium in shadow prices. This may be a silly equilibrium because of an unrealistic aggregate demand function, etc., but it is still there. CHAC probably approaches base-year equilibrium more closely. On the other hand, it is a partial analysis because cross-price elasticities (both within the agricultural sector and between agriculture and other sectors) are ignored, along with income effects.

On p. 9 and elsewhere, more explicit discussion of migration activities would help. There is no wage responsiveness in interregional migration (as there probably would be in the real world) and the supply function just reduces to an upper bound. Explicit mention of this would help.

On p. 15, an explanation of how water supply is costed would help, since this is always a complicated business. Also, on p. 16 I wonder why the draft animal constraint is regional--as the authors point out, you can't drive mules around from district to district all that rapidly. On p. 21, the position of the "heavy line" in the figure is not obvious.

On p. 24, is it reasonable to assume Mexico is a price taker on all its crops, or does it face declining demand curves in export markets? For the stuff exported to the U.S. I should assume the latter. Also the paragraph on the bottom of the page should be rewritten--demand elasticities affect resource allocation but capital-labor substitution still takes place only in production. Like all practical models, CHAC is recursive in the sense that demand and production parameters enter the supply-demand balances, but only production parameters enter the cost-minimization equations.

On p. 27, a figure with "little triangles" would please the traditionalists. It would also show that in the example chosen, producers' surplus is zero at the equilibrium, which might help illustrate what is going on. Also, surplus maximization may first have been proposed by Samuelson in a programming context. But in describing market equilibrium (and finding optimal policies, as in peak load pricing and setting bridge tolls) it is as old as the hills in economics. See the review article in the 12/71 EJ.

On p. 31, why weren't capital recovery factors used to value investments? And on p. 53, competitive imports of agricultural goods enter only the cost function, but are not restricted in any other way. Are the prices CIF or post-tariff? (This will affect the whole price structure of the model.) And are price controls the only way the Mexican government manipulates imports, or should quotas be considered also?

#### Chapter IV.3. CHAC Results...

On p. 7, did choice of technique enter the Thorbecke-Stoutjeskijk exercise? If so, was it as narrow as Mexico's? And on p. 10, some discussion of the regional impact of seasonal unemployment would be of interest. I gather it must differ greatly from North to South. On p. 11a, the profitability measure is not really Bruno's, since he subtracted import costs of production from the denominator. As far as I can see, CHAC treats all production inputs as non-tradable by policy fiat, since otherwise the costs of certain inputs such as chemicals and machine services should clearly be evaluated at world, not Mexican, prices. The main point of Bruno-type analysis is to underline that many apparently profitable import-substituting and export projects are really quite costly when their hidden intermediate import costs are taken into account. This may not be a problem in Mexican agriculture, but it is not even considered in the discussion here. Also, the Table 2 analysis is based on an assumption of completely elastic export demands. Again, is this reasonable? Finally, the explanation of col. 6 of Table 1 ought to be moved forward from Table 2, and amplified.

On p. 25, it should be noted that CHAC is partial equilibrium with respect to the budget, and ignores income effects. For example, an increase in sector income will surely have some positive effects on the budget which are not considered here. Dani Schydrowsky thinks export subsidies can be self-financing in Argentina because of this effect. Could the same be true in Mexico?

#### Chapter IV. 4. ...Agricultural District

At the beginning of this chapter, the word BAJITO is introduced before it is defined, and there is general confusion between the models BAJIO and BAJITO. There is a more serious omission of any discussion of the institutional structure of the Mexican farms. Is land agglomeration ruled out legally, for example? The results make some farm types look more profitable than others. If this is the case, why doesn't all agriculture shift in this direction between 1968 and 1974? If not, why not? On p. 6, are the prices from CHAC shadow, or of the endogenous equilibrium variety?

#### Chapter IV.5. Investment and Employment Alternatives...

The analysis is nice, especially in the discussion of Figures 1 and 2 (although "right" should replace "left" in line 16 of p. 7). More substantively, the whole analysis of section 5 is conditional on fixed product prices. This means that in the profit functions implicit in the production side of the model--which adjust product and factor prices to a competitive resource allocation via changes in technique--many degrees of freedom will have been used up by this exogenous price specification. This may have something to do with the low substitution elasticities between labor and capital, although only simulations under varying product prices would tell. Also some independent verification of the big possibilities for machine-mule substitution on small dryland farms would be reassuring.

#### Chapter IV.6. Linking...

This is quite a clear chapter; I have few comments. Talking about the "decentralized nature of reality" on p. 2 is slightly grandiose, and on p. 3 it seems to me that something like an export demand curve is also an important input from CHAC to DINAMICO (or at least Part I says so). Once again on p. 9, DINAMICO will be maximizing a Hamiltonian--a measure of surplus in shadow prices--in each time period; CHAC just does the same in something closer to base-year prices. Also, on p. 9 it should be stated explicitly that the fixed money wage disappears in DINAMICHAC linkages; this should be underlined throughout. On p. 12, third line from the bottom, DCE must mean ACE, and CD must mean AC in the last line. I

think that Table 3 should definitely be consolidated into half the columns--it's hard to read now. Finally, declining demand curves could easily capture the international marketing difficulties mentioned on p. 31.

Part V. Decomposition Algorithms and Multi-Level Planning

I wonder why this Part is included at all. The first chapter on integer programming would be better as the first chapter in Part III; the other two have little to do with Mexico. The chapter on decomposition techniques is (even more than the others) a computer exercise. It says interesting things about how to set up a model to use the Dantzig-Wolfe algorithm, but that would look better in Econometrica than in this book. And the Kornai chapter, illuminating as the memoirs of a disillusioned decompositor, doesn't have much to do with preceding Parts either--despite superficial Mexican references. Given that the book is likely to cost over \$30 at its present length, is it necessary to include these?

Chapter V.1. A Mixed Integer Algorithm...

Few comments here--a nice chapter. But on p. 2, did Gately find anything specific or not in his comparison of IPE and branch-and-bound? If not, why mention it?

Chapter V.3. Thoughts on Multi-Level Planning...

These are interesting, but are they technical enough for the book? Also, it looks as if the footnote on p. 24, although well taken in spirit, is in direct contrast with the results on the efficiency of the master program's requesting multiple solutions from sub-programs in PACIFICO.

## OFFICE MEMORANDUM

TO: Readers of DRC Mexico monograph  
FROM: <sup>RDN</sup> Roger D. Norton  
SUBJECT: Chapter IV.2

DATE: April 20, 1972

APR 21 1972

Attached is a first English draft of chapter IV.2 of the  
Mexico monograph.

cc: Messrs. H. Chenery ✓  
D. Kendrick  
B. King  
P. P. Kuczynski  
A. Manne  
L. Taylor  
W. Tims  
L. Westphal



The Technology Set and Data Base for CHAC

Luz María Bassoco  
Teresa Rendón\*

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\* The authors wish to express their appreciation to Roger Norton and Leopoldo Solís for helpful comments on this chapter and for support and encouragement throughout the CHAC project.

## 1. Introduction

CHAC includes a set of agricultural supply functions. They are represented implicitly by a series of fixed-coefficient production activities which are differentiated by crop, by technique, and by location. In each location, the activity analysis model approximates a variable-coefficient production function at the district level. The same is true at the sector-wide level, for each crop and for the total value of agricultural output. An econometric specification of the production side would have confronted a number of deficiencies in the existing agricultural data series. For example, the sector-wide time series of production and prices are not very reliable.\* The spatial breakdown is less reliable, except for the irrigated areas. Beyond these problems, there is the fact that the time series do not include information on labor and other inputs.\*\*

In these circumstances an activity analysis approach was adopted. It is based on estimates of discrete production alternatives, but the alternatives are sufficiently numerous so that aggregative behavior in CHAC is virtually continuous and nonlinear.

This chapter sets out the procedures used in constructing the spatial disaggregation scheme, the alternative input-output vectors, the resource availabilities, and other parameters for CHAC. Initial equilibrium

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\* As of this writing, an entirely new data collection system for agriculture is being designed and implemented by Dr. Luciano Barraza of the Secretaría de Agricultura y Ganadería.

\*\* The decennial agricultural censuses include information on a few basic inputs, but only for aggregate production and not by crop. For an econometric analysis of supply based on the census data, see Hartford (1971).

conditions for product prices and quantities are also discussed, along with the prices of inputs which enter the productive process. In virtually all cases, the existing data could not be used directly, but rather were subjected to a series of transformations so that they conformed to the concepts in the model.

A major aim in this process was to develop procedures sufficiently general so that the production side of CHAC could be altered readily to incorporate more district-level detail, to aggregate it, or to selectively aggregate some portions and disaggregate others in order to shift the focus of investigation. Another aim, regarding the technology set in particular, was to describe feasible technological alternatives other than the set of farming practices observed in the base period.

## 2. Definition of districts and regions

On the product supply side of CHAC, there are twenty submodels. Each represents either rainfed (temporal), irrigated, or tropical cultivation, and each covers a particular set of countries or districts, which are not necessarily contiguous. Cropping and investment activities are specified by submodel. The submodels are grouped into four major geographical regions, and labor constraints are specified for each region. This treatment reflects the different regional wage rates and the different degrees of interregional labor mobility.

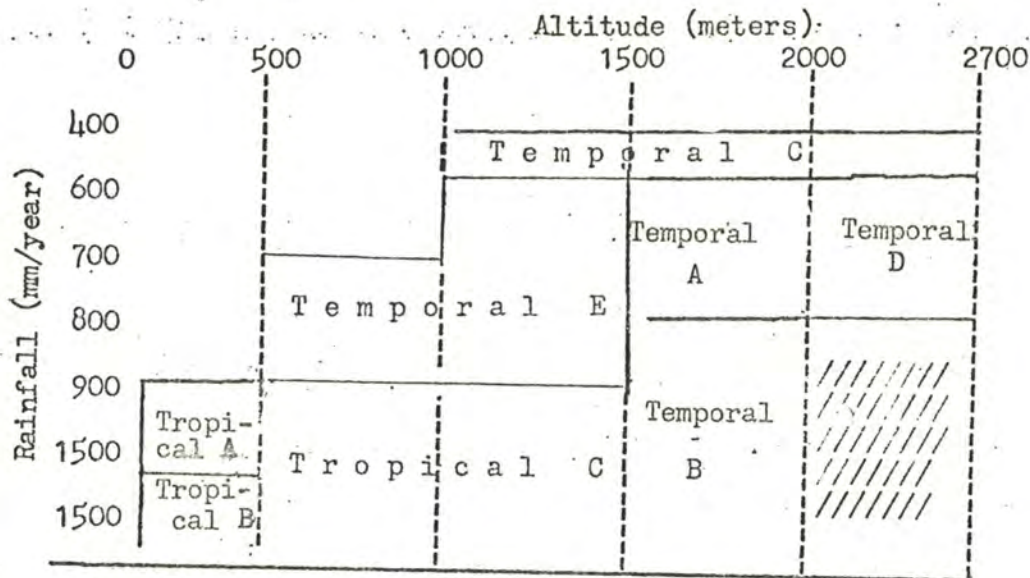
For the irrigation submodels, the spatial building blocks are the administrative irrigation districts of the Secretaría de Recursos Hidráulicos. Some submodels represent individual irrigation districts, and others represent multiple districts. In the present formulation of CHAC, all but one of the single-district submodels are in the northwestern part of the country where most of the export crops are produced. However, the production matrices were

designed so that it is a relatively simple matter to add submodels for individual districts in other areas.

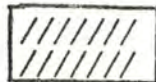
In the case of temporal and tropical agriculture, the submodels are defined on the basis of altitude and annual rainfall rates, which together determine climatic conditions. In Mexico, crops are cultivated at altitudes ranging from sea level to 2700 meters, and under rainfall conditions of 400 mm/year to more than 1500 mm/year. The kinds of crops cultivable, and their yields, vary considerably over climatic zones. Figure 1 shows the basis for defining the five temporal submodels (A to E) and the three tropical submodels (A to C).

Figure 1

Climatic definition of temporal and tropical submodels



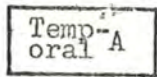
Key:



Conditions not observed in Mexico ,



Pasture, forest, or barren land ,



Conditions covered by Temporal submodel A in CHAC.

*To be redrawn*

The basic major regions into which the submodels are grouped are as follows (see map):

- (I) The Northwest - an arid of large scale irrigation along a thousand-mile coastal strip between the Gulf of California and the Sierra Madre Occidental, plus Baja California. Agriculture is more extensively mechanized here than in any other region.
- (II) The North - the rest of the northern part of the country; this region is also extremely arid and cultivatable only with irrigation except for the eastern portions near the Gulf of Mexico.
- (III) The Central Plateau - an area of mixed rainfed and irrigated farms, concentrated along the course of the Lerma River; the farms are generally smaller than in the North and Northwest; twenty years ago this was the most productive region in Mexican agriculture, but it has been surpassed by the northern regions.
- (IV) The South - tropical agriculture with very few systems of water control; due to the mountainous terrain, this region is the most remote from the major urban markets.

Table 2 gives more exact descriptions of each submodel.

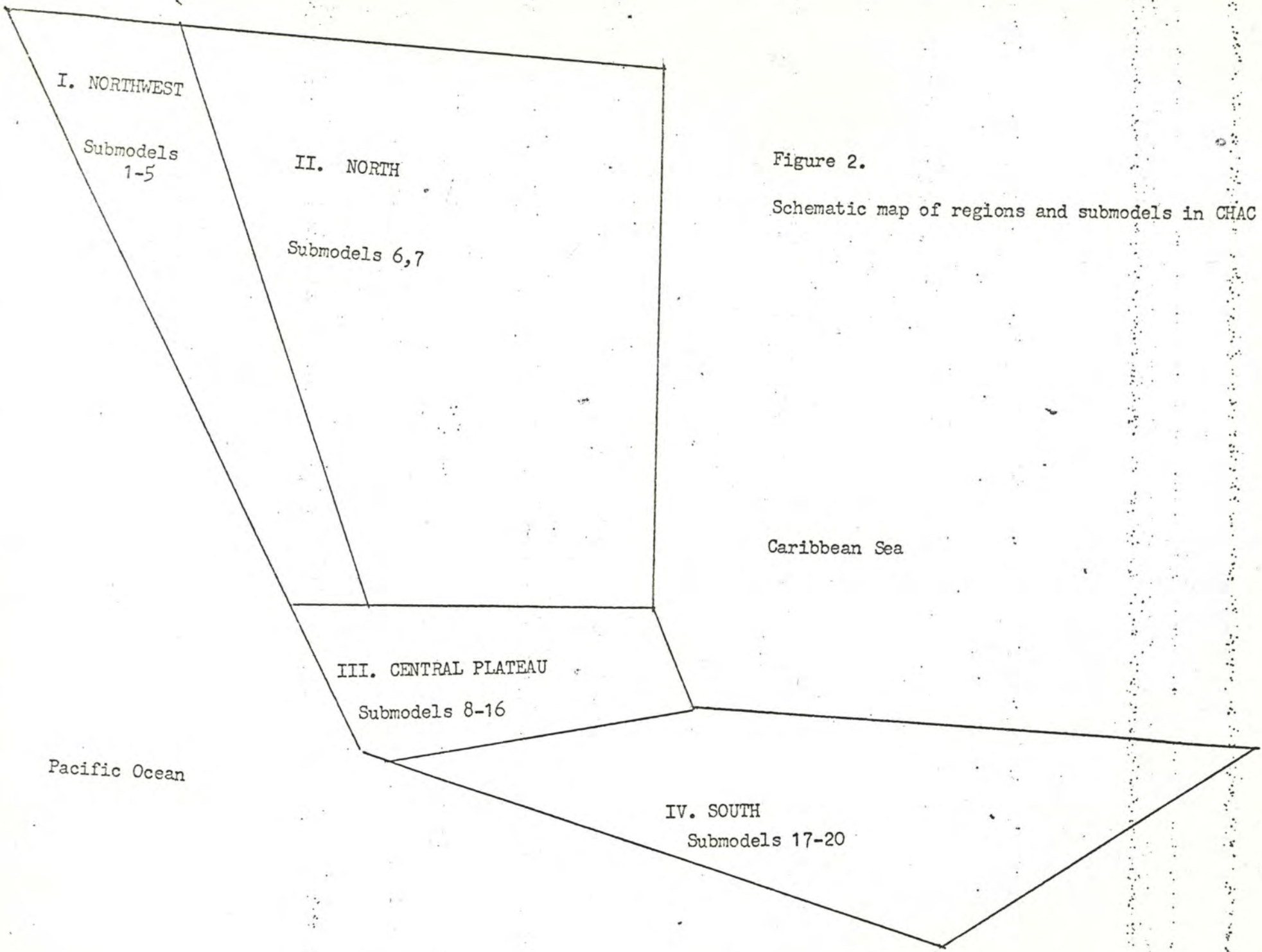


Figure 2.

Schematic map of regions and submodels in CHAC

Table 1. Spatial components of CHAC

Region	Location <sup>1/</sup>	Farm Type	Submodels	
			Number	Name
Northwest	Río Yaqui	I	1	Río Yaqui
	Culiacán ) Río Humaya ) San Lorenzo )	I	2	Culmaya
	Río Colorado	I	3	Río Colorado
	Comisión del Fuerte	I	4	El Fuerte
	<u>3/</u>	I	5	Residual Northwest
North	<u>4/</u>	I	6	North Central
	<u>5/</u>	I	7	Northeast
Central Plateau <sup>18/</sup>	<u>6/</u>	LR	8	El Bajío A <sup>7/</sup>
	<u>6/</u>	SR	9	El Bajío B <sup>7/</sup>
	Alto Río Lerma ) La Begoña )	I	10	El Bajío Irrigated <sup>7/</sup>
(See Figure 1)	<u>8/</u>	R	11	Temporal A
	<u>9/</u>	R	12	Temporal B
	<u>10/</u>	R	13	Temporal C
	<u>11/</u>	R	14	Temporal B
	<u>12/</u>	R	15	Temporal E
	<u>13/</u>	R	16	Central Irrigated <sup>d</sup>
South <sup>18/</sup>	<u>14/</u>	T	17	Tropical A
	<u>15/</u>	T	18	Tropical B
	<u>16/</u>	T	19	Tropical C
	<u>17/</u>	I	20	South Irrigated



Notes to table 2

1. For irrigation submodels, the location is defined in terms of the administrative irrigation districts of the Ministry of Water Resources (S.R.H.). For rainfed and tropical areas, altitude and rainfall define the submodels, and each submodel's precise coverage is stated in terms of municipios (counties). Each municipio is assigned wholly to one submodel.
2. The farm types are as follows:
  - I - irrigated
  - LR - rainfed, large farms (ten has. or more)
  - SR - rainfed, small farms (less than ten has.)
  - R - rainfed
  - T - tropical
 In many of the irrigation submodels there are additional distinctions among farms, based primarily on efficiency in water use.
3. The remaining S.R.H. districts in the states of Baja California, Sonora, and Sinaloa: Santo Domingo, Guasave; Mocorito; Colonias Yaquis; Costa de Hermosillo; Río Altar; Río Altar, Pitiquito y Caborca; Río Mayo; Guaymas.
4. The nine S.R.H. districts in the states of Chihuahua, Coahuila, and Durango (including Don Martín, which is in both Coahuila and Nuevo León).
5. The nine S.R.H. districts in the states of Nuevo León and Tamaulipas.
6. The rainfed portions of the 17 municipios in Guanajuato which are at least partly contained in the S.R.H. districts of Alto Río Lerma and La Begoña.
7. In order to evaluate a set of investment alternatives which includes transforming rainfed land into irrigated land, submodels 8, 9, and 10 are solved together, known collectively as "El Bajío".
8. Mostly parts of the states of Puebla, Guanajuato, Hidalgo and Querétaro.
9. Mostly the states of Jalisco, Michoacán and Morelos.
10. Mostly the states of the northern part of the Central Plateau plus those further north.
11. Mostly the state of México.
12. Mostly portions of the states of Oaxaca, Guerrero, Nayarit, Veracruz, and Tamaulipas. (A small part of this submodel lies in Region II.)
13. The 73 irrigation districts in the states of Jalisco, México, Michoacán, Morelos, Hidalgo, Aguascalientes, Puebla, Querétaro, Tlaxcala, and Zacatecas. Virtually all of these districts are quite small compared to those of the North and the Northwest.

Notes to table 2, cont.

14. Mostly the states of Chiapas, Guerrero, and Veracruz.
15. Mostly the states of Tabasco, Campeche, and Yucatán.
16. Mostly part of Puebla, Chiapas, and Veracruz.
17. The 31 irrigation districts in the tropical states of Veracruz, Chiapas, Campeche, Yucatán, Guerrero, Oaxaca, Colima, and Nayarit.
18. The coverage of the various rainfed and tropical submodels does not fall entirely in the Central Plateau and Tropical regions, respectively. However, the regional designations are good approximations, and the wages in rainfed and tropical areas are very similar in magnitude to those of the Central Plateau and South regions in general.

### 3. Production alternatives

For each of the twenty submodels, various production alternatives have been identified. Each alternative describes a production process which embodies a fixed combination of resource inputs for a given level of output. There are a total of 2345 column vectors representing such production alternatives in the model. (See Table 2.) The production alternatives are functions of: (a) regional cropping patterns, (b) calendars of cultivation practices by crop, (c) classes of land soil types, efficiency of water use, and climate, (d) modes of irrigation, and (e) degrees of mechanization.

#### 3.1 Regional cropping patterns

In each of the submodels, crops were identified for production sets on the basis of the cropping patterns observed in the corresponding district during the 1960's. Since yields, fertilizer requirements, and other elements of the production vector are dependent on local soil and climate conditions, activities cannot be specified for crops which have not been grown previously in that district. This does not appear to be a serious omission in the Mexican context. Producers in irrigated areas already cultivate a wide variety of crops, and, on the other hand, there are only a limited number of crops which are well adapted to conditions of rainfed agriculture in Mexico.

Table 2 shows the various crops specified in each submodel. The basis for crop selection in irrigation submodels is the time series of statistics published for irrigation districts by the Secretaría de Recursos Hidráulicos.\* The information utilized for temporal and tropical submodels

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\* See, for example, Secretaría de Recursos Hidráulicos (1969).

was provided by the Dirección General de Economía Agrícola in the Secretaría de Agricultura y Ganadería.

### 3.2 Calendars of cultivation practices

Several Mexican agencies compile cost of production estimates by crops and location, but these compilations are based on the sequence of cultivation tasks and not on economic inputs. After identifying the crops to be included in the model, the next step was to establish the agricultural calendar for each of the 2345 production activities. The calendar specifies the dates of planting, irrigating, fertilizing, crop tending, and harvesting.

The vector of production coefficients is derived from the agricultural calendar. For a given crop and location, the number of irrigation applications is not constant, but rather it varies with the month of planting. For a crop in a particular irrigation district, there are as many as four alternative planting dates in the model, two summer months and two winter months. For example, in the submodel for the Culmaya area, it is possible to cultivate corn either in summer or winter. Winter corn may be planted in December and harvested in June, or planted in January and harvested in July. Summer corn may occupy the land from May to November or from June to December. (See Figure 2.)

For irrigation submodels, the alternative agricultural calendars were taken from information supplied by the Secretaría de Recursos Hidráulicos. For each temporal or tropical submodel, there exists only one planting date - and hence one calendar of cultivation activities - depending on the month in which the rains begin. Planting dates were taken from information supplied by the Secretaría de Agricultura y Ganadería.

### 3.3 Classes of land and water

The temporal and tropical submodels are defined on the basis of climatic conditions - hence are not necessarily contiguous. The irrigation submodels refer to the administrative irrigation districts of the

Secretaría de Recursos Hidráulicos.\* Within each district, there are as many as four zones demarcated by that ministry to represent varying degrees of efficiency in use of reservoir water. In each zone, a different amount of gross water release at the dam is required to achieve the same net amount of water on the field. The water losses depend upon the length of canals and their state of repair.

Irrigation water is specified in two forms: gravity and well water. The former includes water from reservoirs and river pumps, and its allocation is controlled by the Secretaría de Recursos Hidráulicos. The latter is supplied by private tubewells. In some of the irrigation submodels, both water sources are specified.

The water input norms differ for gravity and well water, due to larger transmission losses in the gravity-fed reticulation system. The prices also differ. For gravity water, the administrative levy is entered as a cost in the objective function. For well water, the pumping cost is entered. Since both types of water are available in limited quantities CHAC determines a shadow cost which normally is greater than these direct costs. The shadow cost is determined by monthly and annual restrictions.

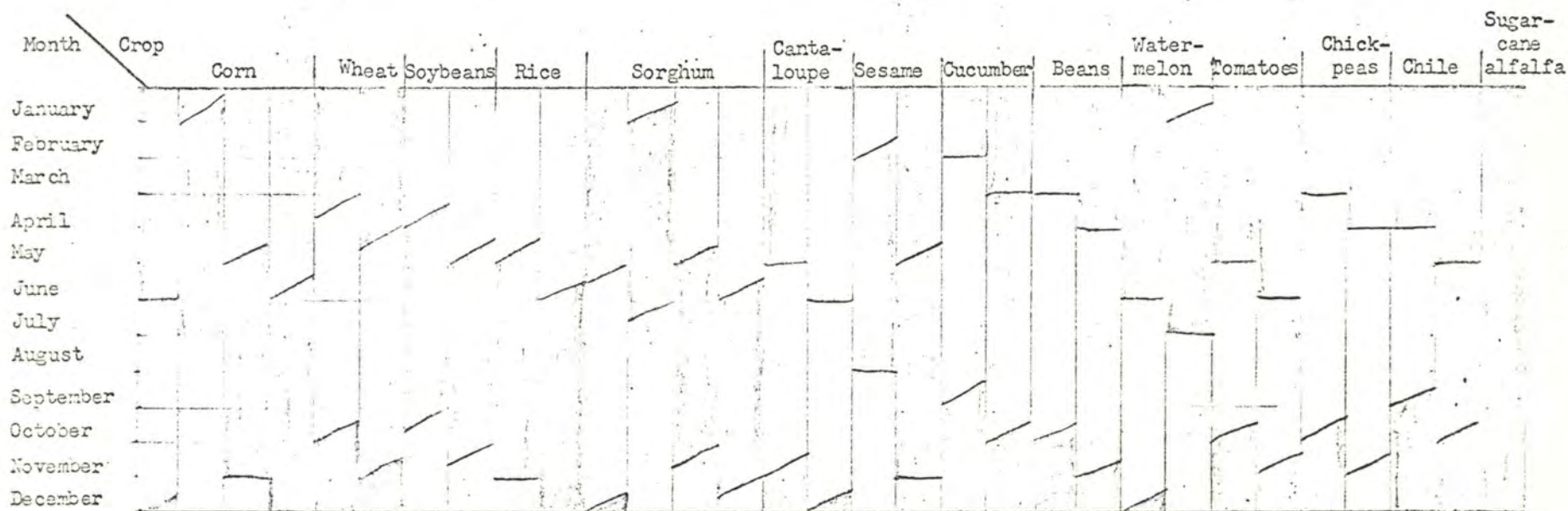
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\* In some cases, the area in these districts is augmented to provide coverage of lands irrigated by dispersed wells.

Table 2. Production activities in CHAC by crop and by district

Geographical submodel Crop	Río Yaquí	Culmaya	El Fuerte	Riego Norte Central	Riego Noreste	Río Colorado	Riego Noroeste	El Bajío Temporal (2 submodel)	El Bajío Riego	Temporal A	Temporal B	Temporal C	Temporal D	Temporal E	Central Irrig. Riego del Centro	Tropical A	Tropical B	Tropical C	Riego del Sur	Number of activities
Garlic						32	4		32						2					70
Dry alfalfa	16		24	12		32	6								2					92
Cotton	16		24	12		32	12							3	4					103
Green alfalfa		12	24	12			6		32						2					88
Rice		12	24				6								4		2		4	52
Oats												3	3							6
Sugar cane		12	24		6		6								4		2	2	4	60
Squash											3									3
Safflower	16	12	24	12		32	6							3						105
Peanuts				6					32		3				2					43
Onions									32						2					34
Forage barley	16			4		32	4								2					58
Grain barley	16			4		32	4		48				3		2					109
Dry chile											3									3
Green chile		12	24				12		32		3				2				2	87
Strawberries									32						2					34
Beans		12	24				9	8	48	3	3	3	3	3	2	2	2	2		124
Chickpeas		12	24				6	8	48	3	3				2					106
Lima beans									32				3		2					37
Tomatoes		12	24				12		32		3				2					85
Sesame	16	12	24				12							3	4	2		2		75
Flaxseed	16		24				6							3						49
Corn	16	22	48	12	12	32	22	12	48	3	3	3	3	3	2	2	4	2	2	251
Cantaloupe		12	24				12						3		4					52
Potatoes			48				12													63
Cucumber		12					6								4					22
Pineapple																	1			1
Watermelon		12	24	12			9								4					61
Sorghum	16	24	48	12	12	32	20	12	48	3	3			3	2		2	2	2	241
Soybeans	16	12	24				10									2				64
Tobacco																1				1
Wheat	16	12	24	12	6	32	8		48			3	3		2					166
Number of activities	176	214	528	110	36	288	210	40	544	12	27	12	21	21	60	9	13	10	14	2,345

Figure 2. Alternative calendars of cultivation in a sample submodel of CHAC (Culmaya)



Note: Part shading  indicates that one third of a month is required under mechanized techniques; this becomes a full month with non-mechanized techniques.

### 3.4 Degrees of mechanization

The irrigated-nonirrigated distinction is one of the ways in which CHAC distinguishes more capital-intensive and more labor-intensive agriculture. Individual crops also vary enormously in their unit labor requirements.\* In addition, alternative degrees of mechanization have been specified for each crop and location.

In CHAC in entirety, there are three degrees of mechanization for each crop: mechanized, partially mechanized, and non-mechanized. In some locations, depending on the observed techniques in the base period, only two degrees are specified. To account for the time lapse inherent in adoption of new techniques, only one-degree changes of technique are permitted in CHAC in the six-year period studied (1968-74). That is, for districts in which only nonmechanized techniques were observed in the base period, CHAC includes partially mechanized and nonmechanized activities.

The alternative degree of mechanization do not affect yields per hectare; that is, they lie along an isoquant. The totally mechanized technique is defined so that all operations requiring traction power are done with machinery rather than animals. These operations include land preparation, harvesting, and some intermediate cultivation steps. There are crop-specific variations. For example, in Mexico cotton is always harvested manually, no matter how capital-intensive the other operations. In this case, the mechanized cotton production technique includes manual harvest.

The partially mechanized technique refers to the practice of using mechanical power for land preparation and seeding, while using draft animals for all other operations. In the nonmechanized technique, draft animals are used for all traction operations. These discrete alternatives

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\* See Tables 3 and 4 of this chapter and also Table 6 of chapter IV.4.



are the major ones observed in Mexico. When a farmer adopts only partial mechanization, he is very likely to use it at the beginning of the crop calendar in order to facilitate the process of getting the crop in the ground.

Machinery operators' time is one of the inputs in the mechanized techniques. When draft animals are used, a (much larger) input of unskilled agriculture labor is required. The input norms in CHAC reflect both kinds of labor. Since machinery operators do not appear to be a binding resource in Mexico, the supply of their services is assumed to be infinitely elastic. Hence their services are not explicit inputs in CHAC, but they are reflected in the machinery cost entries in the objective function.

The input requirements for plowing, harvesting, and other power operations depend only on the degree of mechanization and, for harvesting, on the crop. They do not vary over districts. Plowing requirements per hectare are standard, and harvest requirements per ton are standard by crop. Through published data\* and field surveys of one of the authors (Bassoco), it was possible to estimate these standard norms for each degree of mechanization. In this manner, activities were formed which represent degrees of mechanization other than those observed in a particular district.

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\* The basic published series on costs of production are those of the Secretaría de Recursos Hidráulicos, the Aseguradora Nacional Agrícola y Ganadería, the Instituto Nacional de Investigaciones Agrícolas, and the Banco Nacional de Crédito Ejidal.

#### 4. Technical production coefficients

Information on agricultural production costs typically comes in the form of estimates of total expenses per "operation", such as plowing, irrigation, and fertilizer applications. These estimates include costs of materials, labor, draft animals, and machinery services. There are also estimates of the number of distinct irrigation releases, fertilizer applications, etc., per crop and district. To form activities for CHAC, the problem was to convert this information into statements of required economic inputs, such as labor, fertilizer, and credit. To facilitate this conversion, the unit activity level in all cases was defined to be cultivation of one hectare, rather than one ton of output.

##### 4.1 Labor, machinery, draft animals

For each crop and degree of mechanization, standard inputs of labor and services of machinery and draft animals have been defined for each operation in the agricultural calendar. These operations include both those which involve traction power and those which do not. They range from land preparation and seeding, through plant tending and application of water and chemical products, to the harvest. The standard inputs per operation are constant over districts. But the number of required operations varies over districts in some cases (plant tending, application of chemicals, water releases), and the yield per hectare also varies over districts. Hence the total labor requirement per hectare varies over districts for a given crop and a given degree of mechanization. The number of operations and yields per district are taken from data published by the four institutions mentioned above.

The assumption of standard inputs per operation, regardless of location, is not exactly true, but it is a close approximation to reality. The number of tractor hours required to plow a hectare varies somewhat, depending on the average soil conditions in a district, but it does not

vary greatly. To carry out the standard operation concept, machinery use requirements have been normalized for a tractor of sixty horsepower. Inputs of labor, animal power, and machinery services are expressed in days of labor. This concept is the bridge between technical agronomic information and the economic information of CHAC. It also permits ready identification of those portions of input packages which vary over crops, districts, planting dates, and degrees of mechanization.

Apart from the differing degrees of mechanization, some crops are simply more labor-intensive than others. The mechanized form of cotton cultivation requires almost twice as much labor per hectare as the non-mechanized form of wheat cultivation. This may be seen from Tables 3 and 4, which show the labor, machinery, and animal power inputs into the standard operations for two major crops (cotton and wheat).

The range of techniques in Table 3 and 4 imply certain elasticities of substitution of labor for capital. Calculated at the mid-points of the relevant range, they are as follows:

Cotton

Mechanized to partially mechanized, - .178

Partially mechanized to nonmechanized, - .231

Wheat

Mechanized to partially mechanized, -1.603

Partially mechanized to nonmechanized, - .264

That grains offer more scope for factor substitution than cotton and many vegetables.

4.2 Land and water

The unit level of operation of the CHAC production activities is one hectare. Land inputs are specified monthly. Hence the normal land input coefficient is 1.0, signifying use of one hectare in a particular

Table 3. Sequence of standard operations for cotton cultivation

(Days of unskilled labor, machinery services, and draft animal services required per hectare by month)

Cultivation Month	Operation	Mechanized		Partially Mechanized			Non-mechanized	
		Unskilled labor	Machinery	Unskilled labor	Machinery	Animals	Unskilled labor	Animals
1st	Preparatory tasks		.12		.12		1.0	2.0
	Fallow		.5		.5		3.0	6.0
	Cross-plowing						2.5	5.0
	Harrowing		.2		.2		.5	1.0
	Land levelling		.25		.25		1.0	2.0
	Canal cleaning	1.0		1.0			1.0	
2nd	Irrigation ditches	1.0	.2	1.0	.2		2.0	2.0
	Forming borders a/		.2		.2		2.0	
	Linking borders b/	1.0		1.0				
	Water application	2.0		2.0			2.0	
	Harrowing		.2		.2		2.0	4.0
	Seeding and fertilization	.2	.2	.2	.2		4.0	
	Maintenance of field works		.2	.2			2.0	
3rd	Thinning plants	4.0		4.0			4.0	
	Cultivation		.2	2.0		4.0	2.0	4.0
	Weeding	6.0		6.0			6.0	
	Applications of insecticides (2)							
4th	Fertilization		.2	2.0			2.0	
	Cultivation		.2	2.0		4.0	2.0	4.0
	Weeding	6.0		6.0			6.0	
	Water applications (2)	4.0		4.0			4.0	
	Applications of insecticides (2)							
5th	Cultivation		.2	2.0		4.0	2.0	4.0
	Weeding	12.0		6.0			12.0	
	Water applications (2)	4.0		4.0			4.0	
	Applications of insecticides (2)							

Table 3. Sequence of standard operations for cotton cultivation (Cont.)

(Days of unskilled labor, machinery services, and draft animal services required per hectare by month)

Page 2

Cultivation month	Operation	Mechanized		Partially mechanized			Non-mechanized	
		Unskilled labor	Machinery	Unskilled labor	Machinery	Animals	Unskilled labor	Animals
6th	Weeding	6.0		6.0			6.0	
	Water application	2.0		2.0			2.0	
	Application of insecticides							
7th	Harvest <u>d</u> / (per ton)	11.0		11.0			11.0	
	Transport to farm gate		.12	2.0		4.0	2.0	4.0
8th	Harvest <u>d</u> / (per ton)	11.0		11.0			11.0	
	Transport to farm gate		.12	2.0		4.0	2.0	4.0
9th	Harvest <u>d</u> / (per ton)	11.0		11.0			11.0	
	Transport to farm gate		.12	2.0		4.0	2.0	4.0

## Notes:

a/ "bordeo"b/ "pegar bordos"c/ For cotton, insecticide applications are made by airplane.d/ Normally the harvest covers three months, with 30%, 50%, and 20%, occurring in each successive month.

Table 4. Sequence of standard operations for wheat cultivation

(Days of unskilled labor, machinery services, and draft animal services required per hectare by month)

Cultivation month	Operation	Mechanized		Partially mechanized			Non-mechanized		
		Unskilled labor	Machinery	Unskilled labor	Machinery	Animals	Unskilled labor	Machinery	Animals
1st	Canal cleaning	1.0		1.0			1.0		
	Fallow		.5		.5		3.0		6.0
	Cross-plowing						2.5		5.0
	Harrowing		.2		.2		.5		1.0
	Land levelling		.25		.25		1.0		2.0
2nd	Irrigation ditches	1.0	.2	1.0	.2		2.0		2.0
	Bordering or bench terracing		.2		.2		2.0		
	Linking borders	1.0		1.0					
	Seeding and fertilization	.2	.2	.2	.2		4.0		
	Harrowing						.5		1.0
	Water application	2.0		2.0			2.0		
3rd	Applications of herbicides		.2	3.0			3.0		
	Fertilization		.2	2.0			2.0		
	Water application	2.0		2.0			2.0		
4th	Water application	2.0		2.0			2.0		
	Application of insecticides		.2	3.0			3.0		
	Application of herbicides		.2	3.0			3.0		
5th	Water application	2.0		2.0			2.0		
	Application of insecticides		.2	3.0			3.0		
6th	Water application	2.0		2.0			2.0		
7th	Combine harvesting (per ton)		.27		.27				
	Hand cutting						4.0		
	Hand threshing							.13	
	Transport to farm gate		.12	2.0		4.0	2.0		4.0

calendar month. An exception is made at the beginning of the cultivation cycle, when land preparation activities may require less than a full month. Plowing with draft animals, together with associated activities, usually requires a month's work. With mechanized techniques, however, the same operation requires about ten days. Hence in the mechanized technique, a coefficient of 0.33 is used instead of 1.0. This land savings can be important when double cropping is feasible.

Another exception is made in the case of the harvest, also to differentiate technique. In the case of alfalfa and barley, the form of the crop harvested is reflected in the length of time for which the land is used. Green alfalfa is removed from the land at the time of harvest, but dry alfalfa occupies the land longer in the drying process. Figure 2 shows the monthly land coefficients for various cropping activities in the submodel for Culmaya. From the figure it may be seen which double-cropping combinations are feasible and which are not. For example, a wheat-soybeans or wheat-sorghum rotation pattern is feasible, but wheat-sesame is not. In some cases, a particular rotation is prevented only because a mechanized harvest is not possible for one crop. This is most often true of fruits and vegetables. If it were possible to mechanize the harvest of cantaloupe, a soybean-cantaloupe rotation would be feasible. Tomatoes require a sufficiently long growing season that they cannot be rotated with any other crop. Hence cost of tomatoes cultivation includes the lost opportunity for double cropping.

The irrigation requirements are given by the irrigation schedules formulated by the Secretaría de Recursos Hidráulicos for each crop and district. The coefficients are measured in cubic feet of gross water release from the irrigation source. As noted, in some of the submodels there

are as many as four zones defined with respect to efficiency in gravity water use. Gross well water coefficients differ from those for gravity water, due to different rates of water loss in the reticulation systems.

#### 4.3 Credit, fertilizer, improved seeds, yields

Short-term credit requirements are related to total production costs, and hence they vary over crop, district, and technique. The basis for estimation of credit requirements is the set of credit norms used by the Banco Nacional de Crédito Ejidal.

Inputs of fertilizers and pesticides are grouped together in a row defining chemical inputs. The coefficients are given in pesos rather than physical units. Inputs of improved seeds also are given in pesos. Both sets of coefficients reflect prevailing practices and yields in each submodel area.

Yields vary with the submodel (reflecting soil and climate conditions) and local practices regarding application of chemical inputs. For irrigation district submodels, these yields are five-year averages of yield statistics compiled by the Secretaría de Recursos Hidráulicos. For submodels representing non-irrigated agriculture, yields are compiled as



appropriate weighted averages of state-level data in the national agricultural plan of the Secretaría de Agricultura y Ganadería. Table 5 shows the range of variation of yields in CHAC.

#### 5. Sources of variation in the technical coefficients

In summary, variations in the technical coefficients in CHAC arise from two kinds of sources: (a) geographical differences which give rise to variations in cultivation calendars, fertilization and crop cultivation practices, irrigation requirements, and yields; and (b) alternative degrees of mechanization and efficiency in water use within the same submodel area.

Table 6 shows the effect of mechanization on the coefficients for labor, machinery services, and draft animal services. Coefficients for two sample submodels are shown. Table 7 summarizes the sources of variation in all types of coefficients, grouped by basic agricultural operations. In labor, for example, there are two kinds of coefficients: those which vary over submodel districts and those which do not. The latter include labor inputs for land preparation activities. For the harvest, labor inputs per ton are constant but yields vary among districts. Coefficients which are district-specific are those related to cultural operations: weeding, fertilization, applications of insecticides, etc.

#### 6. Restrictions on resource availability

##### 6.1 Labor force

There are two sources for estimates of the agricultural labor force in Mexico: the decennial population censuses and the agricultural censuses. More resources have been invested in the population censuses, and as a result they are widely considered to be more reliable. However, they are deficient in that they virtually ignore family labor. The agricultural census for 1960, on the other hand, lists 1.5 million unpaid family workers on ejidal farms alone (vs. 0.1 million family workers in the entire sector

Table V Yields by crops and subarea in CHAC  
(metric tons/hectare)

Subarea/Crop	barley	dry alfalfa	cotton fiber	cotton seed	green alfalfa	rice	oats	sugar cane	sunflower	squash	peanuts	sunflower	forage barley	grain barley	dry maize	maize	strawberries	beans	chickpeas	lima beans	tomatoes	sesame	flaxseed	corn	cantaloupe	potatoes	sweetpotatoes	pineapple	watermelon	sorghum	rice	tobacco	wheat		
Culmaya					44.910	3.160		74.320	.750												20.320	.760		1.720	7.610		11.120		6.850	3.400	1.370		2.700		
Rio Tapat		12.154	.823	1.121					1.616				13.471	2.400									.750	1.616	3.685				4.957	1.879			3.822		
Colorado	7.000	7.962	.972	1.667					1.403				10.986	2.234										1.744					3.552				3.600		
El Puerto		8.679	.828	1.421	43.897	2.600		115.920	1.256								4.179	1.322			30.483	.790	1.998	2.343	4.223	14.000		6.510	3.813	1.913			3.166		
Residual Northwest	6.800	9.029	1.013	1.737	45.000	2.960		76.944	1.674				13.044	2.600			8.265	1.760	1.470		10.830	.720	1.364	2.363	7.500	14.000	10.176	7.590	3.600	1.820			3.320		
North Central		16.270	.833	1.428	72.000				1.360		2.300		13.000	1.870										1.806				15.000	3.100				2.270		
Northeast									52.912															2.600				3.700					2.620		
Central Irrigated	6.750	20.300	.935	1.600	87.630	3.667		95.840			2.220	9.200	10.370	3.101	1.700	10.393	11.701	1.080	1.820	2.210	12.502	.720		2.530	9.750	14.000	9.500	11.500	2.791				1.830		
South Irrigated						2.781		64.778									6.945							1.535				1.661					1.856		
<u>Temperal</u>																																			
A																																			
B										8.333	1.277				1.250	2.775			.378	.605				.690					1.926						
C							.500												.380	.800		6.600		1.695				2.687							
D							.800	.750						.709					.439					.534										500	
E			.357	.612																						11.000								.691	
<u>Tropical</u>																																			
A <sub>1</sub>																																		1.000	
A <sub>2</sub>																											25.0						1.500	1.430	
B <sub>1</sub>					1.500		45.000																											2.000	
B <sub>2</sub>					2.500		68.000																											3.500	
B <sub>3</sub>																																		1.600	
B <sub>4</sub>																																		3.000	
C <sub>1</sub>							43.000																											2.000	
C <sub>2</sub>							68.000																											3.500	
<u>El Salto Temperal</u>																																			
1																																			1.200
2																																		2.000	
3																																		2.500	
<u>El Salto Irrigated (nonlevel land)</u>																																			
1														2.500																				3.200	2.500
2	5.500				60.000								3.000	10.000	3.300	5.000	12.500	1.400	2.000	2.000	14.000												5.000	3.500	
3	7.000				100.000								4.000	15.000	4.000	7.000	15.000	1.800	3.000	2.500	18.000												7.000	4.500	
<u>El Salto Irrigated (level land)</u>																																			
1														2.620																				3.650	2.625
2	5.730				84.000								3.150	10.500	3.460	5.250	13.100	1.470	2.100	2.100	14.700												5.250	3.675	
3	7.350				105.000								4.200	15.750	4.200	7.350	15.700	1.890	3.150	2.630	18.900												7.350	4.725	

Table 6. Variation of cotton input coefficients with degrees of mechanization, in two sample districts

(unit:days)

Input	El Fuerte			Río Yaqui	
	Mechanized	Partly mechanized	Non-mechanized	Mechanized	Partly mechanized
Machinery services	3.63	2.07	0	3.23	2.07
Mule services	0	32.00	58.00	0	32.00
Labor:					
January	8.0	12.0	12.0		
February	8.0	10.0	10.0	1.0	1.0
March	8.0	10.0	10.0	4.2	4.2
April	8.0	10.0	10.0	12.0	14.0
May	10.2	12.2	12.2	8.0	12.0
June	13.7	15.7	15.7	12.0	14.0
July	5.5	7.5	7.5	8.0	8.0
August				8.2	10.2
September				13.7	15.7
October	1.0	1.0	9.0	5.5	7.5
November	4.2	4.2	14.0		
December	10.0	10.0	14.0		
Yield(tons/hectare):					
Cotton fiber	.868	.868	.868	.828	.828
Cotton seed	1.488	1.488	1.488	1.421	1.421
(Total labor)	(76.6)	(92.6)	(108.4)	(72.6)	(86.6)

Note:

With different planting dates, the months and, in some cases, the values of coefficients change.

Table 7. Sources of variation in the technical coefficients

Coefficient \ Source of variation	Crop	Planting date	Land class within a submodel	Type of irrigation (well or gravity)	Degree of mechanization	Submodel
Unskilled labor						
Land preparation	X				X	
Harvest	X				X	X
Others	X				X	X
Machinery services						
Land preparation	X				X	
Harvest	X				X	X
Others	X				X	X
Draft animal services						
Land preparation	X				X	
Harvest	X					
Others	X				X	X
Land	X	X	X			X
Irrigation water	X		X	X		X
Chemical inputs	X	X				X
Improved seeds	X					X
Short-term credit	X			X		X
Yield	X	X				X

according to the population census for the same year). In spite of this problem, the population census of 1960 has been taken as the basis for the CHAC labor force, with suitable augmentation for family labor. The figures have been projected forward to 1968 in accordance with regional labor force growth rates calculated from the 1960 census and the preliminary tabulations of the 1970 census. These regional growth rates add up to about a 2.0% growth rate for the sector as a whole.\* Total population has been increasing at about 3.5%, but annual rural-urban migration has amounted to about 1.5% of the rural population.

The population census itself contains two kinds of "agricultural" labor force estimates. One is by occupational category and the other is by sector. For the sectors agriculture (i.e., crops), livestock, forestry, hunting, and fishing, the total labor force is estimated at 6,143,530 in 1960. For the three occupational categories "field workers," ejidal farmers," and "non-ejidal farmers," the total is 4,642,453 persons.\*\* The latter correspond to crop agriculture. Of this total, 2,671,852 persons are listed as heads of farm households ("propietarios"), and 1,970,601 are essentially field workers.

To estimate the family labor component, recourse is made to the demographic figures on family composition. The average farm household has about 5.5 persons, and about half the population is under 15 years of age. Since a wife is occupied in the house most of the time, it is assumed that she contributes one-tenth the field work of her husband. These and other figures yield the following table:

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\* Two percent is the growth rate assured by Keesing and Manne for unskilled agricultural labor. See chapter II.1, section 4.

\*\* Table 27 of the 1960 population census.

Family member	(a) Number per household	(b) Labor equivalent factor	(c) = (a x b) Labor equivalent
Household head	1.00	1.00	1.00
Spouse	.95	.10	.10
Children under 15	2.75	-	-
Children over 15	0.80	.50	.40
			<u>1.50</u>

As the table shows, there are 1.5 male adult-equivalent laborers per family.

This implies that total family labor in 1960 comprised 1,335,926 persons. This is less than the family labor estimated for ejidos alone in the agricultural census, but recall that the reliability of the latter is doubtful. Also the CHAC estimate of the unskilled labor force is substantially higher than that used in DINAMICO, so it was deemed better to err on the conservative side than in the other direction.

Hence, the total labor force engaged in crop agriculture in 1960 is defined as follows:

farm heads	2,671,852
family laborers	1,335,926
day laborers	<u>1,970,601</u>
Total	5,978,379

Since CHAC excludes long-cycle crops, the labor force figure for the model is correspondingly reduced. The total labor force which appears in CHAC for 1968 is 5,181,945. This reflects both the 1960-1968 labor force increase and the deduction of the labor engaged in long-cycle crops.

Farmers and family labor are specified by submodel in CHAC and day laborers by region. To obtain the figures for each spatial entity, county-level data from the 1960 census were aggregated. As noted, to arrive at 1968 estimates, the annual regional labor force growth rate during 1960-70 was utilized.\*

## 6.2 Land and water

The monthly land restrictions in CHAC are based on cultivable land estimates by the Secretaría de Agricultura and the Secretaría de Recursos Hidráulicos. For non-irrigated submodels, the building blocks are counties. Each county is assigned to a submodel according to its altitude and rainfall, as shown in figure 1. For irrigation submodels, the building blocks are the administrative irrigation districts. In some submodels, additional land is included to represent scattered irrigation sites which lie outside the jurisdiction of the administrative districts.

Water restrictions are specified annually and monthly in CHAC. For gravity water, the annual restrictions represent limitations on the annual rate of replenishment of reservoir water, while the monthly restrictions represent limitations on the capacity of the canal system for water delivery.\*\* For pumped water from wells, the annual restrictions represent legal limits designed to maintain the water table level, and the monthly restrictions refer to pumping capacity.

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\* Based on preliminary 1970 population census data. Since the processing of the 1970 census was incomplete when the CHAC data were being compiled, the 1960 census was used as the base for the labor force estimates.

\*\* In two submodels, the monthly restrictions also represent water availability, with opportunities for intertemporal water transfer by holding it the reservoir - at the cost of evaporation loss. For the Río Colorado submodel, which represents an area on the U.S. border, the monthly and annual restrictions are in accord with an international treaty on water use.

## 7. Product prices

For the 1968 solutions of CHAC, the domestic demand curves are passed through a point representing actual base-period prices and quantities. For the 1974 solutions, this point is shifted to represent income and population growth and income elasticities.

For prices, 1967-69 averages were used in order to minimize the effect of short-term fluctuations. Rather than using existing sector-wide price estimates, it was deemed better to construct new sector-wide estimates from micro-level data. Weighted averages of local prices were constructed. The Secretaría de Recursos Hidráulicos collects quite extensive information on local crop prices every year, so these were used as the basis for the sectoral estimates. It was assumed that neighboring irrigated and non-irrigated plots face the same price for a given crop. But, as reported in the statistics, prices vary substantially between regions and to a lesser extent between major areas within a region. This procedure permits the application of the S.R.H. price data to all producing areas, irrigated and non-irrigated. Prices were weighted with local production statistics for both kinds of agriculture.

Table 8 presents production estimates and computed average prices by crop for irrigated, temporal, and tropical areas and for the sector as a whole.

In the case of a few crops, the operations of the national price-support agency (CONASUPO) have resulted in a spread between the farm-gate price and the corresponding price to consumers, after accounting for processing and transportation costs. For these crops, CONASUPO incurs a budgetary deficit. For CHAC, it was necessary to reduce the farm-gate price of these crops by an amount which reflects the subsidy to consumers. This yields a market-clearing price and quantity, and the CHAC demand



curves are passed through that point.

Export markets are specified independently of the domestic markets in CHAC. For products which Mexico exports, it is assumed that the Mexican share of the world market is sufficiently small so that the country is a price-taker. In some cases, the quantity exported is limited by international agreements or by import quotas in other countries.\* For imports also, the fixed-price assumption is made.

For exports, farm-gate prices used in CHAC. These are less than f.o.b. prices. For imports, prices appropriate to consumption in Mexico city are required; these are higher than c.i.f. prices. This puts imports on the same price basis as domestic sources of supply.

#### 8. Factor prices

For sector-wide inputs, the prices used in CHAC are market prices. This includes hired labor, for which the wage varies over regions.\*\* For land, a district-level resource, prices are completely endogenous. For water, the well pumping costs and administrative charges for release of reservoir water are registered in the objective function, but since quantities of available water are limited, the model also computes a shadow rental.

Table 9 shows the calculation of the price of tractor services. Similar calculations were made for pumping costs of wells and services of draft animals.

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\* In the case of sugar, two export markets have been introduced into CHAC: one reflecting the Mexican quota for U.S. imports and the other, at a lower price, reflecting the free international market.

\*\* The pricing of labor, including imputation of farmers reservation wages, is explained in chapter IV.1.

Table 8. Base-period domestic prices and production in CHAC (1968)

Crop	Farm-gate price (pesos/ton)			Production (tons)			National average farm-gate price (pesos/ton)	National production (tons)
	Irrigated	Temporal	Tropical	Irrigated	Temporal	Tropical		
Garlic	2 213			31.0			2 213	31.0
Cotton fiber	2 459	2 381		1 270.8			2 447	1 504.1
Alfalfa (dry)	354						354	
Alfalfa (green)	126			10 932.0			126	10 932.0
Rice	1 134		1 358	368.6		131.8	1 219	500.4
Oats	653	805		22.0	87.2		774	109.2
Sugar cane	64		63	14 216.9		14 926.0	64	29 142.9
Safflower	1 544	1 552		173.4	75.3		1 546	248.7
Squash		576			108.1		576	108.1
Peanuts	1 593	1 298		24.5	50.7		1 391	75.2
Onions	637			122.7			637	122.7
Forage barley	86						86	
Grain barley	1 014	862		135.3	191.9		925	327.2
Dry chile	7 554	8 153		17.7	4.1		7 677	21.8
Green chile	1 413	1 651		121.5	50.9		1 496	171.5
Stawberries	1 977			109.3			1 977	109.3

Table 8. Base-period domestic prices and production in CHAC (Cont.)  
(1968)

Crop	Farm-gate price (pesos/ton)			Production (tons)			National average farm-gate price (pesos/ton)	National production (tons)
	Irrigated	Temporal	Tropical	Irrigated	Temporal	Tropical		
Beans	2 202	2 070	1 726	104.5	720.7	119.4	2 040	944.6
Chickpeas	1 153	967		24.4	159.2		992	183.6
Lima beans	855	865		14.2	31.9		862	45.4
Tomatoes	1 998	1 255		586.2	78.8		1 906	665.0
Sesame	1 500	2 382	2 438	30.2	140.6	22.7	2 407	193.5
Flaxseed	1 701	1 661		8.8	10.1		1 680	18.9
Corn	940	908	935	1 750.5	5 425.6	2 059.1	920	9 255.2
Cantaloupe	682			142.5			682	142.5
Potatoes	973	865		239.2	164.3		929	403.5
Cucumber	1 301			20.5			1 301	20.5
Pineapple			513			297.6	513	297.6
Watermelon	777			187.6			777	187.6
Sorghum	625	657	671	1 280.3	1 173.2	20.2	641	2 523.5
Soybeans	1 600		1 640	259.7		2.7	1 600	272.4
Tobacco			7 722			75.7	7 722	75.7
Wheat	857	895		2 138.6	105.8		859	2 244.4

Notes to Table 8

1. For prices, a 1967-69 average is used.
2. The average price of tomatoes is strongly influenced by the export price. In CHAC, a base-period domestic price of 1150 pesos/ton is used.
3. The average price of cucumbers is strongly influenced by the export price. In CHAC, a base-period domestic price of 586 pesos/ton is used.
4. In the case of corn, it is assumed (on the basis of information contained in the National Agricultural Plan) that 63% of production goes to human consumption and 37% to forage uses.
5. For corn, beans, sorghum, and wheat, the farm-gate prices in the table reflect the subsidies of CONASUPO. For CHAC, prices were adjusted to remove the influence of the subsidy. Thus the base-period prices used for these crops are as follows (in pesos/ton):

corn	861
beans	1834
sorghum	633
wheat	800

Notes to Table 8

1. For prices, a 1967-69 average is used.
2. The average price of tomatoes is strongly influenced by the export price. In CHAC, a base-period domestic price of 1150 pesos/ton is used.
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corn	861
beans	1834
sorghum	633
wheat	800

Table 9. Costs associated with the operation of one 60 h.p. tractor  
(1968 pesos)\*

Acquisition costs

Tractor of 60 h.p.	75 364
Reversible plow with 3-furrow disc	14 200
18-disc harrow	9 250
Land-levelling blade	6 000
Broadcasting seeder	20 000
Cultivator	10 500
	<u>135 314</u>

Useful life

10,000 hours

Gasoline and oil consumption

diesel, 50 liters each 8 hours, at 0.4 pesos/liter  
oil, 8 liters each 125 hours, at 8.0 pesos/liter  
grease, 1 kilogram each 8 hours at 5.0 pesos/kilo

Maintenance expenditures

transmission oil change, 30 liters each 1500 hours,  
at 6.5 pesos/liter  
filter change each 250 hours, 30 pesos  
tire change, one set each 3500 hours at 4,500 pesos/set  
tune-up each 1000 hours, 300 pesos  
cylinder change, 600 pesos

Summary of operating costs per hour

depreciation	13.50
gasoline, oil consumption	3.64
maintenance	2.38

---

\* Apart from the operator's salary.

Major Data Sources

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Secretaría de Recursos Hidráulicos, Costos de Producción de los Principales Cultivos en los Distritos de Riego, Mexico 1969 and earlier years.

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HARVARD UNIVERSITY  
DEVELOPMENT ADVISORY SERVICE  
OF THE  
CENTER FOR INTERNATIONAL AFFAIRS  
1737 CAMBRIDGE STREET  
CAMBRIDGE, MASSACHUSETTS 02138

June 7, 1971

JUN 9 1971  
H. 50pm

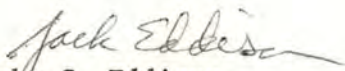
Dr. Hollis Chenery  
International Bank for Reconstruction and Development  
1818 H Street, N.W.  
Washington, D. C. 20433

Dear Hollis:

Enclosed is a corrected copy of the Inception Report on the Harvard-DAS project for "Assistance to Development Planning in Ethiopia." This is the first progress report on the Ethiopia project. It calls attention to the heavy stress on training and other institution building activities which characteriz~~e~~s the project.

The revised copy is being sent to correct a clerical error in assembling the previous version. We apologize for the inconvenience and ask that you destroy the prior version which was sent to you about a week ago.

Sincerely,

  
John C. Eddison

JCE:gw  
Enc.



HARVARD UNIVERSITY  
DEVELOPMENT ADVISORY SERVICE

July -  
Ethiopia

UNITED NATIONS DEVELOPMENT PROGRAMME PROJECT NO. ETH 31  
ASSISTANCE TO DEVELOPMENT PLANNING IN ETHIOPIA

Inception Report\*

\* As provided for in Appendix A  
of the contract between the  
International Bank for Recon-  
struction and Development and  
Harvard University, dated  
December 11, 1971.

April 20, 1971

HARVARD UNIVERSITY  
DEVELOPMENT ADVISORY SERVICE

ETHIOPIA PROJECT  
Inception Report

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## INTRODUCTION

The present document is the Inception Report of the Harvard University Development Advisory Service project in the Planning Commission Office of the Imperial Ethiopian Government, said report being required under Appendix A of the contract dated December 11, 1971, between the International Bank for Reconstruction and Development (hereafter World Bank) and Harvard University, the relevant extract of which reads as follows: "The Advisers will provide the IBRD with: (a) within one month from the Starting Date, an Inception Report showing the progress of the Project and a summary of interim findings; (b)....."

The report is delayed approximately two months beyond the date specified in the contract, for the reason that the Harvard project director in Ethiopia gave top priority during this period to assisting in the establishment of an ambitious foreign training program for the academic year 1971/72, fearing that any postponement of activities in this connection for the sake of meeting the contractual reporting deadline would jeopardize the chances of approved candidates to meet deadlines for applying to foreign training institutions. The project director also noted the fact that the D.A.S. head office in Cambridge, Massachusetts, and he personally were in frequent contact with World Bank officials in Addis Ababa and Washington, ensuring a substantial flow of information to assist the Bank

in fulfilling its responsibilities as Executing Agent for this U.N.D.F.-financed Project. In partial compensation for the reporting delay this report covers Project activities through April 15, 1971, including a description of the full 1971/72 training program approved by the Head of the Planning Commission Office on April 15 itself.

#### PRE-PROJECT ACTIVITIES

By agreement between U.N.D.P., the World Bank, the Imperial Ethiopian Government, and Harvard D.A.S., the provision of certain advisory services to the I.E.G. Planning Commission Office (P.C.O.) commenced in August 1970, over four months prior to the official starting date of the Project, January 1, 1971. The D.A.S. adviser on industrial development, Dr. Donald C. Mead, arrived in Addis Ababa on August 1, 1970, and the D.A.S. adviser on macroeconomic analysis, Dr. Pavle Sicherl, arrived on August 11, 1970. The discussion in a later section of the activities of these two advisers includes their activities during the pre-Project period. Also included in the pre-Project phase was a visit to Addis Ababa during November 3 - 10, 1970, by Professor Walter Falcon, Deputy Director of the D.A.S., who together with I.E.G. officials and the two advisers already on the ground worked out various aspects of the organizational stage of the Project.

PROJECT ACTIVITIES -- JAN. 1 - APRIL 15, 1971

Adviser/consultant recruitment and arrivals

During the first 100 days of the Project five more D.A.S. advisers arrived in Addis Ababa or were approved and programmed to come later in the year. The five men are:

<u>Name</u>	<u>Project assignment</u>	<u>Date of arrival</u>
Clive S. Gray	Director	Jan. 6
T. James Goering	Agriculture	Jan. 16
Alexander ter Weele	Education	March 2

Scheduled to arrive

Bo Erik Thome	Monetary & Fiscal	May 17
William Dodge	Transport & Communications	Late July

At the end of the period recruitment was still underway in respect of the advisers on manpower and water resources and power. In addition, a project director was being recruited to replace Gray, who had been appointed to join the D.A.S. project in Indonesia in late 1971 before the question of his helping to launch the Ethiopia project had arisen.

The first short-term consultant to visit Ethiopia under the project was David N. Smith, Secretary of International Legal Studies at the Harvard Law School, who spent a week in August 1970 advising the Ministry of Mines on mining concessions policy. During the reporting period Professor Raymond Vernon of the Harvard Business School and Professor Simon Kuznets of

the Harvard Department of Economics were scheduled for visits of one to two weeks in May and June. Discussion with potential consultants for several other assignments suggested by the I.E.G. was underway.

Adviser situations and activities

Shortly after the arrival of Project director Gray the Head of the Planning Commission Office, H.E. Ato Belai Abbai, arranged a series of appointments for him with Ministers, Vice-Ministers, and/or senior civil servants in some twenty operating ministries and statutory agencies of the Imperial Ethiopian Government. Through these appointments Gray was informed about the status of the planning and programming units and related organizations of these bodies, learned of the responsible officials' plans for increasing the units' effectiveness and acquainted the officials with the objectives and modus operandi of the U.N.D.F./Harvard Project. Gray stressed particularly the training focus of the Project, solicited names of planning staff who might be considered for Project-financed or other scholarships for foreign training in the near future, and where appropriate encouraged the officials concerned to undertake systematic staff development of their planning units and related organizations, including but not limited to recruitment of fresh economics graduates who would be attracted by favorable prospects for training abroad after a year or two on the job. In nearly all cases Gray found a highly favorable attitude toward the strengthening of planning units and related organizations, combined with a sincere belief in the importance of

sound economic training for planning staff, reflected in a general willingness to give staff members the necessary leave in order to follow postgraduate studies. The names of eleven staff members were put forward for scholarships in 1971/72, and indications were that up to twice as many would be proposed in 1972.

The largest share of Gray's time in the period under review was devoted to putting together an integrated training program for 1971/72, covering both the Planning Commission Office and the ministerial/agency planning units and related organizations. He prepared the necessary documentation for the P.C.O. Head, Deputy Head, and Training Committee, and carried out the functions of secretary to this Committee pending the assignment of this role to a P.C.O. staff member, which occurred at the end of the period.

In other areas, Gray helped to coordinate P.C.O. evaluation of the manpower report published in February by the Ministry of National Community Development and Social Affairs under the title, "An Assessment of Ethiopia's Manpower Requirements and Resources for Economic Development, 1961-70 E.C." The P.C.O. staff members and foreign advisers concerned agreed that substantial further manpower investigation was required to provide the I.E.G. with the minimum of data necessary in order to plan the future development of Ethiopian education and training. In the field of project coordination and evaluation, Gray drafted a proposal for a system of inter-

agency project committees, which the P.C.O. accepted, along with other additions suggested by him for inclusion in the draft manual on project planning in Ethiopia, prepared under the direction of the P.C.O.'s World Bank-seconded adviser, Mr. Colin Bruce. Gray was invited to attend, in an observer capacity, meetings of the Planning and Programming Subcommittee of the Planning Commission, and contributed to P.C.O. and inter-agency discussions of land settlement, indirect tax reform, the forthcoming World Bank-sponsored agricultural sector review, and policy papers for the May inaugural meeting of the Consultative Group on Aid to Ethiopia. He also met on a number of occasions with faculty members of the Department of Economics and College of Business at Haile Sellassie I University (H.S.I.U.) and drafted proposals for cooperation between University and I.E.G. economists (see later section on the University).

Industry adviser Mead has worked in the Industry Division of the P.C.O. Agriculture and Industry Department since his arrival in August 1970. Functioning as his counterparts have been three members of the Division, two with post-graduate degrees from the Central Institute of Planning and Statistics in Warsaw and one a 1970 graduate of H.S.I.U. One of the counterparts has been given the portfolios of tourism and mining, while the other two work on manufacturing, foreign trade and tariffs (and one of these has been assigned construction as well). Shortly after Mead's arrival Ato Philippos Wolde Mariam returned from the U.S. with a Williams College M.A. to become acting head of the Department.



Mead's principal activities thus far can be divided into four broad subject areas. Firstly, he has carried out analysis of the 1959 and 1961 (Ethiopian calendar) Surveys of Industry by the Central Statistical Office, seeking to gain insights into the structure of Ethiopian industry. Secondly, he has looked at questions of pricing and investment policy in the cases of a number of specific firms and industries. As one of two P.C.O. representatives on an inter-agency working party concerned with pricing of petroleum products, Mead contributed to the analysis which convinced the Council of Ministers in March to enact a substantial increase in these prices, thus eliminating an unjustified budget subsidy to petroleum users and significantly enhancing domestic savings. A third area of Mead's focus has been the formulation of general industrial development policy, including the institutional framework within which such policy is decided. In this connection Mead has analyzed the role of the I.E.G. Technical Agency in appraising the feasibility of proposed industrial investments.

Finally, Mead has devoted substantial attention to indirect taxes and tariffs, drafting proposals for the reform of the indirect tax system and for the use of efficiency criteria in evaluating industry applications for tariff protection. In this connection Mead prepared working papers for the first two events in the P.C.O.'s new open seminar program (see section on training below), and led the discussion in both seminars. The two seminars attracted between 25 and 37

participants each from the P.C.O., the Ministries of Finance and Commerce and Industry, the Technical Agency, and the University. Both sessions featured lively discussion of the relative merits for tariff policy of efficiency criteria on the one hand and, on the other hand, an eclectic set of criteria, including some borrowed from material balance theory, which cannot be quantified in a single measure of welfare but must be applied in any given situation through the use of common sense. Between the two seminars various participants wrote a total of some 20 pages of commentary on Mead's working papers, which material was distributed as a working paper for the second meeting. Subsequent discussion in the inter-agency technical committee for evaluation of tariff proposals indicates that Mead's papers and seminars have had considerable effect by way of increasing awareness of efficiency criteria among I.E.G. technicians and acceptance of the principle that efficiency calculations should be made in every case, showing the cost in efficiency terms of using any other criteria to set protective tariffs.

At the end of the reporting period the Head of the P.C.O. designated Mead and two counterparts to represent the Office in the Technical Committee on Tariff Protection.

Macroeconomic adviser Sicherl has been located in the macroeconomic studies section of the P.C.O. Department of Economic Analysis since his arrival in August 1970. Working with him are two relatively experienced counterparts with post-graduate economics degrees obtained in 1964 and 1968 respectively.

The Department does not now have an Ethiopian head, and there are no plans to confirm one for at least another year. Since the D.A.S. fiscal and monetary adviser, Thomé, will work in the same unit after his arrival in May, and one of the counterparts leaves in the summer for foreign study, there is an urgent need to recruit at least two, preferably three new staff members for the section.

Immediately after his arrival in August 1970 Sicherl and his counterparts worked on a report on the Ethiopian economy as background for discussion of both the revenue and expenditure sides of the 1964 EC budget. As the P.C.O. sectoral departments were not accustomed to taking an aggregative look at their respective sectors, their contribution to this exercise was disappointing. After completing this report in October Sicherl and his colleagues cooperated with the Department of Development Programming, which handled the expenditure side, to produce a report entitled "Background and Framework of the 1964 Budget" presenting the P.C.O.'s position to the Budget Committee of the Planning Commission. During November-December Sicherl served on the Budget Committee's technical counterpart, which had the assignment of reconciling P.C.O. and Ministry of Finance proposals.

Thereafter Sicherl examined the seasonal variation of tax revenue, showing that full implementation of the I.E.G. budget requires that public domestic borrowing be concentrated in the first five months of the fiscal year, during which period

it so happens that private borrowing is below average. In January, working as part of a P.C.O. team to draft the I.E.G. paper on development strategy and policy for the May Consultative Group meeting, Sichehl analyzed economic trends during the first two years of the Third Five Year Plan and projected macroeconomic variables over the Plan's final three years. He later served on a joint P.C.O./Ministry of Finance drafting committee to prepare the paper for transmittal to the Council of Ministers. With the budget and Consultative Group documents out of the way, Sichehl has proposed that the macroeconomic studies section should coordinate an effort to construct a pragmatic medium-term model of the Ethiopian economy in which the P.C.O.'s sectoral departments would play a key role and in the process acquire a more global vision of individual sectors and their interrelationships than exists at present.

Agriculture adviser Goering works in the Agriculture Division of the P.C.O. Agriculture and Industry Department, where he has four university-trained counterparts apart from the head of the Department. Two of the counterparts are 1970 graduates (e.g. economics majors) from the College of Agriculture at Alemaya. A fifth staff member was trained at a local agricultural vocational school, and a sixth is currently at Oxford University working on a Ph.D. in economics.

During an initial orientation period Goering established contacts within the Ministries of Agriculture and

Land Reform and Administration, the Grain Board, the Livestock and Meat Board, the Institute for Agricultural Research, F.A.O. and U.S. A.I.D. In late February he prepared a paper on suggested research topics for his division. The paper stimulated discussion on a divisional work program, which has yet to be finalized. Other activities included participation in an inter-agency committee on mechanization in Ethiopian agriculture, inter-ministerial discussions of national land settlement policy, and initiation of an internal P.C.O. mathematics/statistics course (see training section below).

Education adviser ter Weele, the only present member of the Harvard team not located in the Planning Commission Office (the transport and communications adviser will eventually share this distinction), serves as adviser to the planning unit of the Ministry of Education. With the Ministry at present in the throes of reorganization the position of this unit in the formal organizational structure is yet to be clarified. It formerly stood in a line relationship parallel to several divisions within a department that in turn bore the same relationship to other departments, but consideration is now being given to placing the planning unit in the Minister's Office. For the moment it reports directly to H.E. Ato Million Neqniq, the sole Minister of State in the Ministry, which gives it a strong base from which to implant a planning approach on the Ministry's wide-spread operations.

Apart from ter Weele the planning unit now has five members, two of whom are expatriates -- an ex-school master and school administrator from England on direct contract to the Ministry, and a UNESCO adviser with experience in U.S. school finance and administration. Of the Ethiopian counterparts, the unit's director-general has taken courses at the World Bank's Economic Development Institute and UNESCO's International Institute for Educational Planning; the officer responsible for research and evaluation has a University of Illinois M.A.; and the statistician has ten years of experience compensating in part for lack of a university degree. Since two of the Ethiopians are scheduled to leave for overseas training in September an urgent need has arisen to hire as quickly as possible the new local staff that will eventually be required in any case to replace the expatriate advisers. In a report to H.E. Ato Million ter Weele has made proposals for the division of responsibilities in the planning unit and the hiring and training of new staff. Pending consideration of these proposals ter Weele does not at the moment have a direct counterpart.

Ter Weele's primary activity in his first one and a half months has been to develop a formal proposal for the construction of three rural education institutes, to be financed by the World Bank under a recently negotiated I.D.A. education loan to Ethiopia. The proposal includes a discussion of the institutes' objectives, suggestions for staffing, and a schedule for implementation. It is to be acted on shortly by the Ministry's Major Policy Committee.

Another World Bank-related initiative receiving Ter Weele's attention is the forthcoming education sector review, in preparation for which he has begun an evaluation of implementation of the Third Five Year Plan's educational targets. In a series of evaluation charts he has summarized roughly 150 objectives and targets stated in the Plan, and will now proceed to establish 1968 baseline data, estimate achievements up to the Plan's half-way mark, and compare such progress with the rate required to achieve the Plan targets.

Ter Weele has also started an analysis of recurrent costs of teaching materials in laboratory and workshop courses, with a view to rationalizing budget allocations to schools for such purchases. He has contributed to the appraisal of the recently published manpower report, and started to identify Haile Sellassie I University personnel of potential use in the sector review.

#### Training

During the period under review the Head of the P.C.O. established a P.C.O. Training Committee, chaired by the Deputy Head of the P.C.O. with Department Heads and the U.N.D.F./Harvard Project Director as ordinary members. The Committee met twice during the period and formulated a wide range of recommendations to the Head of the P.C.O., all of which were accepted by him. A set of Policies and Procedures for Training of Staff of the P.C.O. and Ministerial/Agency Planning Units and Related Organizations was adopted and circulated among P.C.O. staff.

Ten P.C.O. staff members, plus one already studying in the U.K., were approved for inclusion in the 1971/72 foreign training program (an eleventh was approved but subsequently decided to postpone his departure to 1972.) U.S. A.I.D. agreed to finance scholarships for six P.C.O. candidates. After reviewing reports of interviews with eleven candidates from other agencies (see preceding section), the Committee decided to recommend eight for academic training in 1971/72. By mid-April indications from discussions with scholarship-financing agencies were that sufficient funds would be available from all sources, including a reasonable share of the Project's three-year training budget, to finance the studies of all 19 P.C.O.-approved candidates. At the same time, documentation on all candidates had been forwarded to the D.A.S. training office at Harvard, and candidates were completing application forms to training institutions recommended by Harvard and other scholarship-financing agencies, or were expecting the blank forms momentarily.

Following is the list of approved candidates:



<u>Name</u>	<u>Organization</u>
Bekela Tenagne (1)	PCO— Dept. Econ. Analysis
Gebreselassie Yosief	" — Devel. Budget Division
Kibret Mengistu (2)	" — Dept. Tech. Assistance
Meressa Tekle Mariam	" — Industry Division
Mersie Ejigu	" — Regional & Community Planning Division
Mesgeb Gebre Selassie	" — Transp. & Communics. Div.
Mulugeta Taya	" — Agriculture Division
Neway Gebreab (3)	" — " "
Stephanos Ogbaselassie	" — Water Resources Division
Tekola Dajene	" — Agriculture Division
Yusuf Abdulchi	" — Project Coord. Division
Debebe Agonafer	Awash Valley Authority, planning unit
Getenet Zewdie	Min. Nat. Commun. Dev., Manpower section
Kitesse Diga	Min. Nat. Commun. Dev., Planning unit
Million Tekie	Central Statistical Office
Mitik Beyene (4)	" " "
Solomon Haile Mariam	Ethiopian Tourist Organization
Tesfayerus Mehary	Central Statistical Office
Yusuf Ahmed	Imperial Highway Authority

(1) accepted in the Public Service Fellows program at Harvard.

(2) accepted in the M.A. program in development economics at Williams.

(3) already engaged in study toward a Ph.D. in economics at Oxford.

(4) accepted in the M.A. program in National Economic Planning at University of Birmingham.

It is significant to note that the P.C.O.'s decision to release such a large proportion -- close to one third -- of its professional staff for training in the coming year means that the short-run target for post-graduate training set in the following quotation from the report of the 1970 U.N.D.P. mission which appraised the I.E.G. application for this Project has already been surpassed:

" 3. Foreign Training Fellowships - The seven years programme of foreign training detailed in Table 2 would provide the 60 man staff with 41 man-years of advanced training abroad by 1977 (1970 E.C.), not including the 18 man-years completed by the beginning of the project. On the assumption that a Ph.D. takes 3.5 years to complete and an M.A. 1.5 years on the average, this training programme could provide a total of 5 Ph.D.'s and 22 M.A.'s by 1977 or 27 people with advanced training out of a total staff of 60. Other combinations are possible, of course, of Ph.D.'s, M.A.'s and short-term specialized training courses abroad.

At any rate, such a programme would seem to be minimally necessary to arm supervisory and other key staff with necessary advanced training. A larger programme would be desirable, but it is unlikely that more than six qualified staff members will be found each year to send abroad. To find and release this number will require an effort beyond anything the Planning Commission has previously undertaken."

Such is the enthusiasm of the leadership and entire professional cadre of the P.C.O. for a policy of systematic staff development making liberal use of postgraduate academic training, and so forthcoming are the bilateral scholarship-financing agencies, that it will be surprising if the bulk of the U.N.D.P. report's long-range training targets are not achieved two or three years in advance of the report's 1978 deadline.

Another manifestation of the P.C.O.'s unequivocal support for the Project's training objectives is the decision, made at the end of the reporting period, to reassign the P.C.O. public relations officer, a man of considerable ability and postgraduate training (though not in economics), full-time to a new post of Staff Development Officer, in which various functions connected with internal and foreign training form the major part of the job description. This man will serve ex officio as secretary to the Training Committee, and will relieve the U.N.D.P./Harvard Project director of administrative tasks in respect of training to which he unavoidably devoted considerable time during the reporting period.

The Head of the P.C.O. has approved a proposal by the U.N.D.P./Harvard Project director for a regular program of professional seminars open to all P.C.O. staff and, as appropriate, staff of other I.E.G. agencies and the University. The first two seminars held under this program were described in the preceding section. Apart from making liberal use of

U.N.D.F./Harvard consultants and other visiting economists as seminar leaders, it is planned to use P.C.O. staff and foreign advisers in this role. Topics proposed for seminars in the near future include the economic implications of the approved 1964 E.C. budget, and current trends in the Ethiopian economy.

The training program approved by the Head of the P.C.O. envisages local short courses in topics such as mathematics for economists and project evaluation, open to P.C.O. staff and as appropriate staff of related I.E.G. agencies. Toward the end of the reporting period D.A.S. agricultural adviser Goering inaugurated the first course on mathematics and statistics for economists, involving twice-weekly sessions of 1½ hours, one-third of the time outside office hours, over a three-month period. Attendance appeared to be stabilizing at over 20, including most of the approved candidates for foreign training, two Vice-Ministers and some P.C.O. Department Heads. Initial plans were made during the period for a project evaluation course to get underway in May.

#### Cooperation with Haile Sellassie I University

Following Harvard's general policy, in line with its strong belief in the mutual benefits to be obtained, of encouraging close cooperation between planning agencies in developing countries and local universities, particularly through the latter's economics departments, the D.A.S. advisers have taken the following steps to promote such cooperation with Haile Sellassie I University:

(1) Gray and Head have undertaken to lead seven discussion sessions between them in the second semester of the Economics Department's economic planning course for fourth-year students; five of these meetings were held during the reporting period. Ter Weele is giving one lecture a week, partly during his lunch hour, on applied statistical technique to third-year students in the Statistics Department. On occasion he organizes field trips to acquaint the students more closely with problems in the collection and analysis of education statistics. All three advisers are using the contact to identify possible recruits for their respective I.E.G. agencies.

(2) The Project director proposed to the Head and Deputy Head of the P.C.O. a joint meeting between P.C.O. senior staff, foreign advisers and the H.S.I.U. Economics faculty to discuss possible areas for collaboration in research. The meeting has been scheduled for the last week of April, and the Project director has prepared a descriptive list of topics for discussion.

(3) The Project director also proposed to the Head and Deputy Head that the possibility of officially enrolling a small number of Economics and Business faculty members as unpaid, part-time consultants to the P.C.O. be explored with the President of the University. A letter to that effect has gone to the President.

(4) Ter Weele initiated a discussion chaired by the H.S.I.U. academic vice-president and attended by 8 deans, department heads, and other responsible faculty representatives, to investigate the potential involvement of faculty and students

in research activities connected with the forthcoming education sector survey. Ter Weele is now exploring individual expressions of interest arising out of the meeting.

(5) E.S.I.U. faculty members have been invited to and have attended official and informal seminars promoted by D.A.S. advisers.

(6) Two D.A.S. advisers have counselled some fourth-year students on their thesis topics.

(7) Gray and Mead have accepted an invitation to a weekend conference in early May to discuss the Economics Department's development plan, and are preparing two working papers for the meeting, which will bring together I.E.G. and faculty representatives to discuss ways of making the Department's instruction and research activities more responsive to Ethiopia's development needs. Gray is also serving on the conference preparatory committee.

#### DEVELOPMENTS IN I.E.G. PLANNING ORGANIZATION

Under this heading it is relevant to examine the situation in respect of certain recommendations made by the U.N.D.P. appraisal mission in 1970.

#### Appointment of Deputy Head of P.C.O.

The appointment by His Imperial Majesty of H.E. Ato Afework Zelleke as Deputy Head of the Planning Commission Office with the rank of Vice-Minister was announced on

January 15. H.E. Ato Afework is an economist with post-graduate training at Syracuse University. After working briefly with the Ministry of Community Development he joined the Economic Department of the Ministry of Foreign Affairs and eventually headed this Department before transferring to the Planning Board in 1962 as deputy head with the rank of director-general. In this capacity H.E. Ato Afework was active in the implementation of the Second Five Year Plan. From 1965 to 1971 he served with Ethiopia's Permanent Mission to the United Nations in Geneva, eventually as chargé d'affaires. H.E. Ato Afework took up his duties in the P.C.O. in early February and rapidly eased the administrative burdens of the Head of the P.C.O. The improvement which the Deputy Head's appointment brought about in the functioning of the Office during the reporting period was marked, and completely justified the U.N.D.P. mission's recommendation. H.E. Ato Afework has assumed responsibility on the P.C.O. end for the implementation of the U.N.D.P./Harvard Project, and his presence has expedited the resolution of organizational questions associated with it. Of particular importance to Project objectives has been H.E. Ato Afework's firm leadership of the Training Committee and prompt execution of the many steps necessary to overcome the obstacles caused by the late start in implementing the 1971/72 training program.

Disposition of the Technical Agency

The question of the future of the I.E.G. Technical Agency is at present in the hands of a subcommittee of the

Planning Commission, and no definite prediction can yet be made with respect to its conclusions. It seems likely, however, that the Agency will not be dismantled as the U.N.D.P. mission recommended, but instead will be maintained with possible modifications in its terms of reference. The P.C.O. has advanced proposals with respect to organizational changes which would enable the work of the Technical Agency as well as other bodies concerned with different aspects of project identification and appraisal to be integrated into a coherent system with consistent policy guidance in accordance with national development objectives.

#### The Statistical Act.

The Finance and Legal Committee of the Council of Ministers has recommended a draft Statistics Order and Proclamation to the full Council, and these are expected to receive Council approval within a few weeks. No further hurdles to the enactment of this much-needed legislation are anticipated.

#### P.C.O. staff recruitment

In the summer of 1970 the P.C.O. hired an unprecedented number (eight) of new economics graduates from Haile Sellassie I University. Five of these are included among the 1971/72 foreign training candidates. As of the present the following seven professional staff positions authorized under the 1963 E.C. budget are vacant:



<u>Department/Division</u>	<u>Position</u>
Economic Analysis (macro)	Head
" " "	Jr. expert, fiscal and Monetary
Development Programming (Project Coordination)	Expert
Agriculture & Industry (Industry)	Expert
Infrastructure	Engineer
Technical Assistance	Deputy head
" "	Expert

The post of Head of the Department of Development Programming is also vacant, though not yet established, and the heads of two other departments -- Agriculture and Industry and Social Services -- function in an acting capacity.

Taken together with the existing vacancies, the departure of ten training candidates in September 1971 will leave sizable gaps in the P.C.O. staff; in particular, if training candidates are not replaced, the Agriculture Division will be devoid of active local staff, and the macroeconomic studies section of the Department of Economic analysis will have only one local counterpart for two D.A.S. advisers. However, the Office's approved 1964 E.C. budget will enable it to staff about six new positions in addition to filling the established vacancies, and with two staff members expected to return from foreign training in 1971, the P.C.O. will have the necessary financial resources to support a modest increase in the present number of staff on the job in Ethiopia over the next year. The principal constraint is likely to be the

availability of qualified recruits. As in the past two years the Office plans to canvass the entire graduating class of the H.S.I.U. Economics Department and the agricultural economics majors from the College of Agriculture at Alemaya. The new Staff Development Officer has been given responsibility for professional staff recruitment, which will strengthen the P.C.O.'s capacity to identify promising candidates.

APPENDIX - LIST OF ADVISERS' MEMORANDA  
(August 1970 - April 1971)

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Clive Gray

Policies and Procedures for Training of Staff of the P.C.O.,  
Ministerial/Agency Planning Units and Related Organizations  
of the I.E.G.

Proposals for 1971/72 foreign training program (5 tables and  
associated memoranda).

A Strategy for Project Development and Implementation in the  
Imperial Ethiopian Government.

Proposed additions to draft project planning manual.

Ethiopia's Overall Development Strategy (draft for Consultative  
Group paper).

Work program for D.A.S. manpower adviser.

Work program for P.C.O. Staff Development Officer.

Donald Mead

The Future of the Technical Agency (with Colin Bruce).

A Report on Refinery Price Policy and Other Related Matters  
(with Colin Bruce).

Cost-Benefit Studies According to Little-Mirrlees Method (4  
working papers).

Notes on the 1959 E.C. and 1961 E.C. Industrial Surveys.

Criteria for the Granting of Tariff Protection (2 working papers).

Some Suggestions for Reforming the Indirect Tax System in  
Ethiopia (with Colin Bruce).

Pavle Slicherl

Draft Economic Report and Projections for 1964 E.C.

Background to and Framework of the 1964 E.C. Budget  
(with Dept. of Development Programming).

Seasonal Variation and Short-run Forecasting of Tax Revenue.

Some Technical Reasons why Development Budgets can never be  
100% implemented under present conditions (with C. Bruce  
and W. Mohl).

Progress with Third Five Year Plan.

Economic Prospects 1971 - 1974.

T. James Goering

Comment on Plan of Operation of the Planning and Programming  
Unit of the Ministry of Agriculture.

Comments for the Programming and Planning Unit, Ministry of  
Agriculture, on 'Questionnaire for Peasant Farms in Ethiopia'

Some Thoughts on Possible Research Activities of the P.C.O.  
Agriculture Division.

Some Preliminary Findings on Economic Implications of Duty-  
free Fuel Allowances for Agriculture (with Ato Mulugeta  
Taye).

Possible Follow-up Activities to Visit by the IBRD Agricultural  
Sector Study Preparatory Mission.

Alex ter Weele

Proposal for Construction of One Rural Education Development Institute (REDI) and Two Rural Education Institutes (REI's).

Summary Evaluation Charts to be used for Review of the Third Five Year Plan.

A Proposal for Personnel Recruitment and Training (for the Planning Division of the Ministry of Education).

Overseas Training of Educational Training Personnel.

Comments on the Recent Visit by F. Dunnill of the IBRD.

Comments on the published report, "An Assessment of Ethiopia's Manpower Requirements and Resources for Economic Development, 1961-1970 E.C."

COUNCIL ON FOREIGN RELATIONS, INC.  
THE HAROLD PRATT HOUSE 58 EAST 68TH STREET  
NEW YORK, N. Y. 10021

CABLE ADDRESS: FORAFFAIRS, NEW YORK  
AREA CODE: 212 LEhigh 5-3300

*Handwritten initials*

June 7, 1971

JUN 11 1971

*2:50pm*

Dear Hollis:

We were all sorry that you were not able to come to the McNamara dinner on Friday. William Clark told me that McNamara said you had contributed so much to the speech that he felt it would be redundant for you to hear it, but it was a very fine occasion. Even though a bleak picture emerges when one thinks about population growth and the consequences thereof, the knowledge that men of your caliber are devoting their minds to it is one important reason to be hopeful about the future.

William Clark said that this was the first speech that McNamara had given in the United States in some eighteen months, and we were honored that he chose the Council. Many thanks for all your help in connection with the speech, both in terms of arousing his interest and in terms of the ideas you supplied for it. I hope that there will be a chance to see you one of these days before too long.

All the best,

Sincerely,

*Handwritten signature of David W. MacEachron*

David W. MacEachron  
Deputy Executive Director

Mr. Hollis Chenery  
International Bank for Reconstruction and  
Development  
1818 H Street, N. W.  
Washington, D. C. 20433

COUNCIL ON FOREIGN RELATIONS, INC.  
THE HAROLD PRATT HOUSE 58 EAST 68TH STREET  
NEW YORK, N. Y. 10021

CABLE ADDRESS: FORAFFAIRS, NEW YORK  
AREA CODE: 212 LEhigh 5-3300

May 12, 1971

10:30  
MAY 17 1971

Dr. Hollis B. Chenery  
International Bank for Reconstruction  
and Development  
Room A1221  
1818 H Street, N. W.  
Washington, D. C. 20433

Dear Hollis:

Following our phone conversation about Mr. McNamara's talk at the Council on June 4, I thought it would be useful to put some of this on paper for you. The occasion is the Annual Conference of officers and members of the Council's affiliated Committees in thirty-four cities. During the daytime on Friday, we shall draw on some of the people who attended the Trends Conference last December for talks centering around major trends during the next ten years or so that will affect international relations. Mr. McNamara's talk in the evening will be part of the Conference, but it is a somewhat separate event. We have invited some of the distinguished members of the Council to join in. I would guess that we would have an audience of around 100, which is about as large as a Council dinner can comfortably be.

Carl Kaysen will talk in the morning, sketching out some of the main outlines of the world system as it now exists and then going on to talk about the changes deriving from economic developments. Robert Jastrow of the Goddard Institute for Space Studies will then talk about scientific and technological developments and how they affect international relations, undoubtedly with special reference to space. In the afternoon, Carroll Wilson will describe the major environmental problems facing the world and what this may mean for us, and Henry Owen of Brookings will close the afternoon session with some reflections on how these changes may affect the international institutional framework.

In light of the overwhelming importance of the population-food problem and Mr. McNamara's strong leadership in this area, we thought that it would be immensely valuable for him to deal with this fundamental factor in world affairs. I think it would be safe to assume that virtually everyone in the audience would be familiar with the

Dr. Hollis B. Chenery

May 12, 1971

basic situation and the prospects for the remainder of this century in broad outline. Therefore it would be most valuable if Mr. McNamara could dwell particularly on the policy implications of the food-population problem and give his critique of present efforts to cope with it. What does he consider the suitable national and international response to this problem? What would be some of the consequences of failure to respond appropriately? A talk of this sort to such an audience at this time could be very useful indeed. Let me know if there is anything further that I could do to be of help.

Sincerely yours,

A handwritten signature in blue ink, appearing to read "Dave", written in a cursive style.

David W. MacEachron  
Deputy Executive Director



*Lowther - Draft memo.*

April 2, 1971

Mr. David W. MacEachron  
Deputy Executive Director  
Council on Foreign Relations, Inc.  
The Harold Pratt House  
58 East 68th Street  
New York, N.Y. 10021

Dear Mr. MacEachron:

Mr. Chenery is currently on a mission in Africa, he is expected back in the office on April 12, 1971.

I will insure that your letter of March 29, 1971, is immediately brought to Mr. Chenery's attention on his return.

Sincerely yours,

Jack L. Lowther  
Administrative Officer  
Economic Staff

cc: Mr. Chenery ✓

4.

April 13, 1971

Mr. David W. MacEachron  
Deputy Executive Director  
Council on Foreign Relations, Inc.  
The Harold Pratt House  
58 East 68th Street  
New York, N.Y. 10021

Dear Dave:

With reference to your letter of March 29, 1971,  
I have no objection to your distributing the summary  
of the discussions of the Conference on "Trends Affect-  
ing International Relations". None of the remarks  
attributed to me need to be modified.

Sincerely yours,

Hollis B. Chenery  
Economic Adviser to the President

COUNCIL ON FOREIGN RELATIONS, INC.  
THE HAROLD PRATT HOUSE 58 EAST 68TH STREET  
NEW YORK, N. Y. 10021

CABLE ADDRESS: FORAFFAIRS, NEW YORK  
AREA CODE: 212 LEhigh 5-3300

4:10  
MAR 31 1971

March 29, 1971

Dear Hollis:

It has been suggested that we should make a distribution of the summary of the discussions at the Conference on Trends Affecting International Relations to those who would have a serious interest in the topics. So far the summary has only been sent to the participants in the Conference, the members of the Council's Committee on Studies, and the members of the Board of Directors.

I would appreciate your letting me know within the course of the next two or three weeks whether or not you feel there is any reason why the summary should not be distributed to responsible people who are interested in this subject. If we are going to do this, are there any remarks attributed to you which you would like modified?

*Hollis*

Sincerely yours,



David W. MacEachron  
Deputy Executive Director

Professor Hollis B. Chenery  
International Bank for Reconstruction  
and Development  
Room A1221  
1818 H Street, N.W.  
Washington, D.C. 20433