| | |
|---|---|
| **Folder Title:** | Development Policy - Commodities - Jute - April 1973 - April 1976 |
| **Folder ID:** | 30124862 |
| **Series:** | Commodity Files of the Director, Development Policy |
| **Dates:** | 04/04/1973 - 04/07/1976 |
| **Subfonds:** | Records of the Office of the Vice President, Development Policy (VPD) and the Development Policy Staff |
| **Fonds:** | Records of the Office of the Chief Economist |
| **ISAD Reference Code:** | WB IBRD/IDA DEC-01-08 |
| **Digitized:** | 06/13/2023 |



Development Policy

Comm. (Jute)

1973(April) and 1976(April)

Mr. D. Avramovic, VPD

April 7, 1976

Ernest Stern, VP, South Asia

Stabilization, Adjustment and Diversification Study

Just a brief comment on your paper, on which Gil will comment in more detail.

The problem of the low income country relying on commodities with poor growth prospects is well known. So is the prescription of diversification and adjustment, which your paper restates well. We therefore not only agree with your approach, but are in the process of implementing such a strategy, as the staff may have told you.

For instance, jute. Your paper suggests yield improvements, rationalization of manufacturing support of Jute International, better extension and marketing and price stabilization. The FY1976 Import Credit was based, in part, on an action program for the rejuvenation of the jute industry. Additional financing is contemplated in the next credit. We are supporting Jute International and have just sent a team to develop an action program. We are also seeking to strengthen the credit and extension facilities. The two principal elements missing are a buffer stock and close India-Bangladesh cooperation. The general political relationship between the two makes this unlikely at present but even if this relationship improves, the particular politics of the jute industry will make such collaboration difficult.

In short, while the diagnosis is sound, the paper takes too little account of what is being done, is too facile about how quickly change can be effected in the agricultural sector and ignores the political impediments to intimate collaboration.

cc: Messrs. Chenery
Karaosmanoglu

DOCUMENT OF INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

**For Exclusive Use of Bank Group Staff**



CONFIDENTIAL

Report No. 114-BD

# THE WORLD JUTE ECONOMY

(in two volumes)

## VOLUME I

## THE WORLD JUTE MARKET

April 4, 1973

South Asia Department

## CURRENCY EQUIVALENTS

| | | |
|---|---|---|
| US $ 1.00 | = | Takas (T) 7.28 |
| T 1.00 | = | US $ 0.137 |
| T 1 million | = | US $ 137,000 |

## INITIALS AND ACRONYMS

| | | |
|---|---|---|
| AEJI | - | Association of European Jute Industry |
| BCJC | - | Bangladesh Central Jute Committee |
| BCSIR | - | Bangladesh Council for Scientific and Industrial Research |
| BJA | - | Bangladesh Jute Association |
| BJMC | - | Bangladesh Jute Manufacturing Corporation |
| BJMC | - | Bangladesh Jute Marketing Corporation |
| BJPSC | - | Bangladesh Jute Price Stabilization Corporation |
| BJRI | - | Bangladesh Jute Research Institute |
| BJTC | - | Bangladesh Jute Trading Corporation |
| IJCS | - | Intensive Jute Cultivation Scheme |
| IJIRA | - | Indian Jute Industries Research Association |
| IJMA | - | Indian Jute Mills Association |
| JARI | - | Jute Agricultural Research Institute |
| TRL | - | Technological Research Laboratories |

# THE WORLD JUTE ECONOMY

## VOLUME I: THE WORLD JUTE MARKET

### Table of Contents




(This report was prepared by mission consisting of M. Lav (Chief), E. Grilli, J. Harrison, K. J. Hong, and C. Ladonne (all general economists), R. Morrison (Industrial Consultant), and M. S. Sarma (Agriculturalist, FAO/IBRD). Field work was conducted in major producing and consuming countries from November 22, 1972 to January 15, 1973.)

VOLUME I: THE WORLD JUTE MARKET

LIST OF TABLES

## LIST OF TABLES

## LIST OF TABLES

# THE WORLD JUTE MARKET

## SUMMARY

### Introduction

1. Jute has been an internationally traded commodity for more than 180 years. In 1793, the first shipment from India to Europe arrived in Dundee, where it was hoped that this newly introduced fiber could be processed into materials to replace flax and hemp products. Although jute was stronger and more flexible than flax or hemp, technological difficulties kept jute manufacturing from attaining significant commercial importance for some time. However, persistent supply problems with flax and hemp (obtained mostly from Russia) provided sufficient impetus for repeated experimentation in the U.K. with jute (which could be imported from India) and by 1833 technology had advanced sufficiently so that all-jute cloth could be woven on a commercially feasible basis. A key factor in the commercial success of the new technology was the adaptation of machines previously used for flax processing to a more efficient process based on jute. Jute also promised to provide more stable supplies at lower prices than flax or hemp.

2. The wheel has now turned almost full circle. Jute products, based on a stagnant or slowly changing technological base, are themselves now facing strong competition from products and processes which have been evolved through serious, well-financed, and long-term research and development efforts. A key element in the jute-replacing technology is the adaptation of basic processes and machines used in jute manufacturing to allow the use of synthetic substitutes. The threat is not of recent origin; the competition has been building during the last several decades as consumers became increasingly disturbed with the costs and fluctuations of the jute market.

### World Production

3. Worldwide production of raw jute grew at less than 1 percent per year during the 1950's to 2 million tons at the end of the decade then increased rapidly in 1961/62 to 2.6 million tons (as India expanded output to replace declining imports from Pakistan) and has since remained at approximately that level. Bangladesh produces about one half of all raw jute, India about 40 percent, and Nepal about 2 percent with the remainder distributed among a large number of countries. Production of lower quality fibers similar to jute (especially kenaf in Thailand and China, and mesta in India), increased rapidly from 100,000 tons in 1950 to 1 million tons in 1961/62 but showed no growth thereafter. Increased production of jute, kenaf, and mesta was essentially the result of increased acreage as yields have remained almost constant. Production trends for both raw jute and jute goods are included in Table A below.

Table A: PRODUCTION OF RAW JUTE INCLUDING RELATED FIBERS AND JUTE GOODS
(ooo's of metric tons)

| | Raw Jute | | | | Jute Goods /a | | | |
|---|---|---|---|---|---|---|---|---|
| | India | Pakistan/b | Others | Total | India | Pakistan/b | Others | Total |
| 1951/52 | 670 | 948 | 211 | 1829 | 983 | 1 | 566 | 1550 |
| 1961/62 | 1456 | 1304 | 831 | 3511 | 1096 | 273 | 1544 | 2913 |
| 1970/71 | 1116 | 1163 | 1010 | 3289 | 1042 | 478 | 1352 | 2922 |
| 1971/72 | 1231 | 777 | 1219 | 3227 | 1252 | 305 | 1293 | 2850 |

/a Jute goods production is normally less than raw jute production because: (i) village consumption is not counted; (ii) there is a wastage factor of 5-6 percent in manufacturing. In addition, changes in stock positions can cause discrepancies in any given year.

/b Pakistan, rather than Bangladesh, is used in this table since Bangladesh only became independent on December 16, 1971. When referring to events after that date, this report will refer to Bangladesh.

Source: FAO.

4. The most distinctive changes in the production of jute goods have been the continuous increase in Pakistan's share over time (except for the war-induced decline of the last 2 years) and the increase in production in other countries (mainly Western Europe) in the 1950's followed by declining production in those countries in the 1960's. Production in Pakistan increased from 1951/52 to 1961/62 reflecting a large increase in capacity, then leveled off for several years, at 275,000 to 300,000 tons as no new capacity was installed. However, a large investment program in the middle 1960's enabled production to increase from 289,000 tons in 1964/65, to 587,000 tons in 1969/70, or by over 100 percent. The years following 1969/70 saw production drop markedly to about 305,000 tons in 1971/72. Current trends in Bangladesh indicate a likely level of about 480,000 to 500,000 tons in 1972/73.

5. India, on the other hand, allowed output of manufactures to stagnate over the last 20 years, with the notable exception of the last 2 years when production for export increased to partly absorb world demand resulting from the decline in exports from Pakistan. Exports from India had been declining before this, from a level of about 960,000 tons in the middle 1960's to little more than 600,000 tons in 1970. Overall demand for goods remained constant in India only because of large increases in domestic consumption.

6. Perhaps the most important element in the decline of India as an exporter of jute goods was the squeeze imposed by tariff and quota barriers in Western European markets, on the one hand, and, on the other, Pakistan's aggressive expansion of exports supported by a differential exchange rate system that provided cheap raw jute to her domestic manufacturing industry. Jute prices in Pakistan were typically about two thirds of Indian jute prices (see Volume II for an analysis of this system). The differential exchange rate system was, of course, removed by the Government of Bangladesh on January 1, 1972, and raw jute prices quickly rose by about 55 percent. Quite apart from subsidizing or protecting her jute industry, India has imposed export taxes on hessian, sacking and carpet backing of varying amounts over the years, but amounting to about 6-37 percent for hessian, 5-31 percent for sacking and 6-29 percent for carpet backing.

7. The differing government policies in India and Pakistan were of crucial importance in determining market shares. Pakistan was able to underprice India in hessian and sacking, and by the end of the 1960's had captured about 85 percent of the combined sacking export market of the two countries and about 45 percent of the combined hessian export market. India retained most of the combined carpet-backing market, largely because Pakistan's capacity in carpet backing increased much more slowly than in hessian and sacking.

8. The fact that Pakistan discriminated against raw jute exports in favor of exports of jute manufactures thereby promoting a profitable domestic jute manufacturing industry, proved to be an important determinant of the world jute trade. The smaller jute crops and resulting higher world market prices resulting from lower domestic raw jute prices encouraged the growth of substitutes for jute. In the developing countries, this encouraged the rapid growth of kenaf, mesta, and similar fibers which are combined with jute to allow production of cheaper goods. Since allied fibers such as kenaf were typically 40 to 50 percent less expensive 1/, but can only be used in a given ratio with jute in producing most manufactured products, they have probably been an important factor in preserving the jute market. In the developed countries, synthetics and other products were substituted for jute, thereby diminishing the jute market.

World Demand

9. Demand for jute 2/ expanded quite rapidly in the fifties and early sixties in all the major consuming areas. In the early sixties, the development of new uses and markets sustained the growth of world jute demand even when traditional outlets such as packaging began to shrink under the impact of technological and consumers' preference changes. The development of the carpet-backing market in the early sixties more than offset the losses suffered in packaging and other industrial applications in developed countries. Consumption of jute in felts, padding and wall coverings also expanded considerably and new markets were found in centrally-planned and developing countries. Table B below gives an indication of the changing consumption patterns for jute in the decade of the sixties.

1/ The current price level of kenaf is about the same as that of raw jute. This is no doubt a reflection of the recent shortage of raw jute and it is expected that the price of kenaf will soon decline.

2/ The term jute in this section refers to true jute, kenaf, mesta and allied fibers.

Table B: ESTIMATED WORLD CONSUMPTION OF JUTE AND JUTE GOODS BY MAJOR CONSUMING GROUPS AND END-USES 1961-63 (AVERAGE) AND 1964-66 (AVERAGE) AND 1970

(thousand metric tons)

| | 1961-63 average | % of total | 1964-66 average | % of total | 1970 | % of total |
|---|---|---|---|---|---|---|
| A. Developed Countries | 1,331 | (46) | 1,411 | (41) | 1,314 | (38) |
| B. Centrally Planned | 494 | (17) | 724 | (21) | 834 | (24) |
| C. Developing Countries | 1,097 | (37) | 1,292 | (38) | 1,312 | (38) |
| Total (A + B + C) | 2,922 | (100) | 3,427 | (100) | 3,460 | (100) |
| of which: | | | | | | |
| Packaging & Industrial | 2,450 | (84) | 2,780 | (81) | 2,590 | (75) |
| Carpet Yarn & Cloth | 205 | (7) | 300 | (9) | 420 | (12) |
| Cordage | 125 | (4) | 140 | (4) | 150 | (4) |
| Felts & Padding /1 | 30 | (1) | 45 | (1) | 75 | (2) |
| Others | 112 | (4) | 162 | (5) | 225 | (7) |
| | | (100) | | (100) | | (100) |

/1 In developed countries only.

Source: IBRD, Economic Analysis and Projections Department.

10. Since the mid-sixties, the development of suitable synthetic substitutes gave users in consuming countries the alternative of locally produced goods at prices stable in the short run and declining in the medium run. As against this, jute goods were imported products which were not always available and whose prices were unstable and trending upwards under the impact of supply shortages and increasing costs of production. A research and development effort of considerable proportions was undertaken by synthetics manufacturers in developed countries and progressive quality improvements made their products acceptable to consumers. Economies of scale in production allowed synthetics producers to sell at continuously lower prices. When the battle between jute and synthetic substitutes was truly joined at the beginning of the current decade, the events in the subcontinent gave synthetics manufacturers another critical advantage. New massive investments in plants for the production of various types of synthetic substitutes for jute are now in the making, and synthetics producers' strategy and expectations have changed from one of penetration into jute end-markets to one of elimination of jute from the packaging and carpet-backing scene in all the major geographical markets.

11. Tariffs and quotas have played a major role in limiting the world jute market. When competition between jute and synthetics developed into a major factor, tariffs and quantitative restrictions on imports of goods from jute producing countries effectively precluded the consumers in Western Europe and other areas from the opportunity of purchasing jute goods at world prices and provided an umbrella under which, in recent years, the domestic industries of many European countries could carry out a comfortable transition from jute to the manufacture of synthetic substitutes. The cost of these import restrictions has indded been great, and aid-giving countries especially should realize that the restrictions they have imposed are, in part, responsible for the large aid requirements of important jute-producing countries.

12. The ability of jute to survive as a viable product for consumers and as an important source of income and foreign exchange for producers depends on what will happen in the world markets during the next few years. Availability, prices, and product improvements will determine the future of jute. The options available to the producing countries have shrunk considerably as the result of the most recent market developments and considerable efforts will have to be made to restore the credibility of the product, to maintain existing markets, and to plan ahead for the development of new ones. The world jute demand picture which emerges from the projections can be characterized as follows: (a) world jute consumption is likely to grow very slowly throughout the seventies; (b) most of the demand growth is expected to take place in developing producing countries (particularly India and Bangladesh); (c) of all the other major consuming areas, only in Africa and in the centrally planned countries (mainly People's Republic of China) is jute demand expected to increase; (d) utilization of jute in developed countries is foreseen to decline quite considerably, particularly in Western Europe.

13. Table C summarizes the projections for world demand. Both alternatives (I and II) assume that raw jute and jute goods prices will decline on the average by about 20 percent in the short run and will be maintained at lower levels throughout the seventies competitive with synthetics prices. Alternative II, however, assumes (a) that reduction or elimination of tariffs and quantitative import restrictions in Western Europe will help to cushion the fall in jute consumption; (b) that the People's Republic of China will close a larger proportion of its projected demand gap with imports of raw jute; and (c) that import substitution efforts in Africa will be less successful than is generally anticipated.

14. World import demand projections reflect the fact that jute consumption is expected to grow substantially only in producing countries. The expected fall in jute utilization in Western Europe is fully reflected in the projected decrease in import demand. In centrally planned countries, the import policy of the People's Republic of China is likely to determine whether overall import demand of raw jute will decrease or increase marginally throughout the current decade. Developing countries as a whole are expected to import more raw jute but less jute goods. The net effect is very likely to be an overall stagnation of import demand. The increase in consumption projected for Africa is expected to be net of domestic production and in Latin America a stagnant overall demand and increased domestic production will likely result in a fall in import demand.

15. World imports of raw jute are projected to decrease rapidly during the seventies, while world import demand for jute goods is generally expected to remain stagnant. The most significant change in the pattern of imports is likely to take place in Western Europe, where relaxation of tariffs and other import restrictions would considerably affect the conformation of import demand. The heavily protected domestic jute industry would progressively shrink under the impact of import liberalization and raw jute would be substituted by jute goods imports. The outcome of current and future trade liberalization efforts will largely determine the overall rate of decline of world import demand.

16. While the overall demand picture is not bright, one important factor could alter that picture considerably. Product development based on a serious research and development effort could evolve new commercially feasible uses for jute. It is also appropriate that at this juncture, the jute-producing countries themselves have taken the lead in establishing an international institution for this purpose. An Inter-governmental Conference, held in Dacca in January 1973, set in motion the machinery to establish an international jute organization. It would be premature to discuss at this point the still-evolving details of the organization. It would also be somewhat premature to incorporate the potential impact of such an organization into demand projections for jute. However, the time is long overdue to focus attention on the need for an international research, development and marketing effort to improve the jute position. The greatest need is for product development and for new techniques to lower production costs. The analysis presented in this report projects potentially severe consequences for those countries which depend on the income and foreign exchange which jute provides. Those who are concerned with these potentially severe

Table 3: WORLD CONSUMPTION OF JUTE AND JUTE GOODS, 1970 AND PROJECTIONS FOR 1980

(thousand metric tons)

| | 1970 | | 1980 | | | | 1970-1980 | |
|---|---|---|---|---|---|---|---|---|
| | Quantity | % of Total | Projected (I) Quantity | % of Total | Projected (II) Quantity | % of Total | Implied Growth Rate (I) | (II) |
| | | | | | | | (percent per annum) | |
| A. Developed Countries | | | | | | | | |
| Western Europe | 553 | (16) | 280 | (8) | 330 | (9) | (- 6.5) | (- 5.0) |
| North America | 489 | (14) | 440 | (12) | 470 | (12) | (- 1.1) | (- 0.4) |
| Other Developed | 272 | (8) | 175 | (5) | 190 | (5) | (- 4.3) | (- 3.6) |
| Total | 1,314 | 38 | 895 | 25 | 990 | 26 | - 3.8 | - 2.7 |
| B. Centrally Planned Countries | | | | | | | | |
| Total | 834 | 24 | 1,050 | 29 | 1,100 | 29 | + 2.3 | + 2.8 |
| C. Developing Countries | | | | | | | | |
| Asia | 835 | 24 | 1,150 | 32 | 1,150 | 31 | + 3.3 | + 3.3 |
| of which: India | (550) | (16) | (800) | (22) | (800) | (21) | (+ 3.8) | (+ 3.8) |
| Bangladesh | (56) | (2) | (85) | (3) | (85) | (3) | (+ 4.2) | (+ 4.2) |
| Thailand | (40) | (1) | (45) | (1) | (45) | (1) | (+ 1.2) | (+ 1.2) |
| Others | (189) | (5) | (220) | (6) | (220) | (6) | (+ 1.5) | (+ 1.5) |
| Africa | 281 | 8 | 300 | 9 | 330 | 9 | + 0.7 | + 1.6 |
| Latin America | 196 | 6 | 190 | 5 | 195 | 5 | + 0.0 | + 0.0 |
| Total | 1,312 | 38 | 1,640 | 46 | 1,675 | 45 | + 2.3 | + 2.5 |
| D. Total World (A + B + C) | 3,460 | 100 | 3,585 | 100 | 3,765 | 100 | + 0.4 | + 0.9 |

Note: Alternative I assumes price reductions at about 20 percent.
Alternative II assumes in addition favorable developments for trade including:
(a) lower tariffs and few import restrictions;
(b) larger export to Peoples' Republic of China; and,
(c) less import substitution in African countries.

Source: Economic Analysis and Projections Department, IBRD.

consequences -- producer countries themselves, international aid organizations and bilateral donor countries -- should seriously consider appropriate support of this research effort.

A Projection of World Supply

17. Table D below summarizes the change in the pattern of world supply which is expected to take place between 1970 and 1980.

18. The advantage of Bangladesh over India in producing raw jute is reflected in the projected export of raw jute to India. With world import demand projected to decline and with a large increase in domestic demand projected for India, it is assumed that Bangladesh will increase exports of jute goods. Most of the increment will probably be carpet-backing for the U.S. and perhaps other developed countries. It is further assumed that raw jute production in India will not increase as freer trade with Bangladesh would allow import of raw jute at lower cost than would be possible from increasing production of jute in India.

19. Although the quantity of exports of raw jute from Bangladesh is projected to increase by about 8 percent during the decade, and the quantity of manufactures by 19 percent, projected price declines suggest that export earnings may increase by smaller amounts. One factor operating against this trend is the expected increasing importance of carpet-backing in the mix of exported goods. Since carpet-backing earns about 50 percent more foreign exchange than sacking and 25 percent more foreign exchange than hessian, it is distinctly possible that Bangladesh may enjoy a reasonable increase in foreign exchange earnings, and that India may maintain foreign exchange earnings from jute. Since current output levels are only about one half of feasible capacity, it should be noted that projected increases in demand do not call for increased capacity, but rather for increased utilization of current capacity.

Conclusions

20. The mission is firmly convinced that the fundamental cause of the present precarious position of jute on the world market is the inadequate attention given to jute research over the past several decades. While major Western chemical companies spent tens of millions of dollars developing synthetic substitutes for jute, and foundations and aid donors spent large amounts on rice research, jute research, particularly in Bangladesh, was stagnant. Small wonder that today jute can compete neither with synthetics abroad nor rice at home. While the policies suggested in other parts of the report will help the competitive position of jute in the short- and medium-term, the mission is convinced that no improvement in the long-term competitive position of jute is possible without an innovative, vigorous, well-financed and well-staffed jute research program. The fact that at least three or four years are likely to pass before such a program could make a substantial impact is all the more reason for beginning the program immediately.

Table D: SUPPLY OF JUTE AND JUTE GOODS[/a], 1970

(Thousands of Metric Tons)

1970

| | JUTE | | | JUTE GOODS | | |
|---|---|---|---|---|---|---|
| | India | Bangladesh | World Total | India | Bangladesh | World Total |
| Production | 1,129 | 1,321 | 3,460 | 1,099 | 587 | 3,289 |
| Domestic Consumption[/b] | 1,155 | 658 | 2,522 | 514 | 21 | 2,230 |
| Exports | -26 | 625 | 908 | 549 | 566 | 1,147 |

1980

| | JUTE | | | JUTE GOODS | | |
|---|---|---|---|---|---|---|
| | India | Bangladesh | World Total[/c] | India | Bangladesh | World Total[/c] |
| Production | 1,125 | 1,400 | (3,850) | 1,248 | 685 | (3,590)<br>(3,770) |
| Domestic Consumption | 1,325 | 725 | 3,300 | 798 | 40 | (2,643)<br>(2,628) |
| Exports | -200 | 675 | (603)<br>(558) | 450 | 645 | ( 947)<br>(1,142) |

/a Jute goods production is normally less than raw jute production because: (i) village consumption is not counted; (ii) there is a wastage factor of 5-6 percent in manufacturing. In addition, changes in stock positions can cause discrepancies in any given year.

/b Includes stock adjustments.

/c Upper bracketed figure refers to Alternative I while lower bracketed figure refers to Alternative II (see Table C).

Source: for 1970 data FAO, IJMA, BJMA.

21. In the short run, there is much that can be done to improve jute's competitive position. Pricing and exchange rate policies need to be carefully reviewed, the manufacturing sector could implement programs to increase efficiency, and agricultural production could be improved by proper application of known techniques and inputs. The text of the report presents a detailed analysis of suggested reforms and the reasons why they are needed. There is every reason to believe that a vigorous attack on the problems now facing jute can yield improvements which will bring continued growth for the world jute market.

# THE WORLD JUTE ECONOMY

## VOLUME I: THE WORLD JUTE MARKET

### I. HISTORICAL BACKGROUND

1. Jute has been grown in Bengal and other regions for centuries. It is an annual plant which grows best in hot and damp climates, and which requires considerable inputs of labor for both cultivation and processing. Fiber is obtained from the inner bark of the plant by retting (steeping) the stems in water and then separating, by hand, fiber from bark. While over 30 species are known, only two, Corchorus capsularis (white jute) Corchorus olitorius (tossa jute) are widely grown.

2. In addition to jute proper, a number of similar fibers have become increasingly important in recent years. Of particular note are kenaf, most of which is grown in Thailand, and mesta, of which India is the most important producer. These fibers, which were not produced in any quantity until the early 1950's, now account for about 30 percent of the total production (by weight) of jute and allied fibers.

3. The traditional use for jute was for making sacks for agricultural and other commodities. Until the 1800's production was confined to cottage industries in India, and consumption of jute was generally limited to areas adjacent to the regions where it was grown. In 1793, a shipment of 100 tons was sent to Dundee for experimentation in an attempt to discover whether mechanized production of jute fabrics was possible. At that time, almost all sacks in Western Europe were made either of flax, a material with little strength, high costs, and an uncertain and highly variable source of supply (Russia), or of hemp, which was strong but could not be woven finely enough to make bags suitable for most purposes. The early experiments with jute met with failure, largely because the existing technology was not easily adaptable to jute production - jute fiber was too long, too rough, and too dry. After 40 years of experimentation, in 1833, methods were found to treat jute (by applying oil) so as to make it more suitable for processing. Commercially feasible modifications of flax-processing machinery were also evolved which enabled existing machines to process jute.

4. These events had important consequences in achieving commercial feasibility of large-scale production. An important stimulus on the demand side to jute production occurred in 1838 when the Dutch Government placed a large order for coffee bags to facilitate transport of coffee from the East Indies. The Crimean War of 1854-56 cut off Russia from world markets, and jute producers quickly capitalized on the ensuing shortage of flax and hemp. Supplies of jute to Dundee from India increased markedly. The British jute industry received another boost when the American Civil War greatly diminished supplies of cotton and created a tremendous shortage of cotton bags. The jute market expanded quickly in the following years as industrialization created the need for large quantities of packaging materials, and as railroads and shipping rapidly increased trade possibilities. The Franco-Prussian War of 1870-71 saw the use of large quantities of jute bags for transporting war materials, and the jute industry

grew rapidly in these two countries. During this time, jute manufacturers developed the technology to produce a finer cloth called Hessian, used for a wide variety of industrial packaging purposes.

5. Concurrently, with the rapid expansion of the Western European jute industry, the Indian cottage industry suffered a rapid decline. The costs of small-scale, handloom production were simply too high, even with very low labor costs, to allow competition with large-scale industry. However, European entrepreneurs were eager to take advantage of the supply of cheap labor offered by India, and in 1856 the first jute mill was established in Calcutta. By 1885, 24 mills were established in India, and considerable over-capacity had been created. The Indian Jute Manufacturers Association, established in 1884, had as its main purpose the regulation of output and, during the next 10 years, only 2 new mills were built. By the early 1900's, demand had increased sufficiently so that many new mills were built. In 1914, 64 mills were operating and production in India exceeded production in Dundee.

6. Jute production, which had grown steadily until 1914 to 1.5 million tons, stagnated during World War I. Two important markets, Germany and Austria, were closed and trade to the United Kingdom was limited. After the war, expansion of manufacturing capacity continued in India, while the Western European industry stagnated as a result of this increased competition. However, the depression of the 1930's severely hurt the jute trade as the demand for packaging materials declined concurrently with the decline in world trade.

7. World War II saw the first serious long-term difficulties developing for the jute trade. Demand was strong, but transport difficulties combined with coal shortages in India limited supplies. Consumption stood at 80 percent of pre-war levels. These difficulties accelerated the search for jute substitutes, and gave impetus to efforts to improve bulk-handling techniques. For the world, jute consumption in 1948 was 11 percent below 1936-38 level. This, despite the fact that manufacturing of all commodities, which should have been a good indicator of the demand for jute goods, had increased by about 40 percent.

8. The partition of India in 1948 had a major impact on the jute trade. Pre-partition India accounted for over 95 percent of world raw jute production (and most of raw jute exports), had 57 percent of the world jute loomage (and exported 85 percent of her production), and supplied almost 95 percent of world import of jute goods. After partition all 108 jute mills was located in India while 71 percent of the jute growing area, including the best lands, was in Pakistan. Most marketing and financial resources were in India, and it was necessary for Pakistan to greatly expand its marketing and financial capabilities.

9. Partition signalled an expansion of raw jute production in India to replace raw jute supplies from Pakistan and an increase in manufacturing capacity in Pakistan in order to increase export earnings by processing its

own raw fiber. In 1948-49, India launched a "grow-more jute" campaign which consisted, among other items, of (i) distribution of selected varieties of seeds of subsidized rates; (ii) distribution of fertilizers; (iii) establishment of seed multiplication farms; and (iv) demonstrations of line-sowing (which requires less labor and offers higher yields than traditional broadcast sowing). Pakistan's 6-Year Development Program (1951-57) drawn up in 1950 identified the jute manufacturing industry as one which would receive full support; the first mills were opened in 1954 and by 1958, 10 years after partition, Pakistan had more than 7,750 looms[1/], and processed about 1 million bales of raw jute or about 20 percent of output.

10. Partition and related events described above, while the crucial significance to the jute trade, was only one feature in an era of rapid change. A number of countries besides India and Pakistan began growing jute on a large scale, and a particularly large increase occurred in the production of allied fibers. Centrally planned countries emerged as important producers and consumers of jute. A new product, carpet-backing, was established which was to be an important component of world demand. And perhaps most significant, the shift continued in the location of the jute industry from developed to developing countries. These trends will be explored in the following chapters.

---

1/ Adamjee Jute Mills, completed in 1955, had 3,000 looms.

## II. WORLD DEMAND: STRUCTURE AND LIKELY TRENDS

### Overview

11. This chapter presents an analysis of demand trends during the last 10-20 years and projects future demand to 1980 by major geographical markets and end-uses. While quantitative techniques are employed to some extent, the nature of this exercise requires a considerable number of qualitative judgments.

12. The overall picture is not bright. Traditional markets for jute goods are in almost every case under considerable competition which has increased greatly in recent years and which is likely to increase further in the future. The analysis assumes that certain important steps will be taken by major producer countries. Specifically, it is assumed that prices can and will be lowered considerably for both raw fibers and for manufactures. If these assumptions are not met, the world market for jute will almost certainly decline considerably. The assumptions made in this chapter indicate growth rates through the 1970's of one-half to one percent per year. However, since much of the growth in consumption is predicted to occur in producing countries, world trade is predicted to decline by one and one-half to two and one-half percent per year through the 1970's - this, despite a predicted price decline of 15-20 percent in many markets. Tables 15 and 16 summarize this situation.

13. One important element is not taken into account in the projections - the possible impact of a serious research and development and marketing effort. At the present, jute producing countries in concert with other countries and various international organizations have undertaken to establish an international organization for research and development. It would be premature to anticipate any specific results from this effort. It is not premature to expect that in the absence of a successful effort, the 1970's will present a crisis for the world jute market.

### A. Recent Developments in World Demand - A Summary

14. Demand for jute [1/] expanded quite rapidly in the fifties and early sixties in all the major consuming areas. Since the mid-sixties, however, world consumption has somewhat stabilized at about 3.5 million metric tons, largely as a reflection of the stagnation in demand in developed countries. (See Table 1.) Two major, and largely interrelated, factors were responsible for this change in the trend: stepped-up competition from synthetic substitutes in all the major end markets (bags/sacks, industrial applications and carpet backing) and supply shortages which resulted in high and generally unstable prices for the raw fiber and the finished products.

---

1/ Throughout the chapter, the term jute is employed so as to include true jute, kenaf, mesta and allied fibers.

Table 1: ESTIMATED WORLD CONSUMPTION OF JUTE AND JUTE GOODS, BY MAJOR COUNTRIES AND AREAS, AVERAGE FOR 1961-63, 1964-66 AND 1967-69; AND 1970

(thousand metric tons)

| | Average 1961-62 | Average 1964-66 | Average 1967-69 | 1970 |
|---|---|---|---|---|
| A. Developed Countries | | | | |
| Western Europe | | | | |
| EEC | 298.3 | 302.3 | 329.0 | 315.7 |
| United Kingdom | 166.2 | 168.8 | 154.4 | 130.4 |
| Others /1 | 115.1 | 116.8 | 121.8 | 107.1 |
| Total | 579.6 | 587.9 | 605.2 | 553.2 |
| North America | | | | |
| United States | 431.4 | 492.9 | 464.0 | 439.6 |
| Canada | 43.0 | 47.3 | 54.6 | 49.4 |
| Total | 474.4 | 540.2 | 518.6 | 489.0 |
| Other Developed | | | | |
| Japan | 70.4 | 77.2 | 115.1 | 106.1 |
| Australia | 96.0 | 101.0 | 92.0 | 73.0 |
| South Africa | 77.5 | 71.0 | 65.0 | 62.0 |
| Others /2 | 32.9 | 34.0 | 33.3 | 30.6 |
| Total | 276.8 | 283.2 | 305.4 | 271.7 |
| Total Developed | 1,330.8 | 1,411.3 | 1,429.2 | 1,313.9 |
| B. Centrally Planned Countries | | | | |
| USSR | 73.0 | 118.5 | 106.7 | 126.4 |
| Eastern Europe | 80.5 | 98.3 | 91.9 | 89.3 |
| China, People's Republic of | 326.0 | 487.0 | 549.0 | 598.0 |
| Others /3 | 15.0 | 20.0 | 20.0 | 20.0 |
| Total Centrally Planned | 494.3 | 723.8 | 767.6 | 833.7 |
| C. Developing Countries | | | | |
| Asia | 658.0 | 787.0 | 776.0 | 835.0 |
| Africa /4 | 214.0 | 265.0 | 263.0 | 281.0 |
| Latin America | 225.0 | 240.0 | 207.0 | 196.0 |
| Total Developing | 1,097.0 | 1,292.0 | 1,246.0 | 1,312.0 |
| D. Total World (A + B + C) | 2,922.1 | 3,427.1 | 3,442.8 | 3,459.6 |

/1 Includes Greece, Turkey and Yugoslavia.

/2 Rhodesia, Israel and New Zealand.

/3 Centrally planned countries of Asia.

/4 Includes Near East.

Source: Appendix Tables 2 and 5;
and IBRD, Economic Analysis and Projections Department.

15. In developed countries in particular synthetic products rapidly penetrated all the major jute markets, introducing a new and very dynamic component into the competition process between jute and traditional substitutes (such as paper products and bulk handling techniques). The trend toward bulk handling, containerization and retail packaging, coupled to the impact of synthetic and other substitutes first halted the overall demand expansion and subsequently led to a decline in the utilization of jute.

16. Jute consumption expanded rapidly in developing countries from the mid-fifties to the mid-sixties. The growth of agricultural production and exports created a strong demand for jute in packaging. Competition from traditional substitutes (particularly bulk handling and paper) remained confined to Latin America, where the growth in demand for jute was far less strong than in Africa, Near East and Asia. Since the mid-sixties, however, utilization of jute continued to increase rapidly only in Asian producing countries, while near stagnation prevailed in Africa and the Near East, and Latin America registered a fall in jute consumption. Various factors exogenous to the jute market, such as foreign exchange shortages, trade disruptions because of war and political disturbances and declines in the rate of growth of exports of agricultural products, all contributed to the leveling off of jute demand in developing importing countries during the late sixties. Competition from other vegetable fibers, development of bulk handling techniques and synthetic substitutes, however, also played a role, particularly in Latin American countries where consumption of jute fell quite considerably.

17. Centrally planned countries continued to absorb increasing quantities of jute throughout the sixties, even though a certain leveling off of the expansionary trend became evident in the second part of the decade. The People's Republic of China provided the main dynamic element as jute utilization there was not affected by bulk handling or synthetic and other substitutes. In Eastern Europe and the USSR, on the contrary, signs of a considerable weakening of demand for jute packaging material became quite apparent from the mid-sixties onwards.

18. The events of 1970 and 1971 in the Subcontinent dealt a severe blow to jute and created a crisis situation from which the jute market is only now beginning to recover. Extreme scarcity of raw jute from Bangladesh and very high prices for whatever jute was available in the market caused users in Western Europe to shift quickly to readily available synthetic substitutes. Exports of jute manufactures from Bangladesh were also severely disrupted and the high prices for hessian and carpet backing cloth which prevailed in 1971 and 1972 presented synthetic cloth manufacturers in the United States and elsewhere with a golden opportunity to expand their production and sales to levels which were well beyond their best expectations only a few years ago. Available evidence clearly shows that jute suffered losses of considerable proportions during the past two years in all its major end-uses.

19. In the early sixties, the development of new uses and markets sustained the growth of world jute demand even when traditional outlets such as packaging began to shrink under the impact of technological and consumers' preference changes. The development of the carpet backing

market in the early sixties more than offset the losses suffered in packaging and other industrial applications in developed countries. Consumption of jute in felts, padding and wall coverings also expanded considerably and new markets were found in centrally planned and developing countries. Since the mid-sixties, however, the development of suitable synthetic substitutes gave users in consuming countries the choice between locally produced goods at prices stable in the short run and declining in the medium run, against imported products which were not always available and whose prices were unstable and trending upwards under the impact of supply shortages and increasing costs of production. A research and development effort of considerable proportions was undertaken by synthetics manufacturers in developed countries and progressive quality improvements made their products acceptable to consumers. Economies of scale in production allowed synthetics producers to sell at continuously lower prices. When the battle between jute and synthetic substitutes was truly joined at the beginning of the current decade, the events in the Subcontinent gave synthetic manufacturers another critical push. New massive investments in plants for the production of various types of synthetic substitues for jute are now in the making, and the strategy and expectations of synthetic producers have changed from one of penetration into jute end-markets to one of elimination of jute from the packaging and carpet backing scene in all the major geographical markets.

20. The ability of jute to survive as a viable product for consumers and as an important source of income and foreign exchange for producers depends on what will happen in the world markets during the next few years. Availability, prices and product improvements will determine the future of jute. The options available to the producing countries have shrunk considerably as the result of the most recent market developments and considerable efforts will have to be made to restore the credibility of the product, to maintain existing markets and to plan ahead for the development of new ones.

## B. The Structure of World Demand

### The Major Consuming Areas

21. The traditional importance of developed countries as the major consumers of jute products has steadily declined during the sixties. The share of developed countries in total world consumption of jute goods has dropped from 46 percent in 1961-63 to some 38 percent in 1970. Parallel to this fall in the relative importance of developed countries, centrally planned economies increased their share of total world jute utilization from 17 percent in 1961-63 to 24 percent in 1970. Developing countries on the whole maintained their share at some 38 percent of the total market throughout the decade. (See Table 2.)

22. Among the developed countries the United States represents the single most important market for jute followed by the EEC, the United Kingdom, Japan and Australia. Among the centrally planned countries, the People's Republic of China is by far the largest consumer of jute. Only India, within the developing countries group, has a domestic market for

Table 2: ESTIMATED WORLD CONSUMPTION OF JUTE AND JUTE GOODS BY MAJOR CONSUMING GROUPS AND END-USES 1961-63 (AVERAGE) AND 1964-66 (AVERAGE) AND 1970

(thousand metric tons)

| | 1961-63 average | % of total | 1964-66 average | % of total | 1970 | % of total |
|---|---|---|---|---|---|---|
| A. Developed Countries | 1,331 | (46) | 1,411 | (41) | 1,314 | (38) |
| B. Centrally Planned | 494 | (17) | 724 | (21) | 834 | (24) |
| C. Developing Countries | 1,097 | (37) | 1,292 | (38) | 1,312 | (38) |
| Total (A + B + C) | 2,922 | (100) | 3,427 | (100) | 3,460 | (100) |
| of which: | | | | | | |
| Packaging & Industrial | 2,450 | (84) | 2,780 | (81) | 2,590 | (75) |
| Carpet Yarn & Cloth | 205 | (7) | 300 | (9) | 420 | (12) |
| Cordage | 125 | (4) | 140 | (4) | 150 | (4) |
| Felts & Padding /1 | 30 | (1) | 45 | (1) | 75 | (2) |
| Others | 112 | (4) | 162 | (5) | 225 | (7) |
| | | (100) | | (100) | | (100) |

/1 In developed countries only.

Source: IBRD, Economic Analysis and Projections Department.

jute comparable in size to those of the two single largest consumers: the United States and the People's Republic of China.

23. India and the People's Republic of China, however, are largely self-sufficient in jute. This leaves the United States as the major importer of jute goods and Western Europe as the major outlet for raw jute exports.

The Major End-uses of Jute

24. Packaging is still by far the most important end-use of jute. Sacks and bags account for more than 75 percent of world jute demand. In developed countries, in spite of the recent sharp decline, jute sacks and bags still account for almost 50 percent of total consumption. Utilization of jute as a packaging material is absolutely predominant in both developing and centrally planned countries, where jute sacks and bags account for about 90 percent of their respective total consumption.

25. Carpet yarn and carpet backing cloth are the second most important outlet for jute. About 12 percent of all the jute consumed in the world goes into carpet production as backing and weaving material. This end-use, although much smaller than packaging in terms of quantity and almost exclusively localized in developed countries, 1/ is particularly important since carpet backing cloth has a high unit value and, unlike packaging, the carpet market has a considerable growth potential.

26. Cordage is an important outlet for jute in developing countries where twine and rope making absorbs about 10 percent of total jute consumption. On a world basis, cordage accounts for 4 percent of total jute utilization.

27. Felts and padding are relatively important jute end-uses in developed countries (particularly in the EEC), while their worldwide relevance as an outlet for jute is inferior to cordage (some 2 percent of total world jute consumption).

28. Other end-uses include wall covering, decorative fabrics, various industrial applications, jute mats and carpets. Their importance is relatively minor in both quantity and value terms.

C. The Major Markets for Jute: Current Situation and Prospects

The United States

Market Developments

29. The United States is the single largest market for jute in the developed countries. Unlike Western Europe and Japan, U.S. jute requirements are met almost exclusively by imports of semi-finished products

---

1/ Utilization of jute backing cloth and yarn for carpets accounts for about 30 percent of total consumption in developed countries.

Table 3: U.S. IMPORTS OF JUTE MANUFACTURES AND RAW JUTE, 1961-1971

(thousand metric tons)

| | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A. Jute Manufactures | | | | | | | | | | | |
| Jute Fabrics Less than 100" | 186.7 | 226.0 | 245.0 | 208.5 | 214.3 | 221.6 | 200.1 | 197.2 | 156.7 | 165.0 | 142.1 |
| Carpet Backing | 46.8 | 64.6 | 99.5 | 121.0 | 122.2 | 131.6 | 138.1 | 178.9 | 202.1 | 149.1 | 193.3 |
| Cotton Bale Covers /1 | 89.1 | 74.9 | 71.7 | 100.2 | 112.0 | 58.8 | 42.7 | 56.9 | 72.1 | 59.8 | 50.9 |
| Jute Webbing | 1.6 | 1.9 | 1.7 | 1.6 | 1.9 | 2.0 | 1.9 | 1.7 | 1.6 | 1.6 | 1.6 |
| Yarn, roving | 2.1 | 1.2 | 0.8 | 1.6 | 2.0 | 0.8 | 0.9 | 1.0 | 2.9 | 2.5 | 3.0 |
| Jute Cordage | 1.6 | 2.1 | 0.7 | 2.5 | 2.0 | 2.4 | 2.1 | 1.5 | 1.5 | 1.4 | 1.1 |
| Jute Bags (new) | 1.1 | 1.4 | 0.5 | 1.0 | 2.1 | 0.9 | 1.5 | 1.3 | 0.7 | 1.2 | 1.2 |
| Total | 329.0 | 372.1 | 419.9 | 436.4 | 456.5 | 418.1 | 387.3 | 438.5 | 437.6 | 380.6 | 393.2 |
| B. Raw Jute & Waste | | | | | | | | | | | |
| Jute Butts & Waste | n.a.s. | n.a.s. | 65.2 | 36.4 | 22.9 | 29.5 | 17.9 | 27.7 | 17.4 | 12.8 | 4.5 |
| Jute Fiber | n.a.s. | n.a.s. | 13.3 | 40.4 | 19.2 | 22.4 | 25.9 | 22.9 | 16.9 | 16.8 | 12.9 |
| Total | 22.5 | 79.1 | 78.5 | 76.8 | 42.1 | 51.9 | 43.8 | 50.6 | 34.3 | 29.6 | 17.4 |
| C. Total Imports of Jute & Manufactures (A + B) | 351.5 | 451.2 | 498.4 | 513.2 | 498.6 | 470.0 | 431.1 | 489.1 | 471.9 | 410.2 | 410.6 |

n.a.s. = not available separately.

/1 Converted at 0.9 kg./sq. yd.

Source: U.S. Department of Commerce, Bureau of the Census, Imports for Consumption (various issues).

(hessian, carpet backing cloth and cotton bagging). The importance of the local spinning and weaving industry is marginal: raw jute imports are small and have shown a definite tendency to decline over time. 1/ (See Table 3.)

30. Import demand for jute goods expanded rapidly from the mid-fifties to the mid-sixties, with India as the predominant supplier of various types of hessian cloth. Imports from Bangladesh became important only in the mid- and late-sixties. While technological innovations in transportation and handling of agricultural products, competition from paper in fertilizer and cement shipments and a shift in consumers' preference toward the prepackaging of groceries cut heavily into the market for jute packaging materials, utilization of wide fabrics by the rapidly expanding carpet industry helped to maintain the overall expansion of import demand for jute goods.

31. Since the mid-sixties, however, the expansion of the carpet backing market became insufficient to compensate for the sharp decline in jute cloth consumption in traditional uses. Cotton production declined considerably and so did utilization of jute cotton bale covers. The huge potential market for sand bags for Vietnam was lost to the synthetics industry which rapidly developed a productive capacity that was, after 1969, redirected toward the commercial market for packaging with ominous results for the use of jute in this outlet.

32. In the late sixties, moreover, competition from synthetic substitutes(mainly polyolefins film fabrics) became quite strong in carpet backing where suitable synthetic woven and non-woven fabrics were developed and marketed in considerable amounts at competitive prices. Polyolefins fabrics and polypropylene woven cloth in particular have become the major threat to jute in all the major end-markets.

The Major End-uses

33. The overall market for textile bags showed little expansion in the United States throughout the sixties. Technological innovations in handling and transportation limited its growth. It was only because of the Defense Department's needs for sand bags in 1966-68 that the total market did not actually fall in total size until 1969. Burlap utilization in bags remained practically stagnant until 1967 and fell rapidly thereafter. (See Table 4.) Cotton utilization in bag making declined consistently through the sixties and the early seventies, from 260 million square yards in 1960 to 93.5 million square yards in 1971. Polypropylene enjoyed a considerable boom during the Vietnam war peak (250 million square yards of cloth were sold in 1968), but the subsequent reduction in military activities and the shift to acrylic bags by the Defense Department caused sales of polypropylene cloth to decline to about 70 million square yards in 1970. Sales of polyethylene film bags also slowed down in the late sixties, and only multi-wall paper sack consumption remained fairly stable throughout the period.

---

1/ Jute butts and waste comprise about 50 percent of raw fiber imports. They are utilized in the felts/padding industry.

Table 4: U.S. TRENDS IN CONSUMPTION OF JUTE PRODUCTS BY MAIN END-USES, 1960-1971

(thousand metric tons)

| | Burlap in Bags | Piece Goods | Carpet Backing Yarn | Carpet Backing /1 | Cotton Bagging /2 | Cordage & Twine | Webbing & Narrow Fabrics | Others /3 | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1960 | 173.0 | 59.5 | 14.0 * | 36.0 | 61.0 | 8.7 | 1.6 | 39.0 | 392.8 |
| 1961 | 163.5 | 49.5 | 14.0 * | 40.0 | 72.0 | 8.9 | 1.6 | 39.5 | 389.0 |
| 1962 | 184.0 | 55.1 | 14.6 | 55.0 | 71.0 | 9.6 | 1.9 | 43.0 | 434.2 |
| 1963 | 186.5 | 63.3 | 13.7 | 68.0 | 73.0 | 11.0 | 1.7 | 46.0 | 463.2 |
| 1964 | 175.0 | 63.6 | 13.2 | 82.0 | 80.0 | 11.5 | 1.6 | 51.5 | 478.4 |
| 1965 | 166.0 | 67.3 | 11.9 | 102.0 | 79.0 | 12.9 | 1.9 | 53.0 | 494.0 |
| 1966 | 176.5 | 68.7 | 10.5 | 118.0 | 47.0 | 13.8 | 2.0 | 52.5 | 489.0 |
| 1967 | 165.0 | 59.5 | 8.8 | 130.0 | 34.0 | 14.0 | 1.9 | 45.5 | 458.7 |
| 1968 | 152.0 | 63.7 | 7.8 | 143.0 | 42.7 | 11.0 | 1.7 | 46.5 | 468.4 |
| 1969 | 130.0 | 57.7 | 7.7 | 150.0 | 54.1 | 9.5 | 1.6 | 45.0 | 455.6 |
| 1970 | 122.0 | 43.6 | 6.8 | 149.0 | 47.3 | 6.5 | 1.6 | 30.0 | 406.8 |
| 1971 | 98.0 | 38.6 | 6.5 | 168.0 | 38.2 | 5.0 | 1.6 | 30.5 | 386.4 |

/1 In tufted broadloom carpets only.

/2 Imports since 1968.

/3 Mainly felts and padding and other industrial uses (partly estimated).

* Estimated.

Source: Textile Bags Manufacturers Association; Carpet and Rug Institute; Carpet Backing Council; U.S. Department of Commerce, Bureau of the Census, Imports for Consumption (various issues); and U.S. Tariff Commission, TC Publications 267, 285, 311, 346 and 366.

34. The war-based introduction of a large productive capacity for synthetic textile bags considerably sharpened competition in this market. Polypropylene fabric producers in particular became concerned after 1968 with finding an outlet for their product and entered the commercial packaging market in full strength. Burlap and cotton consumption in bags fell drastically in 1969, 1970 and 1971 (Table 4), while sales of polypropylene bags increased from 70 million square yards in 1970 to about 100 million square yards in 1971 and to an estimated 150 million square yards in 1972.

35. Repeated disruptions of burlap deliveries to the United States and steadily rising prices since 1968 reduced considerably the attractiveness and competitiveness of jute sacks and bags. While burlap prices trended upwards and reach a post-Korean war peak in 1972, polypropylene cloth bag prices fell considerably and the differential between polypropylene fabrics and standard 10 oz. hessian turned heavily against the latter. Polypropylene cloth prices moved slightly upwards in 1971 and 1972 under the pull of demand, but the price differential between 10 oz. burlap and polypropylene replacements widened further. Table 5 illustrates this point.

36. Jute remained relatively more competitive only in lighter constructions where 7½ oz. hessian is utilized. This is because lighter jute fabrics requiring less jute per yard are less costly to produce than heavier jute fabrics, while synthetic replacements for different weight jute products are of more nearly the same weight, and hence, have a smaller cost differential. Woven polypropylene replacements for 7½ oz. hessian are now priced at about 12 cents per square yard against 14 cents per square yard for 7½ oz. jute, a smaller differential than for 10 oz. hessian. This explains the greater competitiveness of jute sacks in the potato market - for which 7½ oz. hessian is used - which absorbs roughly 40 percent of all the burlap cut up for bags in the United States.

37. The relative prices of jute and polypropylene fabrics largely determine the market split between the two competing materials. Raw material (fabric) costs account for roughly 75 percent of the manufacturing cost of both jute and polypropylene bags. Any change in fabric costs is directly reflected in the selling prices of the two types of bags. Consumption of burlap in bags has become, since the entry of synthetic bags into the commercial market in 1969, highly dependent on the relative prices of jute and polypropylene bags. 1/

---

1/ 1969-72 (quarterly data):

$$\log C_b = 4.803 - \underset{(0.172)}{2.17^{*}} \log (P_{jb}/P_{sb}) \qquad R^2 = .63$$

* significant at the 95 percent level,

where $C$ = consumption of burlap in bags;
$P_{jb}$ = retail price of jute potato bags; and
$P_{sb}$ = retail price of corresponding polypropylene potato bags.

Table 5: U.S. MARKET PRICES OF HESSIAN AND POLYPROPYLENE CLOTH FOR BAGS

(cents/square yard)

| | Hessian 40" - 10 oz. (spot New York) | Polypropylene Cloth Replacement (delivered) |
|---|---|---|
| 1966 | 15.6 | n.a. |
| 1967 | 14.1 | 20.0 |
| 1968 | 13.8 | 16.0 |
| 1969 | 15.2 | 14.5 |
| 1970 | 15.5 | 13.0 |
| 1971 | 18.1 | 13.5 |
| 1972 | 22.1 | 14.0 |

Source: Fiber Market News; and interview data.

38. Given the total size of the market, future consumption of burlap in bags will depend on the competitiveness of imported fabrics vis-a-vis locally produced polypropylene cloth. During the seventies the total market for textile bags is likely to shrink further under the impact of higher labor costs for bag handling and increased processing of agricultural commodities. A drop of 5-10 percent in the total size of the textile bag market is generally expected by the end of the decade. Production cost of polypropylene cloth is currently estimated at 2-3 cents per square yard below the actual selling price. Raw material (polypropylene resin) cost makes up about 25 percent of the total manufacturing cost. In the medium run polypropylene resin prices are expected to firm up, but current profit levels suggest that polypropylene cloth manufacturers will probably be able to reduce their prices by about 10 percent from current levels and maintain reasonable margins. Indian jute cloth prices could be reduced by 1.6 cent per square yard in the 7½ oz. grade and by 2.1 cents per square yard in the 10 oz. grade by eliminating the 600 Rs. per ton export duty which is now levied on them. This measure would make 7½ oz. hessian completely competitive with replacement polypropylene cloth and narrow the differential between 10 oz. hessian and replacement polypropylene cloth from the current 8 cents per square yard to 6 cents per square yard. A further price reduction of some 20 percent would be needed to make 10 oz. hessian competitive with polypropylene cloth under present circumstances.

39. Adjustments of the selling prices of hessian cloth would have to be made in the future to maintain the competitiveness of jute cloth in the U.S. bag market, should polypropylene cloth prices be lowered from the recent level. Asian jute hessian exporters have a reasonable possibility of keeping 7½ oz. burlap cloth competitive under most foreseeable circumstances. The market situation is more unfavorable for 10 oz. burlap, where a price cut of some 20 percent (after abolition of the export duty) would be necessary to redress the present imbalance.

40. Assuming that prices of hessian cloth in the United States remain reasonably competitive with polypropylene cloth prices throughout the seventies, jute can be expected to retain most of its current market for potatoes and seeds to minimize its losses in the commercial feeds market. By 1980, the total market for jute bags can be forecast at some 310 to 330 million square yards (75 to 80 thousand metric tons).

Carpet Backing

41. The phenomenal growth of the carpet market in the United States created a strong demand for jute backing cloth and consumption increased rapidly in the sixties. (See Table 3.) Jute is used in all three main areas of carpet backing: (a) primary backing for tufted and needlepunch carpets; (b) secondary backing for tufted carpets; and (c) backing for woven carpets. Tufted carpets are by far the preferred type in the United States and account for almost 90 percent of total carpet production. All tufted carpets required a primary backing, and jute enjoyed a preeminent position in this market until 1968. (See Table 6.) Needlepunch carpets are mostly

Table 6: TUFTED CARPET BACKINGS CONSUMPTION IN THE UNITED STATES

(million square yards)

| Year | Primary Backings | | | | | | | | Secondary Backings | | | | | | | | | | All Tufted Carpet Backings | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jute | % of total | Synthetics | % of total | Other Backings /1 | % of total | Total | % of total | Jute | % of total | Foam/ Rubber | % of total | Other Cushion Backings /2 | % of total | Other Backings /3 | % of total | Total | % of total | Jute | % of total | Others | % of total | Total | % of total |
| 1967 | 295 | (89) | 22 | (7) | 13* | (4) | 330 | (100) | n.a. | ( ) | n.a. | ( ) | n.a. | ( ) | n.a. | ( ) | n.a. | ( ) | n.a. | ( ) | n.a. | ( ) | n.a. | ( ) |
| 1968 | 315 | (81) | 62 | (16) | 13 | (3) | 390 | (100) | 247 | (71) | 56 | (16) | 9 | (3) | 36 | (10) | 348 | (100) | 562 | (76) | 176 | (24) | 738 | (100) |
| 1969 | 314 | (67) | 136 | (29) | 17 | (4) | 467 | (100) | 318 | (76) | 68 | (16) | 4 | (1) | 28 | (7) | 418 | (100) | 632 | (71) | 253 | (29) | 885 | (100) |
| 1970 | 321 | (61) | 186 | (36) | 15 | (3) | 522 | (100) | 296 | (64) | 123 | (27) | 14 | (3) | 29 | (6) | 462 | (100) | 617 | (63) | 367 | (37) | 984 | (100) |
| 1971 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1st quarter | 74 | (59) | 42 | (34) | 9 | (7) | 125 | (100) | 76 | (65) | 32 | (28) | 3 | (3) | 5 | (4) | 116 | (100) | 150 | (62) | 91 | (38) | 241 | (100) |
| 2nd quarter | 84 | (61) | 49 | (36) | 4 | (3) | 137 | (100) | 85 | (66) | 34 | (26) | 3 | (2) | 8 | (6) | 130 | (100) | 169 | (63) | 98 | (37) | 267 | (100) |
| 3rd quarter | 86 | (59) | 55 | (38) | 4 | (3) | 145 | (100) | 89 | (65) | 36 | (26) | 4 | (3) | 7 | (6) | 136 | (100) | 175 | (62) | 106 | (38) | 281 | (100) |
| 4th quarter | 87 | (58) | 59 | (39) | 4 | (3) | 150 | (100) | 95 | (66) | 38 | (26) | 4 | (3) | 7 | (5) | 144 | (100) | 182 | (62) | 112 | (38) | 294 | (100) |
| Total | 331 | (59) | 205 | (37) | 21 | (4) | 557 | (100) | 345 | (65) | 140 | (27) | 14 | (3) | 27 | (5) | 526 | (100) | 676 | (62) | 407 | (38) | 1,083 | (100) |
| 1972 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1st quarter | 78 | (48) | 82 | (50) | 4 | (2) | 164 | (100) | 94 | (63) | 45 | (30) | 4 | (3) | 6 | (4) | 149 | (100) | 172 | (55) | 141 | (45) | 313 | (100) |
| 2nd quarter | 82 | (47) | 88 | (51) | 4 | (2) | 174 | (100) | 101 | (62) | 46 | (29) | 6 | (4) | 9 | (5) | 162 | (100) | 183 | (54) | 153 | (46) | 336 | (100) |
| 3rd quarter | 83 | (48) | 87 | (51) | 2 | (1) | 172 | (100) | 102 | (63) | 45 | (28) | 7 | (4) | 8 | (5) | 163 | (100) | 185 | (55) | 149 | (45) | 334 | (100) |

* Estimate.

/1 Mainly cotton.

/2 Vinyl, polyurethane, etc.

/3 Scrim, non-woven, solid vinyl, etc.

Source: U.S. Department of Commerce, Bureau of the Census, Current Industrial Reports, Series MQ-22 Q(71)-5.

indoor-outdoor carpets and require an all-synthetic backing. Secondary backing is another large use for jute cloth since about 90 percent of all tufted carpets have a secondary backing. Jute maintained a predominant position in this market until 1969. The primary and secondary backing markets for tufted carpets presently absorb about the same yardage of jute cloth, although in terms of weight the primary is more importance since a heavier jute cloth is used as backing (9 oz. as opposed to 7 oz. in the secondary). Woven carpets are a relatively small market for jute in the United States since they only represent 3.5 percent of total carpet production.

42. The carpet-backing market, with its vast size and extremely favorable growth potential, quickly attracted the attention of synthetic fabric manufacturers. Synthetic backing first appeared in the United States in 1964 and a variety of woven and non-woven fabrics has been developed since. The two most important types of primary backing which compete with jute are woven and spun-bonded polypropylene. Of the two, woven polypropylene backing constitutes the most serious threat to jute. 1/ In the secondary backing market jute has so far had to compete with foam rubber and non-woven scrims. A new type of polypropylene woven secondary backing, however, has just begun to be marketed in early 1973 by the leading polypropylene primary backing manufacturer in the United States.

43. Tufted carpet backing production in the United States more than trebled during the sixties. Jute captured most of the growth of this market until the mid-sixties. Since then the share of jute in both the primary and secondary back markets began to slip under the impact of increased competition from polypropylene and other synthetic substitutes. Official statistics of the carpet market became available in 1967, and it is therefore possible to trace with relative precision the path of competition between jute and synthetic backings.

44. In the primary backing market, the decline in the market share of jute was quite rapid from 1967 to 1970, slower in 1971, but exceptionally strong in 1972. (See Table 6.) During this period, while deliveries of jute backing became more uncertain and prices trended upwards, in the face of a rapidly expanding demand, larger quantities of polypropylene backing cloth became available at lower and stable prices. Table 7 illustrates this point.

---

1/ Woven polypropylene backing is cheaper than spun-bonded backing. It also directly competes with jute backing in all those carpet applications where a woven backing is sufficient. Spun-bonded and other non-woven backings are utilized for fine-gauge tufting where they have the advantage of creating no needle deflection and of requiring less needle pressure.

Table 7: U.S. MARKET PRICES OF JUTE AND POLYPROPYLENE PRIMARY BACKING, 1966-1972

(cents per square yard)

| | Average selling prices of jute primary backing | Average selling prices of PP primary backing |
|---|---|---|
| 1966 | 21.75 | 22 |
| 1967 | 20.50 | 19 |
| 1968 | 20.00 | 18 |
| 1969 | 22.25 | 18 |
| 1970 | 18.75 | 17 |
| 1971 | 19.50 | 16 |
| 1972 | 23.25 | 18 |

Source: Trade sources.

45. The market share of jute primary carpet backing depends to a great extent on relative prices of jute and synthetic backing. 1/ As relative prices moved against jute backing throughout most of the late sixties and sharply in 1972, jute's market share dropped accordingly from 89 percent in 1966 to an estimated 47 percent in 1972. Jute backing also suffered from lack of product development. Recent trends within the carpet industry were detrimental to jute backing because of its poor adaptability to the changing needs of the industry. The trend toward indoor-outdoor carpets considerably favored synthetic backing, since jute backing is not rot-proof. This very basic deficiency prevented utilization of jute backing for kitchen carpets. Do-it-yourself installation also grew and synthetic backing was also heavily favored because it is easier to cut than jute. Finally, the tufted carpet industry trended toward fine-gauge tufting. Here again, jute backing was put at a comparative disadvantage, since the density of the jute fabric and its irregular yarn strength cause needle deflection. Although woven polypropylene backing also tended to cause needle defelction in fine-gauge tufting, the product was continuously improved while the quality and performance of jute backing remained unchanged. 2/ Similarly no effective efforts were made to make jute backing rot-resistant.

46. In the secondary backing market jute was better able to withstand inroads from synthetic substitutes because of its lower price relative to that of foam rubber and non-woven synthetic backing and because a woven synthetic secondary backing having the same performance as jute was difficult to develop. (See Table 5.) Jute secondary backing is currently sold in the United States at 16.5 cents per square yard. The lower weight of the secondary backing cloth (7 oz. as opposed to 9 oz. generally used as primary) makes it cheaper on a per yard basis. Foam rubber is considerably more expensive than jute, but it allows savings on installation costs. Synthetic non-woven secondary backing materials (such as Loktuft Duon of Phillips) are currently selling at about 18.5 cents per square yard. It should be noted, however, that in early 1971 Loktuft Duon was selling at

---

1/ 1966-1972 (annual)

$$\log (J_{cb}/T_{cb}) = \underset{(0.059)}{-0.0222} - 2.3128^{*} \log (P_{jcb}/P_{scb}) \qquad R^2 = 0.75$$

* significant at the 95 percent level,

where: $J_{cb}$ = jute primary carpet backing consumption;
$T_{cb}$ = total primary carpet backing consumption;
$P_{jcb}$ = average selling price of jute primary backing; and
$P_{scb}$ = average selling price of polypropylene primary backing.

2/ Some efforts have been made to treat jute carpet backing so as to allow its use in the fine-gauge tufted carpet market. A technically feasible process has already been developed from research sponsored by the Carpet Backing Council, and commercial feasibility is now being tested.

21 cents per square yard when jute secondary backing was quoted at about 19 cents per square yard. Non-woven backing producers have followed the downward trend in jute backing prices and maintained the same price differential between the two types of products. Production of non-woven backing materials is still relatively small in scale and it can be expected that prices will be further reduced as new capacity comes on stream. 1/ It is estimated, for example, that Loktuft Duon prices could come down to 16-17 cents per square yard in the very near future without any loss of profitability to the producers.

47. The position of jute in the primary backing market is in grave danger. Jute is running the risk of becoming in a few years a residual supplier in this market. The losses suffered in 1972 would have no doubt been greater had not polypropylene backing cloth been in tight supply. All the major manufacturers worked at near full capacity and still could not meet all the forthcoming demand. It is generally estimated that another 60 million square yards of polypropylene primary backing cloth could have been sold in 1972. Customers had to be put on allocation and other types of synthetic backing (such as spun-bonded Typar of Dupont) were both at a premium over polypropylene woven cloth.

48. With a market demand for tufted carpets growing very fast and productive capacity fully utilized, polypropylene cloth manufacturers are now in the process of finding ways and means to further expand the scale of their operation. The main difficulty that they are now facing is shortage of looms. 2/ This time delay in the implementation of expansion plans may give jute carpet backing exporters the last chance of maintaining a position of relative strength in this market. Polypropylene primary backing cloth can hardly be outsold. The cost of producing a square yard of polypropylene woven backing is estimated at about 13.5 cents. The product can be marketed at a price of 15 cents per square yard and still give a very comfortable return to the manufacturers. The point, however, is that large investments are now being considered by polypropylene cloth producers and by non-woven synthetic manufacturers. If jute backing cloth

---

1/ Phillips is reported to have sold in 1972 about 70 million square yards of non-woven secondary backing.

2/ Sulzer looms are used to weave polypropylene carpet backing cloth. Demand for this type of loom has been so strong over the past two years that it has outstripped the productive capacity of the manufacturers. A delivery lag of from one to two years is said to be now posted by the manufacturers.

prices were brought and kept down to, say, 17-17.5 cents per square yard, synthetic manufacturers, confronted with the prospects of an increase in the price of polypropylene resin and tougher competition from jute, would probably revise some of their expansion plans and settle for sharing with jute some of this rapidly growing market. This strategy of containment is probably the only feasible one for jute cloth exporters under the circumstances. The urgency for action is, however, great. Similar steps taken a year from now could not achieve the same results.

49. Abolition by the Indian Government of the residual 300 Rs. per ton export duty on 9 oz. backing would automatically decrease prices to 18.8 cents per square yard. A further price reduction of 5-6 percent would, however, still be necessary to achieve a minimum of competitiveness with synthetics. The removal of the 700 Rs. per ton export duty on 8 oz. cloth, which is becoming increasingly acceptable as a primary backing in the United States, would bring its price down to 17.5 cents per square yard and considerably reinforce the position of jute in the primary backing market.

50. As for secondary backing a reduction or preferably complete removal of the 700 Rs. per ton export duty would assure the competitiveness of 7 oz. cloth and act as a powerful deterrent against further inroads from synthetic substitutes. It is of vital importance to the future of jute in the United States that what happened in the primary backing market not be repeated in the only end-market where jute's position is still fairly strong. The very recent attempts by a major U.S. manufacturer to market a woven polypropylene secondary backing cloth should be taken into very serious consideration by all the interested parties as a sign of the intentions and plans of polypropylene fabrics producers.

51. The tufted carpet backing market in the United States is projected to continue to grow rapidly throughout the seventies. Consumption of carpets is very income elastic. 1/ On the basis of income and population forecasts for the seventies, even when allowance is made for a possible future

---

1/ 1955-1971 (annual)

$$\log C_c = -11.728 + 4.236^{*} \log Y_d$$

$$(0.176) \qquad R^2 = .97$$

* significant at the 99 percent level,

where: $C_c$ = total carpet shipments (here taken as equal to consumption)
and $Y_d$ = disposable personal income (in constant dollars).

decline over time of the coefficient of elasticity, 1/ it seems reasonable to project a market of 1,400 million square yards by 1980. (See Appendix Table 1.) Consumption of tufted broadloom carpets would grow slightly faster than total carpet consumption and reach, by 1980, 1,250 million square yards.

52. Assuming that jute primary carpet backing prices were brought down and maintained during the seventies at competitive level with synthetics, utilization of jute primary backing material could grow at some 1.4 to 2.0 percent per annum and jute could retain a 30-32 percent share of the total market.

53. Provided that jute secondary backing remains competitive with foam rubber, non-woven and possibly newly woven polypropylene fabrics, jute secondary backing consumption can be expected to grow at between 5.0 to 6.0 percent per annum throughout the current decade and maintain a 50 to 55 percent share of the total secondary backing market. 2/ Total utilization of jute in tufted carpet backing (including narrow width tufted carpets) is forecast to be, by 1980, between 240 and 255 thousand metric tons.

Other End-uses

54. Consumption of cotton bale covers is forecast to decline slightly from 1970-71 levels, given the fact that cotton production is very likely to remain around 10-11 million bales throughout the seventies and some inroads by polypropylene cloth can be expected into this market. Consumption of piece goods, 3/ cordage and other industrial items is projected to decline to some 3,000 metric tons by 1980. Utilization of backing yarn for woven carpets is expected to remain stationary through the seventies and felt and padding uses are expected to continue to absorb 15-20 thousand metric tons of jute waste and cuttings. Total consumption of jute and jute goods in the United States is forecast to be, by 1980, between 405 and 435 thousand metric tons. (Table 8 summarizes the projections.)

---

1/ Income elasticity of demand for carpets has been historically declining. Projections were therefore made using a semi-log function. Several alternative projections were examined and the function which was used for projection purposes is one which relates per capita consumption of carpets to real per capita disposable income. Consumption of tufted broadloom carpets was (a) projected separately; and (b) taken as a residual after projecting the market share of woven carpets. All projections converged within a fairly narrow range.

2/ It is generally assumed that 90 to 95 percent of tufted carpet produced in the United States during the decade will have a secondary backing.

3/ Excluding carpet backing for narrow carpets.

Table 8: UNITED STATES CONSUMPTION OF JUTE AND JUTE GOODS, 1971 (ACTUAL) AND 1980 (PROJECTED)

(thousand metric tons)

| | Actual | | Projected | | | | Implied Growth Rate | |
|---|---|---|---|---|---|---|---|---|
| | 1971 | % of Total | 1980 I | % of Total | 1980 II | % of Total | 1971 1980 I | 1971- 1980 II |
| Bags | 98.0 | 25 | 75.0 | 19 | 80.0 | 18 | -2.9 | -2.2 |
| Piece goods /1 | 21.5 | 6 | 17.0 | 4 | 18.0 | 4 | -2.5 | -2.0 |
| Cotton bagging | 38.0 | 10 | 38.0 | 9 | 41.0 | 9 | 0.0 | +0.8 |
| Carpet backing (broad) | 168.0 | 43 | 222.0 | 55 | 239.0 | 55 | +3.2 | +4.0 |
| of which: | | | | | | | | |
| primary | (94.0) | (24) | (107.0) | (27) | (112.0) | (26) | (+1.4) | (+2.0) |
| secondary | (74.0) | (19) | (115.0) | (28) | (127.0) | (29) | (+5.0) | (+6.2) |
| Carpet backing (narrow) | 17.0 | 4 | 18.0 | 4 | 18.0 | 4 | 0.0 | 0.0 |
| Carpet backing yarn | 6.5 | 2 | 6.5 | 2 | 6.5 | 2 | 0.0 | 0.0 |
| Others | 37.5 | 10 | 28.5 | 7 | 32.5 | 8 | -3.0 | -1.6 |
| Total | 386.5 | 100 | 405.0 | 100 | 435.0 | 100 | +0.5 | +1.3 |

/1 Excluding carpet backing cloth for narrow carpets.

Source: Table 4 (actual);
IBRD, Economic Analysis and Projections Department (projections).

Western Europe

Market developments

55. Western Europe represents another major market for jute and jute goods (16-17 percent of total world consumption). The local spinning and weaving industry traditionally absorbed more than 50 percent of world jute exports. Difficulties, however, arose during the sixties when rising processing costs and raw material prices greatly diminished the ability of the local industry to hold its own against various types of synthetic and other substitutes. Utilization of raw jute stagnated in the mid-sixties and subsequently declined. (See Table 9.) Net imports of jute manufactures during the sixties increased only in EEC countries, while they remained fairly stagnant in the United Kingdom and actually declined in the rest of Western Europe. (See Appendix Table 2.) On the whole, consumption of jute and jute goods expanded moderately from 1961-63 to 1967-69 but subsequently declined quite sharply, following roughly the same path as domestic production of jute goods.

56. Synthetics competition started somewhat later in Western Europe than in the United States and, with the exception of the United Kingdom, did not become a major factor until 1969-70. Relatively higher prices for polypropylene and polyethylene resins and the presence of a long-established and highly protected local jute industry all contributed to the slow start of synthetics competition in most Western European countries. Since the late sixties, however, polyolefins fabrics have made strong inroads in all the major jute end-uses, except carpet yarn, and the position of jute has become quite critical. Consumption of jute declined by about 10 percent between 1968 and 1970 and apparently by more than 15 percent in 1971. (See Table 9.) Consumption of textile polyolefins increased correspondingly from 32,700 tons in 1970 to 50,500 tons in 1971 and 63,200 tons in 1972. (See Appendix Table 3.)

57. Paradoxically, one of the most important causes of the slow and late start of synthetics competition in Western Europe - the high degree of protection enjoyed by the local industry - has become a serious obstacle to any effective competition between jute and synthetic substitutes. This is not to say that the decline of jute consumption in Western Europe was only due to the unwillingness or inability of the local jute industry to compete with synthetics. Technological innovations and shifts in consumer preferences (i.e., bulk handling of agricultural commodities and a trend toward retail packaging of groceries) became an important factor working against jute in Western Europe as well as in the United States and in most of the developed countries, cutting down considerably the size of the market for textile packaging materials which jute had to share with synthetic and other substitutes. When competition between jute and synthetics developed into a major factor, tariffs and quantitative restrictions on imports of goods from jute producing countries effectively precluded the consumers in Western Europe from the opportunity of purchasing jute goods at world prices and provided an umbrella under which, in recent years, the domestic

Table 9: WESTERN EUROPE: ESTIMATED UTILIZATION OF JUTE GOODS BY MAIN END-USES AND CONSUMING AREAS, 1965, 1968, 1970 & 1971

(thousand metric tons)

| | 1965 | (% of Total) | 1968 | (% of Total) | 1970 | (% of Total) | 1971 |
|---|---|---|---|---|---|---|---|
| A. Bags and Sacks | | | | | | | |
| EEC | 111.0 | | 101.0 | | 76.0 | | 51.5 |
| United Kingdom | 37.0 | | 29.5 | | 20.0 | | 15.9 |
| Others | 81.0 | | 75.5 | | 62.5 | | n.a. |
| Total | 229.0 | ( 39) | 206.0 | ( 33) | 158.5 | ( 28) | n.a. |
| B. Industrial and Other Cloth Applications | | | | | | | |
| EEC | 57.5 | | 55.5 | | 47.5 | | 46.0 |
| United Kingdom | 51.0 | | 42.0 | | 37.5 | | 32.8 |
| Others | 14.5 | | 16.0 | | 14.0 | | n.a. |
| Total | 123.0 | ( 21) | 113.5 | ( 19) | 99.0 | ( 18) | n.a. |
| C. Carpet Backing Cloth /1 | | | | | | | |
| EEC | 15.5 | | 35.5 | | 56.0 | | 46.5 |
| United Kingdom | 23.5 | | 32.2 | | 22.5 | | 17.8 |
| Others | 6.5 | | 9.5 | | 13.0 | | n.a. |
| Total | 45.5 | ( 8) | 77.2 | ( 12) | 91.5 | ( 16) | n.a. |
| D. Carpet Yarn | | | | | | | |
| EEC | 59.5 | | 57.0 | | 56.5 | | 47.0 |
| United Kingdom | 48.5 | | 45.8 | | 43.0 | | 41.3 |
| Others | 8.5 | | 10.5 | | 11.5 | | n.a. |
| Total | 116.5 | ( 20) | 116.0 | ( 19) | 111.0 | ( 20) | n.a. |
| E. Cordage and Cable | | | | | | | |
| EEC | 27.0 | | 24.0 | | 22.5 | | 17.0 |
| United Kingdom | 9.0 | | 7.3 | | 5.5 | | 4.9 |
| Others | 4.5 | | 4.5 | | 4.0 | | n.a. |
| Total | 40.5 | ( 7) | 35.8 | ( 6) | 32.0 | ( 6) | n.a. |
| F. Felts | | | | | | | |
| EEC | 30.0 | | 63.0 | | 60.0 | | 50.0 |
| United Kingdom | - | | - | | - | | - |
| Others | 3.0 | | 4.0 | | 6.0 | | n.a. |
| Total | 33.0 | ( 5) | 67.0 | ( 11) | 66.0 | ( 12) | n.a. |
| G. Total Utilization (A + B + C + D + E + F) | 587.5 | (100) | 615.5 | (100) | 558.0 | (100) | n.a. |

/1 All carpets.

Source: IBRD, Economic Analysis and Projections Department.

industries of many European countries could carry out a comfortable transition from jute to the manufactures of synthetic substitutes.

Tariffs and Quantitative Restrictions on Jute Goods Trade

58. EEC countries have the highest rate of nominal and effective protection against jute manufactures imports from all sources within Western Europe. (See Appendix Table 4.) U.K. tariffs, on the contrary, are not applicable to imports from Commonwealth countries. Imports of jute goods from India and Bangladesh were therefore not affected. The structure of protection against jute goods, however, is complicated in both the EEC and the United Kingdom by severe quantitative restrictions for non-standard or specialty products (carpet backing cloth, carpet yarn, light weight scrims, etc.). (See Table 10.)

59. The price-raising effect of the protection granted to the jute industry in Western Europe placed jute at a severe comparative disadvantage vis-a-vis synthetic substitutes.

The Major End-uses

60. Sacks and bags are still a relatively important, although declining, outlet for jute. (See Table 9.) Synthetics penetration of this market advanced more rapidly in the United Kingdom than in other Western European countries. Trade estimates indicate that in the United Kingdom consumption of polyolefins sacks increased from 1.3 thousand tons in 1968 to some 3.1 thousand tons in 1970 and 3.6 thousand tons in 1971. Jute's market share declined from 87 percent in 1968 to 65 percent in 1971. In EEC countries only the bag export market (i.e., the market in which duties on imported fabrics and bags are withdrawn when the bag is used for the export of products) has been largely immune to synthetics competition. Imports of new bags from India, Bangladesh and other Asian countries for this market have considerably increased over time. Apart from the duty rebate, the fact that bags are mostly utilized for exports to developing countries (mainly Africa), where importers still prefer jute bags because of their reuse value, also played a positive role. No precise information exists on utilization of polyolefins in packaging material for the EEC as a whole. Trade estimates, however, indicate that the market share of jute has declined considerably from some 95 percent in 1969 to about 65 percent in 1971. A study of the European packaging market conducted by a major U.S. manufacturer of polypropylene fabric indicates that for Western Europe as a whole, the market share of synthetics increased from 12 percent in 1968 to 33 percent in 1970 and 40 percent in 1971.

61. Jute has suffered in Europe from severe price competition from lower cost, woven polypropylene cloth and bags. In the United Kingdom, for example, woven synthetic replacement for 10 oz. hessian is currently available at 5.25 pence per square yard. 1/ Indian 10 oz. hessian is

---

1/ Considerably lower prices - around 4 pence per square yard - are quoted for Portuguese polypropylene cloth.

Table 10: EEC AND U.K. IMPORT QUOTAS ON JUTE MANUFACTURES

(tons)

| | | 1972 | |
|---|---|---|---|
| | | Bangladesh | India |
| EEC /1 | | | |
| Category 4. | Jute cloth of any weight) 150 to 230 cm in width) | 1,255 | 6,250 |
| Category 5. | Jute cloth of any weight) over 230 cm in width ) | | |
| Category 6. | Jute yarn | 3,400 | (no quotas) |
| U.K. | | | |
| BTN 57.10 | Fabrics up to 99" wide | | 13,700,000 sq. yds. |
| | Fabrics of 100" wide and over | | 3,500,000 sq. yds. |
| 57.06 | Yarn | | 500 tons |
| 62.03 | Bags/sacks /2 | | 50 tons |

/1 Category 2 goods (jute cloth weighing from 310 to 500 gr/$m^2$ and less than 150 cm in width + bags weighing from 310 to 500 gr/$m^2$); and Category 3 goods (jute cloth weighing less than 310 gr/$m^2$ and less than 150 cm in width + bags weighing less than 310 gr/$m^2$) are not subject to global EEC quotas, but are regulated by bilateral arrangements with individual member countries.

/2 Except for heavy bags and woolpacks.

Source: Indian Jute Mills Association; Bangladesh Jute Mills Association; and Commonwealth Secretariat.

quoted at 7.5 pence per square yard, while Bangladesh 10 oz. hessian is quoted at 6.4 pence per square yard. Ex-Dundee comparable hessian cloth sells at 11.6 pence per square yard. Imported 10 oz. standard hessian would have very serious difficulties competing in the U.K. market with locally produced woven polypropylene replacement. In the EEC, given the further weight of the import duty, competition seems out of the question. Competition with even cheaper Portuguese woven polypropylene cloth would be impossible even under the most favorable conditions. Tariff-free imports of lighter fabrics, on the contrary, would have a good chance to compete with woven polypropylene replacement. Bangladesh 7½ oz. hessian is quoted in the United Kingdom at 5 pence per square yard. Ex-Dundee 7½ oz. sells at about 9 pence per square yard, while comparable polypropylene woven cloth sells at 4.75 pence per square yard. In the United Kingdom, where no duties on imports of hessian from Commonwealth countries are applicable, a 10 percent reduction of current c.i.f. prices would make Indian and Bangladesh light hessians competitive with synthetics. 1/ Country analysis strongly indicates that in the absence of a fast relaxation of import tariffs and export price reduction, consumption of jute in packaging in the EEC could become negligible by 1980 (some 15 thousand tons). The overall market for packaging is not expected to shrink much below current levels, but synthetics are expected to cut heavily into the jute bag market. Should EEC tariffs be abolished and jute fabrics become more competitive, jute could probably be expected to hold its current position in the export market for bags and minimize its losses in the domestic bag market. Utilization of bags in the EEC could be tentatively put at some 35 thousand tons by the end of the seventies.

62. In the United Kingdom utilization of jute bags is expected to decline further to about 5 thousand tons by the end of the seventies. Utilization of jute bags and sacks in other Western European countries (including Southern Europe) is expected to be by 1980 around 25-30 thousand tons by the end of the seventies. Western European total consumption of jute in packaging is therefore forecast to be between 40 to 60 thousand metric tons by the end of the seventies, depending on price and trade liberalization developments.

63. Carpet backing is another important end-use of jute in Western Europe which accounted in 1970 for 16 percent of total consumption. (See Table 9.) Total production of carpets in Western Europe doubled in volume

---

1/ The cost of producing woven polypropylene cloth to replace 7 oz. hessian in the United Kingdom is estimated to be around 3.9 pence per square yard. Given the advantage that U.K. polypropylene weavers have vis-a-vis weavers in other Western European countries (with the exception of Portugal) in terms of lower polypropylene resin prices and labor costs, is is conceivable to assume that if hessian were competitive in price with polypropylene cloth in the United Kingdom, it would, in the absence of import tariffs, also be generally competitive throughout Europe.

during the second half of the sixties (from 195 to 391 million square meters between 1965 and 1970). In spite of the phenomenal growth of tufted carpet production which more than trebled over this period, woven carpets still accounted in 1970 for 28 percent of the total market, a much higher percentage than in the United States. Needlefelt carpet production increased even faster than tufted production, but from a much smaller base. (See Table 11.) Tufted and needlefelt carpets accounted over this period for all the growth in output. Production of carpets, moreover, increased faster in the EEC than in the United Kingdom and other Western European countries. EEC countries accounted in 1970 for nearly 59 percent of total output (45 percent in 1965), while the U.K. share of the market fell from 48 percent in 1965 to 33 percent in 1970. The faster output growth registered in the EEC was due to the more rapid growth of tufted and needlefelt carpets which together accounted for 75 percent of EEC output in 1970 compared to 50 percent in the United Kingdom, where woven carpet production is still very important.

64. The very fast growth of tufted and needlefelt carpet production in Western Europe created, in the second half of the sixties, a strong demand for jute carpet backing. Consumption of jute carpet backing doubled in volume between 1965 and 1970. The joint production of tufted and needlefelt carpets, however, increased fourfold and jute captured only one half of this total market growth.

65. Competition from synthetic substitutes started later in Western Europe than in the United States and within Western Europe production of synthetic backings on a commercial scale was first developed in the United Kingdom. In the United Kingdom, moreover, synthetic penetration proceeded further and faster than in the United States. In 1967 synthetic penetration was below 10 percent, but by the end of 1969 the market share of synthetics had already reached 40 percent. Production of synthetic cloth remained until recently concentrated in the Dundee area and was generally carried out by the major jute processors. Polypropylene woven cloth was, since its very introduction, the most important competition in this field. In 1970 polypropylene backing alone was reported to have penetrated about 60 percent of the total market for tufted carpets.

66. In the EEC countries synthetic penetration was slow until 1969, when 91 percent of the total backing used in tufted carpets was still reported to be made out of jute. In the EEC, moreover, synthetic materials other than polypropylene began to be used in carpet backing. Woven polyesters became particularly important in Germany and various types of non-woven polypropylene and polyesters were used throughout the EEC. Competition, however, sharpened in 1970 and 1971. It is estimated that in 1971 the share of synthetics in the primary carpet backing market increased to some 57 percent. While jute still holds 74 percent of the secondary carpet backing market in the EEC (as well as in Europe in general), only 25 percent of tufted carpets have a secondary backing. Jute backing still holds about 65 percent of the needlefelt carpet market, but only 30 percent of all the needlefelt carpets produced in EEC countries have a backing of any kind.

Table 11 : WESTERN EUROPE:
OUTPUT OF CARPETS BY
MAJOR TYPES AND CONSUMING
AREAS, 1965 AND 1970

(million square meters)

| | 1965 | % | 1970 | % |
|---|---|---|---|---|
| Tufted | 56.8 | (29.0) | 182.1 | (46.0) |
| Woven | 113.8 | (58.0) | 109.1 | (28.0) |
| Needlefelt | 10.3 | (5.0) | 77.8 | (20.0) |
| Others | 14.3 | (8.0) | 22.1 | (6.0) |
| Total | 195.2 | (100.0) | 391.1 | (100.0) |
| of which: | | | | |
| EEC | 87.4 | (44.8) | 230.3 | (58.9) |
| United Kingdom | 92.7 | (47.5) | 129.6 | (33.1) |
| Others | 15.1 | (7.7) | 31.2 | (8.0) |
| | | (100.0) | | (100.0) |

Source: A Survey of the European Carpet Industry, ITI, 1971.

67. Synthetic penetration of the carpet backing market varies greatly between EEC countries, and it is much stronger in the Federal Republic of Germany and the Netherlands than in France and Italy. In the Federal Republic of Germany a new woven polypropylene backing plant recently set up by the leading U.S. producer of polybac practically pushed jute out of the carpet backing field in 1972. This plant alone operates more Sulzer looms than are used for the same purpose in the whole Dundee area. 1/

68. Jute carpet backing prices in Europe vary considerably from country to country. In general, however, the relationship to synthetics has been over time similar to that of the United States. Woven polypropylene cloth is the major threat to jute. Woven polyester backing is more expensive than either jute or polypropylene backing. Where this type of backing is popular (in the Federal Republic of Germany, for example), its utilization is generally justified on the basis of cost saving considerations in the tufting process.

69. Imports of jute carpet backing are subject in both the EEC and the United Kingdom to rigid quantitative restrictions. (See Table 10.) If the cost structure of the U.K. jute industry can be taken as generally representative of the situation in Western Europe (Portugal is probably the only important exception), it is clear that protection in Western Europe is preventing jute from competing with polypropylene in the carpet backing market. Woven polypropylene primary backing is available in the United Kingdom at 7.25 pence per square yard, jute backing at 13 pence per square yard. 2/ It is estimated that to make domestically produced jute carpet backing competitive with woven polypropylene cloth, BWC jute (the standard grade used for carpet backing) should be delivered to the mills at £88 per ton, which corresponds to £67 per ton f.o.b. Bangladesh. This is clearly not an achievable price under current production technologies. Without the export duty actually levied on both primary and secondary backing, the Indian jute industry is in a position to supply primary backing at 7.7 pence and secondary backing at 6.1 pence per square yard. Therefore, jute secondary backing could be placed in a secure position, while primary backing prices would still have to be cut by about 10 percent.

70. The carpet market in Western Europe is expected to increase rapidly throughout the seventies. Tufted carpets are expected to lead the growth of the overall market as consumption of tufted carpets in Europe is highly income elastic. 3/ Output projections show that the market for

---

1/ About 12,000 metric tons of polypropylene carpet backing was produced in Germany during 1972.

2/ Jute secondary backing sells at 10.5 pence per square yard.

3/ Income elasticity of demand for tufted carpets in Wester Europe was bound to be very high. Time series analysis yields an income elasticity of demand of 5.9 in the EEC and 6.0 in EFTA countries (both considered as a group).

tufted carpets in Western Europe is very likely to grow at close to 9 percent per annum throughout the seventies. (See Appendix Table 1.) Independent projections for needlefelt carpet output indicate a growth of 7-8 percent per annum for the next 8-9 years.

71. In spite of this large potential market for primary backing material which is likely to materialize in the 1970's (560 million square yards in tufted carpets alone), jute primary backing consumption is projected to decline considerably throughout Western Europe. Unless tariffs and quotas are abolished in the near future, the market share of jute can be expected to fall from 43 percent in 1971 to some 10 percent in 1980. In the secondary backing market the position of jute is expected to remain relatively stronger and to maintain at least 55 percent of this market (from 74 percent in 1971). As mentioned before, however, only 25 percent of all the tufted carpet currently produced in Europe has a secondary carpet backing. In making the projections for jute consumption in secondary carpet backing it was assumed that this situation would continue to hold throughout the seventies. There is evidently a possibility of inducing a much larger utilization of secondary backing in tufted carpets. Jute promotion could be very effective in this field. Even assuming that the market split between jute and synthetic secondary backing will remain unchanged, if a consumption pattern similar to the one prevailing in the United States could be induced, jute secondary backing consumption in Western Europe could increase by the end of the current decade from a projected 15,000 to some 50,000 tons. Without such an effort, utilization of jute in tufted carpet backing (both primary and secondary) is here predicted to decline to 30-35 thousand tons by 1980. Another 10 thousand tons of jute backing is expected to be utilized in needlefelt carpets. 1/ Total consumption of jute backing in Western Europe is therefore projected to be between 40 to 45 thousand tons by the end of the current decade.

72. Carpet yarn represents a substantial outlet for jute in Western Europe (20 percent of the total market). Jute yarn is utilized to manufacture woven carpets and finds its application mainly in the weft under which the pile yarns are looped. Production of woven carpet backing declined slightly from 1965 to 1970 and so did utilization of jute yarn in this end-use. (See Table 9.) One third of all the Western European production of woven carpets is concentrated in the U.K.-EEC countries (particularly in Belgium and the Netherlands) and accounts for most of the remainder.

73. Manufacturers of polypropylene yarns (as distinct from tapes) are now showing increasing interest in this market. Polypropylene yarn, however, still presents technical difficulties and synthetic penetration in this field has been limited. Experiments with polypropylene yarn are now being conducted and it can be foreseen that technical difficulties will be overcome and that polypropylene yarn will be utilized in increasing quantities in Western Europe.

---

1/ Production of needlefelt carpets in Western Europe is projected to reach 240 million square yards by 1980.

Table 12: WESTERN EUROPE: CONSUMPTION OF JUTE AND JUTE GOODS, 1970 (ACTUAL) AND 1980 (PROJECTED)

(thousand metric tons)

| | Actual | | Projected | | | | Implied Growth Rate | |
|---|---|---|---|---|---|---|---|---|
| | 1970 | % of Total | 1980 I | % of Total | 1980 II | % of Total | 1970-1980 I | 1970-1980 II |
| Bags & Sacks | 158.5 | (26) | 45 | (16) | 70 | (21) | -11.8 | -7.8 |
| Industrial & Other Cloth Applications | 99.0 | (18) | 65 | (23) | 70 | (21) | -4.1 | -3.4 |
| Carpet Backing Cloth | 91.5 | (16) | 40 | (14) | 45 | (14) | -7.9 | -6.8 |
| Carpet Yarn | 111.0 | (20) | 80 | (29) | 85 | (26) | -3.2 | -2.6 |
| Cordage & Cable | 32.0 | (6) | 15 | (5) | 20 | (6) | -7.3 | -4.6 |
| Felts | 66.0 | (12) | 35 | (13) | 40 | (12) | -6.1 | -4.9 |
| Total | 558.0 | (100) | 280 | (100) | 330 | (100) | -6.6 | -5.1 |

Source: Table 9 (actual); and IBRD, Economic Analysis and Projections Department (projections).

74. Production of woven carpet, moreover, is forecast to remain stagnant or to decline marginally throughout the seventies. If raw jute prices are decreased to some £95 per metric ton c.i.f. Europe (prices are now at about £135 per ton), jute yarn could remain competitive with synthetic and maintain a predominant share of their market. On this assumption, consumption of jute in carpet yarn is predicted to be at 80-85 thousand metric tons in 1980.

75. Industrial and other cloth applications represented, in 1970, 18 percent of the total market for jute in Western Europe. Given the variety of cloth applications included in this category, the end markets cannot be projected separately. On the basis of past trends, it seems reasonable to assume that these applications will account for some 65-70 thousand metric tons of jute in 1980. Utilization of jute in cordage and cables is also projected to decline under the impact of synthetics substitution. Continuation of recent trends would indicate a further sharp reduction of this jute end market to about 15-20 thousand metric tons by the end of the decade.

76. Consumption of jute in felts is almost exclusively concentrated in the Federal Republic of Germany where an estimated 45,000 tons of jute went into felts in 1970 (or 75 percent of total consumption of felts in Western Europe). Changes in house-building techniques are likely to decrease future jute requirements for roofing felt. Synthetics are expected to cut heavily into the market for industrial felt. Production of needlefelt carpets is projected to grow considerably during the seventies, but their jute content is likely to be considerably reduced. Consumption of jute in felts can only be expected to be around 35-40 thousand metric tons by the end of the decade.

77. Total utilization of jute in Western Europe is expected to decline considerably during the seventies. End-use projections indicate that by 1980 consumption is likely to fall to 280-330 thousand metric tons (41-50 percent below 1970 levels). Table 12 summarizes the projections.

India

78. India is the world's leading producer and exporter of jute goods. Mill consumption of jute increased by 3.6 percent per annum in the first half of the sixties, but declined quite rapidly in the second half (at an average rate of 5.2 percent per annum). Only in 1971 and 1972, when the productive capacity of Bangladesh was severely disrupted, did mill consumption of jute in India increase again. Cottage consumption, after somewhat increasing in the early sixties, remained stationary throughout the decade at an estimated level of 36 thousand metric tons a year. (See Table 13.)

79. The main reason behind the fall in jute mill consumption was the sharp decline in exports of jute goods that India experienced in the second half of the sixties. The growth in internal consumption of jute goods (at an average of 5.5 percent per annum between 1960 and 1970) only partially offset the fall in exports.

Table 13: INDIA: UTILIZATION OF RAW JUTE AND JUTE MANUFACTURES, AVERAGE FOR 1961-63 AND 1964-66; AND 1967 TO 1971

(thousand metric tons)

| | Average 1961-63 | Average 1964-66 | 1967 | 1968 | 1969 | 1970 | 1971 |
|---|---|---|---|---|---|---|---|
| A. Raw Jute | | | | | | | |
| Mill consumption | 1,274.0 | 1,415.0 | 1,280.0 | 1,214.0 | 1,022.0 | 1,093.0 | 1,259.0 |
| Cottage consumption * | 27.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| Total consumption | 1,301.0 | 1,451.0 | 1,316.0 | 1,250.0 | 1,058.0 | 1,129.0 | 1,295.0 |
| B. Jute Manufactures | | | | | | | |
| Exports | | | | | | | |
| Hessian | 426.4 | 436.2 | 382.3 | 338.2 | 251.7 | 282.7 | 305.9 |
| Sacking | 272.8 | 230.6 | 185.5 | 93.6 | 48.2 | 79.1 | 113.4 |
| Carpet Backing | 62.5 | 112.7 | 141.6 | 179.8 | 219.3 | 138.3 | 245.5 |
| Others | 74.5 | 89.3 | 59.1 | 59.8 | 50.7 | 48.8 | 55.7 |
| Total | 836.2 | 868.8 | 768.5 | 671.4 | 569.9 | 548.9 | 720.5 |
| Domestic Utilization | | | | | | | |
| Hessian | 50.0 | 61.0 | 63.0 | 66.0 | 63.0 | 75.0 | 69.0 |
| Sacking | 250.0 | 320.0 | 336.0 | 375.0 | 380.0 | 373.0 | 424.0 |
| Others | 37.0 | 41.0 | 44.0 | 55.0 | 61.0 | 66.0 | 73.0 |
| Total | 337.0 | 422.0 | 443.0 | 496.0 | 504.0 | 514.0 | 566.0 |
| Stocks /1 | | | | | | | |
| Hessian | 26.1 | 41.7 | 48.2 | 47.8 | 17.8 | 43.3 | 30.0 |
| Sacking | 40.6 | 47.8 | 59.1 | 56.1 | 21.2 | 38.1 | 57.8 |
| Carpet Backing | 7.4 | 16.2 | 8.0 | 9.2 | 22.7 | 13.9 | 11.9 |
| Others | 9.5 | 11.0 | 13.7 | 12.7 | 8.2 | 7.0 | 10.2 |
| Total | 83.6 | 116.7 | 129.0 | 125.8 | 69.9 | 102.3 | 109.9 |

* Estimate.

/1 IJMA reporting mills (end-of-year stocks).

Source: Indian Jute Mills Association; IBRD, Economic Analysis and Projections Department.

80. Bags and sacks are by far the major consumption items (75 percent of total consumption in 1971). Cement bags are the largest single end-use for jute in India as they account for roughly 27 percent of the total bag market. Grain sacks represent the second largest single use and take up another 25 percent of the bag market. Fertilizer and sugar bags come next. They account jointly for another 24 percent of this market. Industrial and other packaging fabrics together with the "other goods" sector equally split among themselves in 1971 the remaining 25 percent of the total market for jute goods in India.

81. Production of cement in India is forecast to double during the seventies. Fertilizer production is expected to increase fourfold over the same period. Agricultural production is also forecast to grow during the seventies at perhaps a slightly lower rate than the one experienced in the sixties. Consumption of sacks and bags can therefore be projected to grow at an average annual rate of 4 percent per annum during the current decade (600 thousand tons of goods by 1980).

82. Future consumption of packaging and industrial fabrics is likely to be affected by increased competition from synthetics and only a marginal growth can be expected in this sector. 1/ Jute canvas, tarpaulin and cordage which make up the bulk of the "other goods" sector, are also likely to be affected by synthetics competition and overall demand can be expected to remain stagnant. Consumption in these two end-uses, taken together, is forecast to be by 1980 around 155,000 metric tons. The overall size of the domestic market for jute goods in India is projected to be around 755,000 metric tons by the end of the seventies, which implies an average annual growth rate of 3.2 percent over 1971 levels. Cottage consumption is also expected to increase by some 20 percent over the next nine years and reach 43,000 tons by 1980.

Other Producing Countries in Asia

Bangladesh

83. Bangladesh is the world's largest producer of raw jute and the second largest exporter of jute goods. While raw jute production essentially stagnated during the sixties, output and exports of jute goods strongly stimulated by government policies expanded very rapidly. Mill consumption of jute increased at an average of 10 percent per annum and overseas exports of jute goods even faster (at some 11.5 percent a year). Cottage consumption of jute apparently increased quite rapidly in the early sixties and again in the late sixties and early seventies. Domestic utilization of jute goods, on the contrary, remained fairly stagnant in the late sixties but showed a strong increase in 1971/72 when both hessian and backing consumption apparently almost doubled over the previous three-year average. (See Table 14.)

---

1/ It is estimated that output of synthetic packaging material would displace 100,000 tons of jute goods by the end of the Fifth Plan (1978/79).

Table 14: BANGLADESH: UTILIZATION OF RAW JUTE AND JUTE MANUFACTURES, AVERAGE FOR 1960/61-1962/63 AND 1963/64-1965/66; AND 1966/67 TO 1971/72

(thousand metric tons)

| | Average 1960/61-1962/63 | Average 1963/64-1965/66 | 1966/67 | 1967/68 | 1968/69 | 1969/70 | 1970/71 | 1971/72 |
|---|---|---|---|---|---|---|---|---|
| A. Raw Jute | | | | | | | | |
| Mill consumption | 289.7 | 364.1 | 429.1 | 544.9 | 549.4 | 620.9 | 501.7 | 283.2 |
| Cottage consumption /1 | 16.0 | 24.0 | 40.0 | 30.0 | 31.0 | 37.0 | 36.0 | 45.0 |
| Total consumption | 303.9 | 388.1 | 469.1 | 474.9 | 580.4 | 657.9 | 537.7 | 327.2 |
| B. Jute Manufactures /2 | | | | | | | | |
| Exports | | | | | | | | |
| Hessian | 65.3 | 76.3 | 89.1 | 139.0 | 164.4 | 207.5 | 175.4 | 78.0 |
| Sacking | 149.2 | 178.9 | 235.7 | 240.4 | 236.9 | 285.7 | 148.4 * | 102.1 * |
| Carpet Backing | - | 7.1 | 19.3 | 27.0 | 27.9 | 31.0 * | 38.4 * | 27.0 * |
| Others | 3.4 | 9.4 | 13.7 | 21.8 | 29.3 | 32.0 * | 25.8 * | 17.4 * |
| Total | 217.9 | 271.7 | 357.8 | 428.2 | 458.5 | 506.2 | 388.0 | 224.5 |
| Domestic Utilization | | | | | | | | |
| Hessian | n.a. | n.a. | n.a. | 5.7 | 8.0 | 5.9 | 4.3 | 10.0 |
| Sacking | n.a. | n.a. | n.a. | 17.3 | 11.2 | 11.1 | 9.8 | 20.4 |
| Others | n.a. | n.a. | n.a. | 3.1 | 3.5 | 3.8 | 4.6 | 3.0 |
| Total | n.a. | n.a. | n.a. | 26.1 | 22.7 | 20.8 | 18.7 | 33.4 |
| Stocks /3 | | | | | | | | |
| Hessian | 7.4 | 14.2 | 21.4 | 15.4 | 25.1 | 25.1 | 33.8 | 52.8 |
| Sacking | 21.0 | 39.9 | 36.0 | 54.6 | 32.3 | 32.2 | 29.3 | 48.5 |
| Carpet Backing | - | 0.6 | 2.4 | 1.8 | 2.6 | 3.4 | 4.9 | 9.1 |
| Others | 0.8 | 1.7 | 1.7 | 1.9 | 2.7 | 3.6 | 2.8 | 3.5 /4 |
| Total | 29.2 | 56.4 | 61.5 | 73.7 | 62.7 | 64.3 | 70.8 | 113.9 |

n.a. = not available; * partly estimated; /1 Estimate; /2 Excluding exports to Pakistan; /3 End-of-year stocks; /4 End of June 1972.

Source: Bangladesh Jute Mills Association; IBRD, Economic Analysis and Projections Department.

84. Consumption of rice bags is the single most important outlet for jute. Cordage and twine consumption are also important and so are a variety of fabrics for packing, household and agricultural applications.

85. The prospects for domestic consumption of jute goods in Bangladesh are generally favorable. Utilization of rice bags, cordage and twine, and other packaging fabrics is expected to increase along with agricultural production. The blending of jute with cotton in various textile applications (union fabrics of which jutton - a jute-cotton blend - is perhaps the best-known) could to some extent increase jute utilization. Fertilizer production is also expected to increase and create a substantial market for bags. Total utilization of jute and jute goods at the end of the seventies can be tentatively put at some 85-90 thousand tons (40-45 thousand tons for industry-produced goods and 45 thousand tons for cottage consumption).

Thailand

86. Thailand is the world's second largest exporter of raw jute. Its manufacturing capacity expanded in the sixties, but was essentially geared to the domestic market. The inferior quality of fiber (kenaf) grown in Thailand limits production of manufactured goods to sacks and bags. In the late sixties, when domestic demand began to level off, exports to neighboring countries expanded to some 16-17 thousand tons.

87. In spite of the fall in exports of rice in the late sixties, utilization of rice bags is still the largest single outlet for jute in Thailand (about 35 percent of the overall domestic market). The recent growth of sugar exports also created some demand for sugar bags. Total domestic use of jute bags, however, seems to have somewhat stagnated in the late sixties at an annual level of 40,000 tons. Consumption of cordage and twine is also estimated to have remained fairly constant at some 4,000 tons.

88. The use of jute in packaging in Thailand is expected to increase only very moderately through the seventies in spite of no foreseeable threat from synthetic substitutes. Even assuming a recovery in rice and an expansion in sugar exports, the expected decline of oilseeds and maize exports will probably lead to only a very modest growth of the domestic market for bags over the next ten years. Total domestic consumption by 1980 is therefore projected to be around 45,000 tons (42,000 tons of bags and 3 to 4 thousand tons of cordage).

Other Markets in Developing Areas

89. According to two recent reports prepared for the FAO Intergovernmental Group on Jute and Allied Fibers, 1/ it would seem that there is some need to reconsider the widely held opinion that whatever the pace of

---

1/ See FAO Study Group on Jute, Kenaf and Allied Fibers Consultative Committee - Twelfth Session (Rome, September 29-October 1, 1971); Ibid Tenth Session (Rome, September 28-30, 1970).

substitution by other fibers and packaging techniques in developed countries, the developing countries will continue to offer an expanding market for jute and jute goods.

Latin America

90. Consumption of jute in Latin America is largely in the form of sacking mainly for bagging grains, coffee, fishmeal, sugar and other agricultural commodities in addition to minerals and metals (Chile, Bolivia). Consumption of jute goods in Latin America rose until the 1964-65 period reaching a peak of 240,000 tons, but has since declined to 207,000 tons in 1967-69, and to less than 200,000 tons in 1970. (See Table 1.) This occurred despite a rise of over 5 percent in the tonnage of agricultural production of the major jute consuming countries. A number of factors have been responsible for this decline in jute consumption: bulk handling deprived jute of large portions of some of its markets (grains in Argentina and Brazil, fishmeal in Peru, sugar in Guyana); the local processing of certain agricultural commodities previously exported as unprocessed goods decreased packaging requirements for export, and growing pressure from substitutes such as paper sacks and cotton bags, and more recently, woven plastic sacks.

91. Four countries in Latin America account for over 65 percent of the total jute consumption of this continent 1/ - Peru, Chile, Brazil and Argentina. Peru is growing some fiber (over 3,000 tons) and its output may double by 1975. Present manufacturing capacity is estimated at about 10,000 tons per year. At the end of the 1960's, Peru was importing some raw fiber from Pakistan and Thailand (3,000 tons average) and important quantities of finished goods (averaging 10/15,000 tons a year depending on fishmeal production). Half of the fishmeal market, however, has gradually become bulk-handled and a polypropylene plant was established in 1968. A 50 percent tariff on imported jute goods, originally intended to protect local jute growers, will be acting in favor of polypropylene and bulk handling techniques. Chances are, therefore, that the fishmeal market will be entirely lost to jute bags during the seventies. Import of jute and jute goods may well fall drastically during the seventies as the total size of the domestic market for jute goods is likely to remain around 10,000 tons (i.e., at 1970 levels), while domestic production is expected to be able to meet 60 percent total requirements.

92. Chile imports all its jute goods and no manufacturing facilities exist in the country. Imports of jute goods in 1969 were about 9,000 tons. Consumption is gradually decreasing and Brazil, and perhaps Peru, protected by high tariff walls, are likely to supply part of the Chilean jute market, which is expected to shrink further during the seventies.

---

1/ Cuba, with an estimated utilization of jute goods of some 40,000 tons in 1970 is included here.

93. Argentina imports all her requirements of raw fiber (9,500 tons in 1970), most of which come from Brazil. Argentina is also a major importer of hessian cloth (33,000 tons in 1970), two thirds of which normally came from Asian producers and one third from Brazil. Consumption of jute and jute goods has steadily declined from 50,000 tons (the average consumption during the first half of the 1960's) to 42,500 tons in 1970 largely as the result of progressive substitution of bulk handling techniques. Further reductions of packaging requirements can be expected in the seventies particularly for exports of grains. Bag requirements for potatoes, oilseeds and grains for the domestic market are, however, likely to increase. Total utilization of jute and jute goods is therefore expected to decrease by 1980 only marginally from 1970 levels (to some 35 thousand metric tons).

94. Brazil is the only country in South America which grows jute and other similar fibers in sufficient amounts to cover its own needs and to have a sizeable surplus of jute goods for export. Brazil produced about 30,000 tons of jute in 1970, plus another 35,000 tons of allied fibers. Manufacturing capacity is currently estimated at over 100,000 tons, but capacity utilization is thought to be about 60 percent. The bagging of agricultural commodities is the predominant end-use of domestically produced jute. Coffee, rice, raw sugar and maize for export and domestic consumption require a large quantity of jute bags, estimated at some 50,000 tons in 1970. Cotton, paper and plastic bags are in the main used for refined sugar, flour, cocoa and animal feeds. In addition to bulk handling, limited inroads by other packaging materials have taken place in the fields where jute bags are traditionally used, largely because of government regulations and partly because of consumers' preferences.

95. Brazilian agricultural production and exports are projected to increase considerably in the course of the decade and a large potential market for jute bags is likely to materialize. Bulk handling, however, will probably be extended and, even assuming the continuation of present government regulations in favor of jute sacks, no considerable deviation from the consumption trends of the past 5-6 years can be expected. Consumption of jute goods is therefore projected to grow to 75-80 thousand tons by the end of the seventies.

96. Cuba is another large consumer of jute bags, most of which used to be imported from Bangladesh and the USSR. 1/ Jute bags are mostly utilized for sugar. Bulk shipments of sugar, however, had already started in the late sixties and this trend is very likely to continue through the seventies. Heavy declines in Cuba's jute bag requirements can be expected and total consumption of jute goods will probably decrease to 40-45 thousand tons by 1980.

---

1/ Cuba produces some 4-5 thousand tons of kenaf a year.

97. In conclusion, therefore, consumption of jute and jute goods in Latin America is not expected to be in 1980 substantially different from current levels. The projected increase in Brazilian consumption is likely to offset the decline which is expected to take place in most of the other consuming countries.

Africa and Near East

98. African countries account for about 8 percent of all the jute and jute goods consumed in the world (an estimated 281,000 tons in 1970). Imports of raw jute are still prevalent, but a very big effort is now being made to meet the raw material requirements of the local processing industry from domestically produced fibers. Import substitution efforts are twofold: (a) more jute and allied fibers are being grown locally; and (b) other vegetable fibers (particularly hard fibers) are being used to manufacture sacks. Zaire, Nigeria, Dahomey, Nigeria and the UAR are already producing substantial amounts of jute-like fibers. Hard fiber producers (i.e., Tanzania, Kenya, Ethiopia, etc.) utilize these fibers wherever possible.

99. Jute processing capacity is expanding rapidly in Africa and local processing is expected to cover an ever-growing share of total jute goods requirements (about 60 percent by 1975). Packaging needs are expected to increase in line with agricultural production and export, but the market for jute sacks and bags is forecast to increase slowly in the course of the decade on account of (a) substitution from other vegetable fibers; and (b) an already marked shift towards use of polyolefins (for example, in Morocco, Tunisia, Senegal and Madagascar).

100. The total market for jute and jute goods is forecast to grow to about 300-330 thousand metric tons by 1980, which would imply a substantial slowdown of the expanding trend of the late sixties.

The Centrally Planned Countries

101. Consumption of jute and jute goods has since the mid-sixties increased substantially in the People's Republic of China, marginally in the USSR, and has actually declined in Eastern Europe. (See Table 1.) On the whole, imports of raw jute have remained stationary since 1964-66 and imports of jute goods have fallen. Increments in production of jute and allied fibers in both the USSR and the People's Republic of China took care of the expanding requirements of the domestic markets.

102. In the USSR, production of kenaf rose during the sixties from an estimated 38 thousand tons in 1961-63 to some 45,000 in 1970. In the late sixties, however, production apparently began to level off and no great output expansion seems in the making in the near future. According to official statistics, net imports of raw jute have actually declined in the years following 1966, only to show a considerable jump in 1970. Net imports of new jute sacks increased considerably until 1965, but sharply

declined in the second half of the decade. Net imports of sacking material, however, trended upwards throughout the period. Apparent consumption of jute goods increased only marginally since 1964-65 and showed a cyclical pattern, probably connected to the cycles of agricultural production.

103. It is particularly difficult to forecast jute goods consumption in the USSR, because very little is known about bulk handling of commodities, prepackaging of goods for retail sale and, above all, production and investment policies.

104. Agricultural output is likely to increase in the seventies and cotton production in particular will probably expand further, sustaining demand for packaging material. Carpet production, currently estimated at 16.5 million square yards, is also expected to increase in the seventies and to generate a potential market for jute carpet backing cloth which could reach some 6-7 thousand tons by the end of the current decade. Demand for jute sacks, however, is particularly difficult to forecast given the basic uncertainty which surrounds bulk handling developments and the direction of plastics production and utilization. A plastics industry of considerable dimensions is being developed in the USSR and the decision of where to use plastics will probably depend not only on the prices of raw jute and jute products relative to those of polyolefins and other natural fibers used in the USSR (flax, for example), but also on political considerations.

105. In the short-run utilization of jute and jute goods is likely to increase as are imports from Asian producing countries. In the longer run, however, competition from bulk handling and synthetic substitutes can be expected to sharpen. It seems, therefore, advisable, at least for estimation purposes, to assume that by 1980 demand for jute will be only 7-10 percent above 1970 levels (i.e., 130-140 thousand metric tons).

106. The outlook for jute in Eastern Europe does not look too promising. Hungary is reported to have closed down its only jute mill and Czechoslovakia to be operating the 7-8 remaining jute mills at half of their capacities. In Poland (as well as in Czechoslovakia and in the Democratic Republic of Germany) the development of a domestic plastics industry is like to adversely affect consumption of jute in packaging. Jute may take over some of the markets previously held by flax, but overall growth prospects appear to be poor.

107. The only somewhat more promising outlet for jute throughout Eastern Europe seems to be carpet backing, given the fact that carpet production is rising and this trend is likely to continue. It appears, however, that even under the best possible circumstances, the increase in jute carpet backing utilization will not be sufficient to compensate for expected losses in packaging. Jute consumption in Eastern Europe is one the decline and this trend is expected to continue through the seventies. Utilization of jute and jute goods in Eastern Europe is projected to decline to some 65-70 thousand tons by 1980.

108. The People's Republic of China is probably the largest single consumer of jute and jute goods and, unfortunately, the one for which information is almost totally lacking. Taking FAO and trade estimates of production, it would seem that raw jute output increased at over 7 percent per annum throughout the sixties. In spite of this very rapid growth, production did not keep pace with demand and raw jute had to be imported to complement domestic supply. Apparent consumption (estimated production plus imports) grew throughout the sixties at close to 8 percent per annum, from 326,000 tons in 1961-63 to 598,000 tons in 1970.

109. Agricultural output is generally expected to continue to grow in the seventies roughly along past trends. The widespread application of labor-intensive technologies will probably reduce to a minimum bulk handling and containerization. Demand for packaging material can therefore be expected to grow in the seventies at some 7 percent per annum. This would create an overall potential market for jute of about 950,000 tons by 1980 (assuming that demand for cordage products remains more or less stagnant in the 1970's). Production of food crops spurred by population pressures would reduce land available for jute cultivation, and it seems unlikely that domestic production of jute-like fibers will increase in the seventies as rapidly as in the sixties. Assuming a slight decline from the output growth experienced in the second half of the sixties, jute-like fiber production can be projected to increase at 3.5-4.0 percent per annum throughout the seventies and to reach 750-800 thousand tons by 1980. This would leave a gap of 150-200 thousand tons of jute which could either be filled by imports or by utilization of domestically produced polyolefins.

110. The People's Republic of China has therefore the potential of becoming a large importer of raw jute. Here again, economic as well as political considerations will play a role in determining import policies. For the purpose of our demand projections, we have assumed rather subjectively that the People's Republic of China will import some 50 to 75 thousand tons of jute by the end of the seventies. It is clear, however, that this represents only a rather crude estimate and that the variance in our calculations is quite high. Import demand could reach 100,000 tons, but it could as well be close to zero, depending on developments about which we can only conjecture.

111. Total demand for jute and jute goods in Centrally Planned Countries 1/ is, therefore, projected to increase by 1980 to about 1,050-1,110 thousand metric tons (26 to 33 percent above 1970 levels). Practically all the growth in demand, however, is expected to take place in the People's Republic of China.

---

1/ Demand in the Centrally Planned Countries of Asia is assumed to increase to 25 thousand tons by 1980.

## D. World Demand for Jute: Projected Trends

112. When the projections for the five major consuming areas are aggregated and complemented by projections for other developed countries outside Western Europe and the United States (i.e., Japan, Australia, New Zealand, South Africa, Rhodesia, Israel and Canada), the world jute demand picture which emerges can be characterized as follows: (a) world jute consumption is likely to grow very slowly throughout the seventies; (b) most of the demand growth is expected to take place in developing producing countries (particularly India and Bangladesh); (c) of all the other major consuming areas, only in Africa and in the Centrally Planned Countries (mainly the People's Republic of China) is jute demand expected to increase; and (d) utilization of jute in developed countries is foreseen to decline quite considerably, particularly in Western Europe.

113. Table 15 summarizes the projections for world demand. Both alternatives (I and II) imply that raw jute and jute goods prices will decline in the short run and will be maintained throughout the seventies competitive with synthetics prices. Alternative II, however, assumes (a) that reduction or elimination of tariffs and other import restrictions in Western Europe will help to cushion the fall in jute consumption; (b) that the People's Republic of China will close a larger proportion of its projected demand gap with imports of raw jute; and (c) that import substitution efforts in Africa will be less successful than it is generally anticipated.

114. World import demand projections, summarized in Table 16, reflect the fact jute consumption is expected to grow substantially only in producing countries. The expected fall in jute utilization in Western Europe is fully reflected in the projected decrease in import demand. In Centrally Planned Countries, the import policy of the People's Republic of China is likely to determine whether overall import demand of raw jute will decrease or increase marginally throughout the current decade. Developing countries as a whole are expected to import more raw jute but less jute goods. The net effect is very likely to be an overall stagnation of import demand. The increase in consumption projected for Africa is expected to be met by domestic production, while in Latin America a stagnant overall demand and increased domestic production will likely result in a fall in import demand.

115. World imports of raw jute are projected to decrease rapidly during the seventies, while world import demand for jute goods is generally expected to remain stagnant. The most significant change in the pattern of imports is likely to take place in Western Europe, where relaxation of tariffs and other import restrictions would considerably affect the conformation of import demand. The heavily protected domestic jute industry would progressively shrink under the impact of import liberalization and raw jute would be substituted by jute goods imports. (See Alternatives I and II for raw jute and jute goods in Table 16.) The outcome of current and future trade liberalization efforts will largely determine the overall rate of decline of world import demand.

Table 15: WORLD CONSUMPTION OF JUTE AND JUTE GOODS, 1970 (ACTUAL) AND 1980 (PROJECTED)

(thousand metric tons)

| | 1970 | | 1980 | | | | 1970-1980 | |
|---|---|---|---|---|---|---|---|---|
| | Quantity | % of Total | Projected (I) Quantity | % of Total | Projected (II) Quantity | % of Total | Implied Growth Rate (I) | (II) |
| | | | | | | | (percent per annum) | |
| A. Developed Countries | | | | | | | | |
| Western Europe | 553 | (16) | 280 | (8) | 330 | (9) | (- 6.5) | (- 5.0) |
| North America | 489 | (14) | 440 | (12) | 470 | (12) | (- 1.1) | (- 0.4) |
| Other Developed | 272 | (8) | 175 | (5) | 190 | (5) | (- 4.3) | (- 3.6) |
| Total | 1,314 | 38 | 895 | 25 | 990 | 26 | - 3.8 | - 2.7 |
| B. Centrally Planned Countries | | | | | | | | |
| Total | 834 | 24 | 1,050 | 29 | 1,100 | 29 | + 2.3 | + 2.8 |
| C. Developing Countries | | | | | | | | |
| Asia | 835 | 24 | 1,150 | 32 | 1,150 | 31 | + 3.3 | + 3.3 |
| of which: India | (550) | (16) | (800) | (22) | (800) | (21) | (+ 3.8) | (+ 3.8) |
| Bangladesh | (56) | (2) | (85) | (3) | (85) | (3) | (+ 4.2) | (+ 4.2) |
| Thailand | (40) | (1) | (45) | (1) | (45) | (1) | (+ 1.2) | (+ 1.2) |
| Others | (189) | (5) | (220) | (6) | (220) | (6) | (+ 1.5) | (+ 1.5) |
| Africa | 281 | 8 | 300 | 9 | 330 | 9 | + 0.7 | + 1.6 |
| Latin America | 196 | 6 | 190 | 5 | 195 | 5 | + 0.0 | + 0.0 |
| Total | 1,312 | 38 | 1,640 | 46 | 1,675 | 45 | + 2.3 | + 2.5 |
| D. Total World (A + B + C) | 3,460 | 100 | 3,585 | 100 | 3,765 | 100 | + 0.4 | + 0.9 |

Source: Economic Analysis and Projections Department, IBRD.

Table 16: WORLD IMPORT DEMAND FOR JUTE AND JUTE GOODS, 1970 (ACTUAL) AND 1980 (PROJECTED)

(thousand metric tons)

| | 1970 (Actual) | | | 1980 (Projected) | | | | | | 1970-1980 (Implied Growth Rate) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Jute Goods | | Jute | | Jute Goods | | Total | | Jute | | Jute Goods | | Total | |
| | Jute | | Total | (I) | (II) | (I) | (II) | (I) | (II) | (I) | (II) | (I) | (II) | (I) | (II) |
| A. Developed Countries | | | | | | | | | | | | | | | |
| North America | 33 | 428 | 461 | 18 | 23 | 422 | 447 | 440 | 470 | | | | | | |
| Western Europe | 447 | 116 | 563 | 180 | 85 | 100 | 245 | 280 | 330 | | | | | | |
| Other Developed | 144 | 127 | 271 | 80 | 85 | 95 | 105 | 175 | 190 | | | | | | |
| Total | 624 | 671 | 1,295 | 278 | 193 | 617 | 797 | 895 | 990 | -7.7 | -11.1 | -0.8 | +1.7 | -3.6 | -2.6 |
| B. Centrally Planned Countries Total | 142 | 77 | 219 | 125 | 165 | 75 | 75 | 200 | 240 | -1.3 | +1.5 | 0.0 | 0.0 | -0.9 | +0.9 |
| C. Developing Countries | | | | | | | | | | | | | | | |
| Asia /1 | 65 | 78 | 143 | 110 | 110 | 70 | 70 | 180 | 180 | | | | | | |
| Africa | 62 | 160 | 222 | 70 | 90 | 105 | 115 | 175 | 205 | | | | | | |
| Latin America /2 | 15 | 101 | 116 | 15 | 15 | 80 | 85 | 95 | 100 | | | | | | |
| Total | 142 | 339 | 481 | 195 | 215 | 255 | 270 | 450 | 485 | +3.2 | +4.2 | -2.7 | -2.2 | -0.6 | 0.0 |
| D. Total World (A + B + C) | 908 | 1,087 | 1,995 | 598 | 573 | 947 | 1,142 | 1,545 | 1,715 | -4.0 | -4.5 | -1.4 | +0.5 | -2.5 | -1.5 |

/1 Excluding producing countries.

/2 Excluding Brazil.

Source: IBRD, Economic Analysis and Projections Department.

116. The future of jute, however, is by no means predetermined. This chapter has stressed the importance of achieving and maintaining price competitiveness with synthetic substitutes. This represents the necessary condition for the survival of jute in the short run. In the longer run the market for jute might well be improved by exogenous factors such as the energy crisis and the consequent likely increase in the prices of synthetic products which are derived from oil. An additional factor of potential impact is ecology. There is no efficient way to dispose of synthetic products. Increasing use of synthetics for a variety of products will at some point become a serious burden to the environment unless appropriate disposal techniques are developed. It is possible, and would be economically efficient, to require synthetics manufacturers to bear this burden. The implied increase in the financial cost of synthetics to reflect economic costs would improve the competitive position of jute.

117. While the overall demand picture is not bright, one important factor could alter that picture considerably. Product development based on a serious research and development effort could evolve new commercially feasible uses for jute. The history of jute has, indeed, depended on product development. The spinners and weavers of Dundee, in the early 1800's, developed products - jute bags and sacks - which caused a tremendous increase in the demand for jute. Hessian cloths, developed in Europe during the second half of the 19th century, provided another large outlet for jute. When these markets began to lose ground in the middle of the 20th century, carpet backing developed a a major end-use, largely through research and development efforts in the United States. Now, when the future of jute looks so uncertain, it is clearly appropriate to embark on a serious research, development and marketing effort to improve traditional products and to find new markets for jute.

118. It is also appropriate that at this juncture, the jute-producing countries themselves have taken the lead in establishing an international institution for this purpose. The Intergovernmental Conference in Dacca, which was held in January 1973, set in motion the machinery to establish an international jute organization. It would be premature to discuss at this point the still-evolving details of the organization. It would also be somewhat premature to incorporate the potential impact of such an organization into demand projections for jute. However, the time is long overdue to focus attention on the need for an international research, development and marketing effort to improve jute's position. The analysis presented in this chapter predicts potentially severe consequences for those countries which depend on the income and foreign exchange which jute provides. Those who are concerned with these potentially severe consequences - producer countries themselves, international aid organizations and bilateral donor countries - cannot afford not to support this effort.

Table 1: PRODUCTION OF TUFTED CARPETS IN WESTERN EUROPE AND NORTH AMERICA, 1964 TO 1971 AND PROJECTIONS FOR 1980

(million square yards)

| | Actual | | | | | | | | Projections | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1980 | (% p.a.) |
| A. Western Europe | | | | | | | | | | |
| EEC | 18.3 | 25.6 | 36.0 | 52.0 | 71.0 | 95.4 | 122.8 | 154.3 | 330.0 | 8.8 |
| Other Europe | 36.5 | 43.3 | 50.2 | 63.0 | 74.3 | 84.9 | 97.1 | 110.0 | 230.0 | 8.5 |
| (of which U.K.) | (33.1) | (38.4) | (42.7) | (52.7) | (59.5) | (63.3) | (72.6) | (84.5) | (140.0) | (5.7) |
| Total Western Europe | 54.8 | 68.9 | 86.2 | 115.0 | 145.3 | 180.3 | 219.9 | 264.3 | 560.0 | 8.7 |
| B. North America | | | | | | | | | | |
| United States | 318.9 | 375.8 | 407.7 | 432.2 | 511.0 | 562.7 | 604.0 | 681.0 | 1,400.0 | 8.3 |
| (of which broadlooms) | (219.7) | (259.9) | (288.7) | (328.6) | (394.7) | (455.3) | (502.3) | (558.5) | (1,250.0) | (9.3) |
| Canada /1 | 9.3 | 11.2 | 15.6 | 15.8 | 20.5 | 23.6 | 25.8 | 28.9 | 60.0 | 8.5 |
| Total North America | 328.3 | 387.0 | 423.3 | 448.0 | 531.5 | 586.3 | 629.8 | 709.9 | 1,460.0 | 8.3 |

/1 Broadlooms only.

Source: National Production Statistics (actual data); and IBRD, Economic Analysis and Projections Department (projections).

Table 2: NET IMPORTS OF JUTE GOODS, AVERAGE FOR 1961-63, 1964-66 AND 1967-69; AND 1970

(thousand metric tons)

| | Average 1961-63 | Average 1964-66 | Average 1967-69 | 1970 | |
|---|---|---|---|---|---|
| A. Developed Countries | | | | | |
| Western Europe | | | | | |
| EEC | 14.2 | 23.3 | 38.0 | 51.7 | |
| United Kingdom | 38.5 | 40.5 | 43.6 | 36.3 | |
| Others /1 | 42.4 | 30.2 | 35.9 | 27.9 | |
| Total | 95.1 | 94.9 | 117.5 | 115.9 | |
| North America | | | | | |
| United States | 373.6 | 437.0 | 421.1 | 380.6 | |
| Canada | 42.0 | 45.0 | 52.0 | 47.0 | |
| Total | 415.6 | 482.0 | 473.1 | 427.6 | |
| Other Developed | | | | | |
| Australia | 88.0 | 94.0 | 84.0 | 63.0 | |
| South Africa | 45.0 | 40.0 | 35.0 | 32.0 | |
| Japan | - 2.8 | - 7.4 | 5.1 | 3.9 | |
| Others /2 | 30.1 | 31.1 | 28.8 | 28.1 | |
| Total | 160.3 | 157.7 | 152.9 | 127.0 | |
| Total Developed | 671.0 | 734.6 | 743.5 | 670.5 | |
| B. Centrally Planned Countries | | | | | |
| USSR | 18.0 | 54.0 | 36.0 | 45.0 | |
| Eastern Europe | 25.0 | 36.8 | 33.9 | 31.8 | |
| China, People's Republic of | 1.0 | 4.0 | 1.0 | n.a. | |
| Total Centrally Planned | 44.0 | 94.8 | 70.9 | 76.8 | |
| C. Developing Countries | | | | | |
| Asia /3 | 114.5 | 98.3 | 62.5 | 77.5 | * |
| Africa and Near East | 158.0 | 208.0 | 177.0 | 160.0 | * |
| Latin America | 152.0 | 160.0 | 119.0 | 101.0 | |
| Total Developing | 424.5 | 466.3 | 358.5 | 338.5 | |
| D. Total World (A + B + C) | 1,139.5 | 1,295.7 | 1,199.9 | 1,085.8 | |

* Estimate.

/1 Other Western European countries, plus Greece, Turkey and Yugoslavia.

/2 Consisting of New Zealand, Rhodesia and Israel.

/3 Includes Pakistan.

Source: National Trade Statistics (wherever available) complemented by: European Association of Jute Industries, Statistical Yearbook (Annual); FAO, Monthly Bulletin of Agricultural Economics and Statistics, February 1971; Commonwealth Secretariat, Wool Intelligence, Fiber Supplement (various issues).

Table 3: ESTIMATED CONSUMPTION OF WOVEN TEXTILE POLYOLEFINS IN WESTERN EUROPE, 1969-1972

(thousand metric tons)

| | 1969 | 1970 | 1971 | 1972 |
|---|---|---|---|---|
| EEC | | | | |
| Polypropylene | 5.0 | 7.9 | 18.4 | 24.8 |
| Polyethylene | 0.8 | 2.1 | 3.3 | 5.3 |
| Total | 5.8 | 10.0 | 21.7 | 30.1 |
| United Kingdom | | | | |
| Polypropylene | 7.5 | 11.0 | 13.0 | 14.0 |
| Polyethylene | - | - | - | - |
| Total | 7.5 | 11.0 | 13.0 | 14.0 |
| Other Europe | | | | |
| Polypropylene | 8.1 | 10.9 | 15.3 | 18.4 |
| Polyethylene | 0.2 | 0.2 | 0.5 | 0.7 |
| Total | 8.3 | 11.1 | 15.8 | 19.1 |
| Total Consumption | 21.6 | 32.1 | 50.5 | 63.2 |
| of which: | | | | |
| Polypropylene | 20.6 | 29.8 | 46.7 | 57.2 |
| Polyethylene | 1.0 | 2.3 | 3.8 | 6.0 |

Source: European Association for Textile Polyolefins (confidential); and trade estimates.

Table 4: TARIFFS ON JUTE AND JUTE MANUFACTURES IN MAIN DEVELOPED CONSUMING COUNTRIES

(percent ad valorem)

| | United States | United Kingdom /1 | EEC | Japan | Australia |
|---|---|---|---|---|---|
| Raw jute | 0 | 0 | 0 | 0 | 0 |
| Jute yarn | 0 | 10-15 | 8 | 5 | 30 |
| Jute fabrics | 0 /2 | 20 | 15-22 | 10 /3 | 0 |
| Jute sacks/bags (new) | 1.5 /4 | 20 | 15-20 | 10 /3 | 10 /5 |

/1 Imports from Commonwealth countries are duty-free.

/2 0.2 ¢/lb. specific duty + 2.5% ad valorem on bleached, colored or flame-resistant fabrics.

/3 A ceiling on imports exists at 21,000 metric tons.

/4 Plus specific duty of 0.2¢/lb.

/5 Except for corn sacks which are admitted duty-free.

Source: U.S. Tariff Commission; Commonwealth Secretariat; and UNCTAD Secretariat.

Table 5: NET IMPORTS OF RAW JUTE AND ALLIED FIBERS
AVERAGE FOR 1961-63, 1964-66 AND 1967-69
AND 1970

(thousand metric tons)

| | Average 1961-63 | Average 1964-66 | Average 1967-69 | 1970 |
|---|---|---|---|---|
| **A. Developed Countries** | | | | |
| Western Europe | | | | |
| EEC | 289.6 | 284.1 | 295.5 | 273.3 |
| United Kingdom | 137.8 | 128.3 | 110.8 | 94.1 |
| Other /1 | 72.7 | 86.6 | 85.9 | 79.2 |
| Total | 500.1 | 499.0 | 492.2 | 446.6 |
| North America | | | | |
| United States | 57.8 | 55.9 | 42.9 | 29.6 |
| Canada | 2.0 | 2.7 | 3.0 | 3.0 |
| Total | 59.8 | 58.6 | 45.9 | 32.6 |
| Other Developed | | | | |
| Japan | 74.2 | 86.3 | 112.3 | 104.0 |
| Australia | 8.0 | 7.0 | 8.0 | 10.0 |
| South Africa | 30.5 | 29.0 * | 28.0 * | 28.0 * |
| Others /2 | 2.8 | 2.9 | 4.5 | 2.5 |
| Total | 115.5 | 125.2 | 152.8 | 144.5 |
| Total Developed | 675.4 | 682.8 | 690.9 | 623.7 |
| **B. Centrally Planned Countries** | | | | |
| USSR | 17.5 | 24.5 | 24.7 | 36.4 |
| Eastern Europe | 55.5 | 61.5 | 58.0 | 57.5 |
| China, Peoples' Republic | 9.7 | 56.2 | 56.3 | 47.5 |
| Total Centrally Planned Countries | 82.7 | 142.2 | 139.0 | 141.4 |
| **C. Developing Countries** | | | | |
| India | 48.8 | 117.1 | 90.5 | - 25.6 |
| Other Asia /3 | 58.0 | 52.0 | 51.0 | 65.0 |
| Africa/Near East | 42.0 | 44.5 | 65.0 | 61.5 |
| Latin America | 11.5 | 14.5 | 14.0 | 15.0 |
| Total Developing Countries | 160.3 | 228.1 | 220.5 | 115.9 |
| **D. Total World (A + B + C)** | 918.4 | 1,053.1 | 1,050.4 | 881.0 |

* Estimate based on exports from producing countries.

/1 Other Western European countries plus Greece, Turkey and Yugoslavia.
/2 Consists of New Zealand, Rhodesia and Israel.
/3 Includes Pakistan.

Source: National Trade Statistics (wherever available) complemented by: European Association of Jute Industries, Statistical Yearbook (Annual); Indian Jute Mills Association, Annual Summary of Jute and Gunny Statistics (various issues); Bangladesh Jute Board, The Jute Season, 1968/69 and 1969/70; Commonwealth Secretariat, Industrial Fibers (various issues); and FAO, Trade Yearbook (various issues).

## III. WORLD SUPPLY: STRUCTURE AND TRENDS

### A. Historical Perspective

119. The world supply of jute and jute goods has undergone important changes in the last two decades. In general terms, the 1950's saw a large increase in the production of raw jute and allied fibers, 1/ while the 1960's saw important changes in the location of manufacturing activity.

Table 17: PRODUCTION OF RAW JUTE AND JUTE GOODS /a

(000's metric tons)

| | Raw Jute | | | | Jute Goods | | | |
|---|---|---|---|---|---|---|---|---|
| | India | Pakistan | Others | Total | India | Pakistan | Others | Total |
| 1951/52 | 670 | 948 | 211 | 1829 | 983 | 1 | 566 | 1550 |
| 1961/62 | 1456 | 1304 | 831 | 3591 | 1096 | 273 | 1544 | 2913 |
| 1970/71 | 1116 | 1163 | 1010 | 3289 | 1092 | 478 | 1352 | 2922 |
| 1971/72 | 1231 | 777 | 1219 | 3227 | 1252 | 305 | 1293 | 2850 |

/a At least three possible factors cause jute goods production to differ from raw jute production in any given years. These are: (i) changes in stock positions including carryovers from one year to the next; (ii) village consumption; and (iii) a wastage factor of 5-6 percent in manufacturing.

Source: IJMA, BJMA, AEJI, and FAO.

120. Production of jute and allied fibers increased rapidly during the 1950's doubling from 1.8 million tons in 1951 to 3.6 million tons in 1961, a growth rate of about 7.5 percent per year. Production in Pakistan, which accounted for about 50 percent of total output in the early 1950's, grew at only 3 percent per year to reach 1.3 million tons in 1961/62 thereby declining to 36 percent of the total. In fact, 1961/62 was a particularly good year in Pakistan because of favorable weather conditions, and the average crop for the decade was about 1 million tons with no discernable trend. Production in India increased from about 670,000 tons to 1.5 million tons (about one-third of the

1/ Including mesta (produced mainly in India) and kenaf (produced mainly in Thailand and China).

increment being mesta) as the result of an extensive program to expand jute acreage in order to supply domestically jute previously imported from Pakistan. Production in Thailand increased from almost nil to about 300,000 tons (almost all of which is kenaf), while production in the USSR and mainland China increased by 265,000 tons to 365,000 tons, of which about two-thirds is kenaf. The most important structural changes during the 1950's were the decline in the share of Pakistan in total world production and the increasing importance of allied fibers which had accounted for only 8 percent of output in 1951/52 but which increased to about one-quarter of the total by the end of the decade. Since allied fibers are low-cost, low-quality substitute for jute, the development was important as a measure of the potential market lost to jute because of an inability to increase yields and lower production costs.

121. In the main, the 1960's have been a decade of stagnancy for the production of raw jute and allied fibers. There have been fairly large yearly fluctuations based largely on varying climatic conditions. However, output has averaged about 3.5 million tons per year or roughly the same as in 1961, with 77 percent accounted for by jute. The main fluctuations have been in jute production in India which have been counterbalanced by the fairly sensitive supply response of Thai kenaf. Bangladesh and India now each supply about one-third of total world production and the USSR and mainland China about 15 percent, with Thailand, Nepal, and other countries in Asia, Africa, and Latin America accounting for the remainder.

122. Political considerations were the key factor causing trade between India and Pakistan to diminish in the early 1960's and to cease in 1965. 1/ Thus, India could no longer import raw fiber from Pakistan, a situation for which India had started to prepare soon after partition with a "grow-more-jute" campaign. 1/ By 1966, India had expanded jute and especially mesta output considerably, and only relatively small imports of Thai kenaf (about 15 percent of Indian consumption) were required. Thailand maintained an essentially laissez-faire attitude both towards world trade and domestic production. Since kenaf is grown on marginal land with few alternative uses, the supply response to world price fluctuations is fairly sensitive. In practice, this meant that a poor Indian crop one year was followed by a large Thai crop the following year, an important element in replacing drawn-down buffer stocks.

123. The most distinctive changes in the production of jute goods have been the continuous increase in Pakistan's share over time (except for the war-induced decline of the last 2 years) and the increase in production in other countries (mainly Western Europe) in the 1950's followed by declining production in those countries in the 1960's.

---

1/ See Chapter I for a brief description of the campaign. Of course, there was considerable informal border trade - perhaps on the order of 100,000 tons per year.

124. Production in Pakistan increased from 1951/52 to 1961/62 reflecting a large increase in capacity, then leveled off for several years, at 275 to 300,000 tons as no new capacity was installed. However, a large investment program in the middle 1960's enabled production to increase from 289,000 tons in 1964/65, to 587,000 tons to 1969/70, or by over 100 percent. The years following 1969/70 saw production drop markedly at about 305,000 tons in 1971/72. Current trends in Bangladesh indicate a likely level of about 480-500,000 tons in 1972/73 (see Volume II for a more detailed discussion).

125. India, on the other hand, allowed output of manufactures to stagnate over the last 20 years, with the notable exception of the last 2 years when production for export increased to partly absorb world demand resulting from the declines in exports from Pakistan. Exports from India had been declining before this, from a level of about 960,000 tons in the middle 1960's to little more than 600,000 tons in 1970 (see Table 35). Overall demand for goods remained constant only because of large increases in domestic consumption.

126. Perhaps the most important element in the decline of India as an exporter of jute goods was the squeeze imposed by tariff and quota barriers in Western European markets on the one hand, and Pakistan's aggressive expansion of exports supported by a differential exchange rate system that provided cheap raw jute to her domestic manufacturing industry. Jute prices in Pakistan were typically about one-half Indian jute prices (see Volume II for an analysis of this system). The differential exchange rate system was, of course, removed by the Government of Bangladesh on January 1, 1972, and raw jute prices quickly rose by about 50 percent.

Table 18: TAXES ON INDIA'S EXPORTS OF JUTE MANUFACTURES

| | Unit Value/a (Rs. per ton) | Export Duty |
|---|---|---|
| Hessian | | |
| June 1966 | 2,406 | 900 |
| May 1967 | 3,359 /b | 750 |
| Feb. 1968 | 2,777 | 500 |
| March 1969 | 3,557 | 200 |
| Dec. 1971 | 4,152 | 600 |
| Sacking | | |
| June 1966 | 1,918 | 600 |
| May 1967 | 2,570 /b | 450 |
| Feb. 1968 | 2,001 | 250 |
| March 1969 | 2,527 | 150 |
| Dec. 1971 | 2,960 | 150 |
| Carpet-Backing | | |
| June 1966 | 3,057 | 900 |
| May 1967 | 4,638 /b | 600 |
| Dec. 1969 | 5,080 | 300 |
| Dec. 1971 | 4,488 | 700 /c |

/a For the month closer to the date of the change in export duty.
/b June 1966-March 1967 (average).
/c Reduced to 400 Rs/ton for constructions ≥ 9o.z. per sq. yd. from October 31, 1972.

Source: Monthly Statistics of Foreign Trade of India, and IJMA, Annual Summary of Jute and Gunny Statistics 1971/72.

127. Quite apart from subsidizing or protecting her jute industry, India has imposed export taxes on hessian, sacking and carpet backing of varying amounts over the years, but amounting to about 6-37 percent for hessian, 5-31 percent for sacking and 6-29 percent for carpet backing.

128. The differing government policies in India and Pakistan were of crucial importance in determining market shares. Pakistan was able to underprice India in hessian and sacking, and by the end of the 1960's had captured about 85 percent of the combined sacking export market of the two countries and about 45 percent of the combined hessian export market. India retained most of the combined carpet backing market, largely because Pakistan's capacity in carpet backing increased much more slowly than in hessian and sacking.

129. The fact that Pakistan discriminated against raw jute exports in favor of exports of jute manufactures thereby promoting a profitable domestic jute manufacturing industry proved to be an important determinant of the world jute trade. The smaller jute crops implied by lower domestic raw jute prices encouraged the growth of substitutes for jute. In the developing countries, this encouraged the rapid growth of kenaf, mesta, and similar fibers which are combined with jute to allow production of cheaper goods. Since allied fibers such as kenaf were typically 40 to 50 percent less expensive, 1/ but can only be used in a given ratio in most production, this was probably an important factor in preserving the jute market. In the developed countries, synthetics and other products were substituted for jute thereby diminishing the jute market situation. It would appear that a wiser policy would have been a lesser degree of discrimination against raw jute exports thereby preserving jute markets in Western Europe until the time when they could have been supplied with goods from Pakistan. The degree of substitution is discussed in Chapter II.

130. The data on manufacturing output over time suggest that a considerable shift has occurred in the location of manufacturing capacity, and such a shift has indeed taken place.

131. Aside from the apparent (rather than real) decline in the number of Indian looms, the table below portrays the two basic features of structural change in manufacturing capacity over time - the rapid increase in capacity in Pakistan and the equally rapid decline of capacity in Western Europe. The increase in capacity in Pakistan, discussed in detail in Volume II, was part of the Government's program to increase foreign exchange earnings and industrial employment among other considerations.

---

1/ The current price level of kenaf is about the same as that of raw jute. This is no doubt a reflection of the recent shortage of raw jute and it is expected that kenaf price will soon decline to previous levels.

Table 19: NUMBER OF LOOMS BY COUNTRY

| | 1952 | 1960 | 1966 | 1970 |
|---|---|---|---|---|
| India | 68,557 | 72,125 | 75,265 | 41,032 /a |
| Pakistan | 2,087 | 8,092 | 14,342 | 21,508 |
| Western Europe | 35,609 | 28,349 | 24,658 | 12,908 |
| Of which: | | | | |
| United Kingdom | ( 8,140) | ( 6,588) | ( 5,834) | ( 3,384) |
| France | ( 6,477) | ( 3,953) | ( 2,851) | ( 2,183) |
| Germany (Federal Rep.) | ( 5,084) | ( 3,873) | ( 3,690) | ( 2,291) |
| Belgium | ( 3,718) | ( 3,310) | ( 3,174) | ( 1,218) |
| Rest of World | 15,923 | 22,060 | 25,331 | 27,000 |
| Total | 122,176 | 130,626 | 139,596 | 102,448 /a |

/a The entries for India for 1952, 1960, and 1966 consist of all looms previously registered with the IJMA and represent, in part, a number of looms which were inactive or which no longer existed. Since 1968 is the first year for which the number of active looms only is available, it is not possible to give an estimate of looms in use for the earlier years. However, a comparison of data for 1966 and 1968 indicates that the earlier figures contain a sizeable upward bias of about 25,000 looms.

Sources: AEJI Statistical Yearbook, IJMA, BJMA, and FAO. The rest of World entry for 1970 is a mission estimate.

132. The rapid decline of manufacturing capacity in Western Europe is directly related to decreased consumption, as tariff barriers and quotas effectively prohibited the import of manufactured items. The key characteristic of this decline is that it has been progressive and monotomic for some decades, and that it has occurred in almost every major jute-using country in the region. The most precipitous decline has occurred in the United Kingdom, which, by 1971, had only 2,054 operating looms, only 25 percent of the 1952 level, and less than 5 percent of India's current capacity. The

only countries which are exceptions to this precipitous decline are Portugal, where loomage increased from 558 in 1952 to 951 in 1971, and Spain, where loomage has been declining very gradually. The analysis of Chapter II of this volume discussed trends in Western Europe in detail.

133. The research effort expended during these years will be discussed at the end of this chapter, but it is worth mentioning at this point that, while some institutions were established which evolved useful results, jute technology on the whole has remained stagnant. Agricultural production, and yields in particular, have remained unchanged, as has the basis methods of converting fiber to manufactured goods. This stagnant technological base combined with the pricing policies mentioned above clearly invited a strong research and development effort for synthetic substitutes on the part of large companies in developed countries. The results of that effort began to pay off in the middle 1960's, although jute-producing countries did not respond for more than half a decade afterwards.

B. Importance of Jute to Producing and Exporting Countries

134. Jute and allied fibers are of significant importance to at least four developing countries, and of varying degrees of importance to a number of others. Bangladesh is quite clearly the country most dependent on jute. Exports of raw jute and jute manufactures have accounted for over 60 percent of foreign exchange earnings in recent years, and are expected to account for over 80 percent of foreign exchange earnings in 1972/73.

Table 20: EXPORTS OF JUTE AND JUTE GOODS FROM BANGLADESH

(millions of US dollars)

| | 1969/70 | | 1970/71 | | 1971/72 | | 1972/73 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % | Value | % | (Est.) |
| Raw Jute | 160 | 30 | 105 | 24 | 100 | 32 | 130 | 35 | |
| Jute Manufactures | 193 | 36 | 160 | 37 | 123 | 40 | 185 | 49 | |
| Other | 189 | 34 | 167 | 39 | 85 | 28 | 60 | 16 | |
| Total | 542 | 100 | 432 | 100 | 308 | 100 | 375 | 100 | |

Source: Bangladesh Planning Commission.

Volume II examines the importance of jute to Bangladesh in greater detail.

135. The importance of jute to India is greater than suggested by percentages of national figures because production is localized in Bengal, and other important areas where alternative sources of income are quite limited. However, even in terms of percentages of foreign exchange earnings, jute manufactures are the most important single item, accounting for about 15 percent of total earnings.

Table 21 : EXPORTS OF JUTE GOODS FROM INDIA

(millions of US dollars)

| | 1968/69 | | 1969/70 | | 1970/71 | |
|---|---|---|---|---|---|---|
| | Value | % | Value | % | Value | % |
| Jute Goods | 291 | 16 | 276 | 15 | 254 | 12 |
| Other | 1,522 | 84 | 1,608 | 85 | 1,793 | 88 |
| Total | 1,813 | 100 | 1,884 | 100 | 2,047 | 100 |

Source: Ministry of Foreign Trade.

136. Nepal has produced about 30-40,000 tons of raw jute, or a little over 1 percent of the world's total. Despite this low share, jute exports are extremely important as they account for over two-thirds of that country's foreign exchange earnings.

137. Thailand has been an important supplier of raw fiber (kenaf) to India, Japan, and other countries. While Thailand accounts for about 10 percent of world production, it is of distinct importance as a supplier as Thai production has often made up for shortfalls in India and Bangladesh (since it is often subject to different climatic conditions), thereby helping to keep world prices stable. Since 1965, kenaf exports have accounted for between 5 and 15 percent of foreign exchange earnings.

## C. Relative Costs and Prices

138. Raw jute costs and prices have shown significant differentials among various producer countries. Indian costs and prices have, in the past, been considerably above levels in Pakistan, partly because of Pakistan's differential exchange rate system which suppressed the domestic price of raw jute, but also because productivity in Pakistan was higher and relative costs lower. In addition, Indian jute is, in general, of lower quality. The price differentials existed over time because of a ban from 1965 to liberation on trade between the two countries. There has, of course, been a considerable amount of smuggling in response to the price differential, perhaps on the order of 100,000 tons per year.

139. The following table indicates the relative cost of raw jute in sacking and hessian production in India and Pakistan in 1968. The differential for sacking was about $44/ton, and raw jute costs to Indian mills were one-third higher in sacking production. The differential in hessian was estimated at $23/ton, indicating that raw jute costs to Indian mills were some 10-15 percent higher than raw jute costs to Pakistani mills. No cost figures were available for carpet-backing, but it may be surmized that the cost differential was greatest in that activity as carpet-backing requires high-quality fiber, in short supply in India but relatively plentiful in Pakistan.

140. Conversion costs, on the other hand, were lower in India than in Pakistan, reflecting the greater relative efficiency of the Indian industry. This comparison is, of course, made at the then prevailing official exchange rates of 4.76 Rupees/dollar for Pakistan and 7.28 Rupees/dollar for India. Nevertheless, it will be seen later in paragraph that India's relative conversion cost advantage persists today with identical exchange rates in the two countries. Conversion costs in the Indian industry were 38 percent below those in Pakistan for hessian production and 54 percent below for sacking production.

Table 22: COMPARATIVE COST OF JUTE GOODS IN INDIA AND PAKISTAN: 1968

(per ton)

| | HESSIAN | | | | SACKING | | | |
|---|---|---|---|---|---|---|---|---|
| | Pakistan | | India | | Pakistan | | India | |
| | Pak. Rs. | US$ | Ind. Rs. | US$ | Pak. Rs. | US$ | Ind. Rs. | US$ |
| 1. Jute Cost | 868 | 182 | 1540 | 205 | 608 | 128 | 1288 | 172 |
| 2. Conversion Cost | 953 | 200 | 925 | 123 | 692 | 145 | 597 | 79 |
| 3. Manufacturing Cost | 1821 | 382 | 2465 | 328 | 1300 | 273 | 1885 | 251 |
| 4. (a) Deduct Bonus at 45% Price for Pakistan | 783 | 164 | | | 568 | 119 | | |
| (b) Add Export Duty for India | — | — | 508 | 68 | — | — | 254 | 34 |
| 5. Net Price | 1038 | 218 | 2973 | 396 | 732 | 154 | 2139 | 283 |
| 6. F.A.S. Selling Price Plus Export duty for India on 4.7.68 | 1741 | 366 | 2770 | 369 | 1262 | 265 | 2029 | 270 |
| 7. Profit (+)/Loss (-) = 6-5 | +703 | +148 | -230 | -27 | +530 | +111 | -110 | -15 |
| 8. Pakistan's advantage over India | | | | | | | | |
| In $ | | | | +178 | | +131 | | |
| In Indian Rs. | | | | +1335 | | +983 | | |
| 9. Average Batch Cost Rs./Md | 31 | | 55 | | 23 | | 46 | |

Source: IJMA.

141. It would, of course, be dangerous to accept such cost figures as precise estimates of relative costs and efficiency. Precise estimates simply do not seem to be available. For example, raw jute costs may be significantly overstated. Nevertheless, the estimates are probably good indications of the direction of relative costs and efficiency, and seem to conform to generally accepted if not always quantified estimates.

142. The overall cost advantage of Pakistan's industry over India's industry which existed despite a disadvantage in conversion costs and was based solely on less expensive raw jute, is consistent with estimates that Pakistani mill owners were earning 10-15 percent profits on sales while underbidding Indian exporters thereby increasing Pakistan's market share.

143. After the creation of Bangladesh and the introduction of a uniform exchange rate, raw jute prices in Bangladesh rose considerably. Devaluation was not the only factor as food shortages caused rice prices to rise considerably. Since jute competes with rice for productive resources including land, this no doubt was of considerable importance in raising raw jute prices in Bangladesh by about 60 percent.

144. The mission estimated current manufacturing costs in India and Bangladesh. The basis for these estimates is , for India, IJMA data and mission estimates, and for Bangladesh, a sample survey of 12 mills combined with BJMA data.

Table 23: COMPARATIVE COSTS OF PRODUCTION IN INDIA AND BANGLADESH

| | HESSIAN | | | | SACKING | | | | CARPET BACKING | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | India | | Bangladesh | | India | | Bangladesh | | India | | Bangladesh | |
| | Rs/Ton | % | Tk/ton | % | Rs/ton | % | Tk/ton | % | Rs/ton | % | Rs/ton | % |
| Raw Materials | 1900 | 55 | 1750 | 44 | 1600 | 58 | 1396 | 54 | 2600 | 56 | 2176 | 45 |
| Conversion Costs | 1598 | 45 | 2247 | 56 | 1152 | 42 | 1213 | 46 | 2018 | 44 | 2632 | 55 |
| Of which: | | | | | | | | | | | | |
| Wage & Salaries | ( 976) | (28) | (1024) | (26) | ( 749) | (27) | ( 564) | (21) | (1244) | (27) | ( 969) | 20 |
| Stores | ( 62) | ( 2) | ( 193) | ( 5) | ( 37) | ( 1) | ( 100) | ( 4) | ( 263) | ( 6) | ( 320) | 7 |
| Interest | ( 68) | ( 2) | ( 245) | ( 6) | ( 51) | ( 2) | ( 118) | ( 4) | ( 103) | ( 2) | 401 | 8 |
| Depreciation | ( 58) | ( 2) | ( 238) | ( 6) | ( 38) | ( 1) | ( 135) | ( 5) | ( 144) | ( 3) | 350 | 7 |
| Others | ( 374) | ( 1) | ( 547) | (13) | ( 277) | (10) | ( 296) | (12) | ( 264) | ( 6) | 592 | 13 |
| TOTAL | 3438 | 100 | 3997 | 100 | 2752 | 100 | 2609 | 100 | 4618 | 100 | 4808 | 100 |
| Selling Price /1 | 3560 | | 3700 | | 2600 | | 2600 | | 4550 | | 4600 | |

/1 For India, F.A.S. (cost of factory) for Bangladesh, F.O.B.

Source: Mission estimates based on: (1) IJMA data for India, (2) mission sample survey for Bangladesh.

For purposes of analysis, it is also helpful to present cost ratio based on the above table.

Table 24: RELATIVE COSTS OF PRODUCTION IN INDIA AND BANGLADESH

| | Raw Materials | Labor | Non-Labor Conversion Costs | Total Conversion Costs | Total |
|---|---|---|---|---|---|
| Hessian | | | | | |
| Bangladesh Costs / Indian Costs | .92 | 1.05 | 2.18 | 1.46 | 1.16 |
| Sacking | | | | | |
| Bangladesh Costs / Indian Costs | .87 | .75 | 1.61 | 1.05 | .94 |
| Carpet Backing | | | | | |
| Bangladesh Costs / Indian Costs | .84 | .78 | 2.15 | 1.30 | 1.04 |

Note: Computed rate of 1 Taka = 1 Rupee.

Source: Table 23.

145. It is, of course, difficult to verify such estimates. They are, however, consistent with the previous estimates given previously, with the notable exception that raw materials costs in Bangladesh are now much higher as a result of the devaluation and resulting high domestic prices for raw fiber. If the cost estimates are correct, 1/ the profit position for both India and Bangladesh is apparently extremely weak, which is verified by budgetary indications in Bangladesh.

146. Raw materials are generally less expensive in Bangladesh than in India, by from 8 percent by hessian to 16 percent for carpet-backing. Since the cost differential for carpet-backing raw materials (394 Takas or 20 £ per ton) about the same as shipping costs from Bangladesh to Western Europe, it seems obvious that raw jute exports from Bangladesh to India would benefit both countries. The reason why the raw materials differential between India and Bangladesh shows up most strongly in carpet-backing is that this product

1/ Perhaps the weakest area in such estimates in the costs of raw jute, many mills purchase jute from trading companies that they own and there is some reason to believe that raw jute may be over-invoiced in such situations.

requires high quality fiber which is scarce in India but much more plentiful in Bangladesh. However, the differentials in hessian and sacking raw materials costs also appear great enough to make exports of raw jute to India profitable for both countries.

147. Conversion costs in Bangladesh appear higher than in India, despite generally lower labor costs as non-labor conversion costs in Bangladesh are estimated at almost twice Indian levels. Capital is more costly. This in part reflects the newer capital stock in Bangladesh and higher depreciation charges. However, interest on capital is an important item and this largely reflects the large amounts of working capital borrowed from the banking system in turn caused largely by a build-up of inventories as well as the need to cover expenses (largely wages) during the war when production was low. Stores are an extremely costly item in Bangladesh. These and other aspects of industrial costs in Bangladesh are discussed in Chapter IV.

148. It is, of course, important to note that the above comparisons are made on the basis of the official exchange rates for India and Bangladesh, and that there are indications that such a basis of comparison may reflect a financial rather than economic advantage in India.

149. It would surely be worth considerable effort to increase productivity per loom both in Bangladesh (which is about 75 percent of 1969/70 levels) and in India, which also has excess capacity, before investing in new plant and equipment. Output levels in both countries are less than 50 percent of feasible capacity. The need to more fully utilize existing capacity before considering any expansion is especially relevant today since machinery costs during the past several years have been increasing because of increase in costs of productive on the one hand, and a strong demand on the other. New equipment is being installed in Africa and several Asian countries especially Indonesia, which to date have mostly imported finished products.

150. The mission attempted to compare production costs in India and Bangladesh with those in Western Europe. The following table gives mission estimates (based on industry interview) for production costs of carpet-backing in the United Kingdom.

Table 25: CARPET BACKING PRODUCTION COSTS IN THE UNITED KINGDOM

(U.S. Dollars per ton)

| | 9 oz. Carpet Backing | 7 oz. Carpet Backing |
|---|---|---|
| Raw Material | 348 | 360 |
| Yarn production | 307 | 312 |
| Weaving | 221 | 228 |
| Total | 876 | 900 |

Note: Converted at $2.40 to the pound.

Source: Mission estimates.

151. These costs are about 70 percent above production costs in India and Bangladesh. If accurate, they provide a strong rationale for the rapid demise of the jute carpet-backing industry in the United Kingdom.

## D. Pricing Policies

152. Pricing, especially in terms of foreign exchange, has probably been the most important policy variable used by governments to influence jute production. In view of these projections of world demand given in Chapter II, pricing is once again a key policy variable, although in the longer run, changing the cost level and structure of production combined with improved marketing techniques are also of great importance.

153. One of the key decisions in the past was that of Pakistan to employ a differential exchange rate for exports of raw jute and jute manufactures, a decision which had the effect of imposing a tax on raw jute of about 50 percent in the late 1960's. (See Volume II, pages 2 to 5 for a more detailed explanation and discussion.) The essential feature of the differential exchange rate was, therefore, to protect Pakistan's domestic jute manufacturing industry by raising the international price of raw jute while keeping domestic raw jute prices low.

154. The differential exchange rate system gave up to 8.6 Rupees per dollar for exports of jute manufactures but only 4.76 to 5.6 Rupees per dollar for exports of raw jute.

Table 26: EFFECTIVE EXCHANGE RATES FOR RAW JUTE AND JUTE MANUFACTURES

| | Jute Manufactures Effective Exchange Rates (Rs /dollar) | Raw Jute Effective Exchange Rates (Rs /dollar |
|---|---|---|
| 1961/62 | 5.68 | 4.28 |
| 1962/63 | 5.72 | 4.24 |
| 1963/64 | 5.60 | 4.22 |
| 1964/65 | 5.60 | 4.55 |
| 1965/66 | 5.58 | 4.52 |
| 1966/67 | 5.82 | 4.56 |
| 1967/68 | 7.30 | 4.76 |
| 1968/69 | 7.66 | 4.76 |
| 1969/70 | 8.19 | 4.76 |
| 1970/71 | 8.61 | 5.62 |

155. The differential exchange rates lead, of course, to a serious misallocation of resources a situation that was corrected with the introduction of a unitary exchange rate in Bangladesh of about 7.8 Takas per dollar. In terms of maximizing foreign exchange earnings, however, it is not clear that a unitary foreign exchange system is superior to a differential foreign exchange rate system, although it is clear that exchange rate levels of the past were distinctly overvalued. In terms of maximizing earnings, pricing policy should reflect marginal revenue considerations, and, specifically relative elasticities of demand and market shares.

156. It appears quite likely that the elasticity of demand for raw jute was and is lower than the elasticity of demand for jute manufactures. This likelihood is based on the theory of derived demand and is in agreement with commercial attitudes. Since raw jute comprises only about 50 percent of the costs of jute manufactures and since it must, of course, be used in a fixed proportion to output a given percentage change in the price of raw jute will probably change the amount demanded by only one-half as much 1/ as the same percentage price change in jute manufactures.

157. Market share considerations would have also suggested that raw jute exports from Pakistan faced a less elastic demand curve than did exports of jute manufactures. Pakistan in 1951/52 supplied about one-half of the world output of raw jute, but much less than one percent of the output of jute manufactures. In 1961/62, the ratios had changed to about one-third for raw jute and about 10 percent for jute manufactures, and in the late 1960's jute manufactures in Pakistan for almost 20 percent of world production. It could therefore be argued that, to the extent that the conditions described in this and the preceding paragraph hold true today, there is some reason to consider the merits of a differential exchange rate.

158. In any event, it is apparent from the analysis of Chapter II that demand elasticities for both goods and raw jute are quite high, especially in the long run, and that prices of raw jute and jute goods need to be reduced. Indeed, the problem with considerations such as market shares, is precisely that they tend to suppress the most important aspect of market demand, namely, the competition with synthetics. It is of overriding importance that world prices of raw jute and jute goods be lowered if there is to be a long run for jute. The most feasible short-run solution to this problem would be an exchange rate adjustment. A more complete description of pricing mechanisms in Bangladesh is given in Volume II.

---

1/ More formally, the elasticity of derived demand for raw jute, given fixed factor proportions in which the assumption that raw jute comprises 50 percent of costs can be computed from the following:

$$n_r = \frac{\frac{1}{2} en}{\frac{1}{2} n + e}$$

where $n_r$ is the elasticity of demand for raw jute
$n$ is the elasticity of demand for jute goods
$e$ is the elasticity of supply of other factor

159. While this discussion has so far dealt with Pakistan and Bangladesh, India has, of course, also varied the effective exchange rate for exports of manufactures by imposing an export tax, discussed in paragraph . The effect of this tax has been to increase the cost of jute goods significantly, especially at crucial times such as the last two years, when a long-term policy would have indicated lower prices for jute goods to diminish expansion of capacity and output of synthetic substitutes.

160. Thailand and many other producers of raw fiber have adopted essentially a laissez-faire policy towards pricing. This has allowed market forces to govern output though, of course, with some lags in supply response. The result has been an important stabilization of world supplies.

## E. Trade and Trade Prospects

161. Exports of jute goods from India and Bangladesh taken together have remained roughly constant through the 1960's, with India's share declining somewhat and Bangladesh's increasing (see Table 34). The total amounted to over 1 million tons until 1970/71, but the last two years saw a decline largely due to war.

162. India's exports of jute goods are highly concentrated among a few countries. The U.S., which accounted for one third of the total in the early 1960's, increased its share progressively to 44 percent for the year 1969/70 - 1971/72. All of this increase was on account of carpet-backing. The U.S.S.R., which accounted for only 3 percent of exports in the early 1960's, now accounts for 14 percent, almost all of which is hessian and sacking. Canada and Australia account for about 5 percent each, with a large number of other countries importing small amounts.

163. Bangladesh's exports of jute goods increased rapidly until 1969/70, reaching over 500,000 tons in 1969/70, with civil disturbances and war causing a decline thereafter. About 90 percent of exports are hessian and sacking. The U.S. accounts for one-fourth of total exports. Exports to East Africa are for a similar amount.

164. Exports of raw jute from Bangladesh go to a wide variety of countries (see Table 37). The EEC countries currently absorb about one third of the total, with other Western European countries accounting for another one-third. India, which accounted for about 10 percent of exports in the early 1960's, received no raw jute between 1964/65 and 1972/73. However, on March 28, 1972, the Government of Bangladesh and India agreed to include 75 million takas of raw jute in a barter arrangement, under which sales were to be finalized at current market rates. This could amount to trade in the order of 30 to 40,000 tons. In view of the existing raw jute cost differentials, there seems to be ample scope for increasing such arrangements. The superior quality of Bangladesh jute is also an important consideration, especially since much of India's research effort is directed towards producing Indian fiber of similar quality.

165. There would also appear to be scope for raw jute trade between Bangladesh and Thailand. With a normal ratio of kenaf to jute prices of about 60 percent, blending kenaf with jute could lower production costs considerably. This would be especially true for Bangladesh mills in Chittagong area, which is the major port and which also face high jute prices because of the distance from jute-growing areas in Bangladesh. There is also some small scope for exporting jute from Bangladesh to Thailand which has several small mills. Mixing small quantities of Bangladesh jute with kenaf, say in a ratio of 1 to 10, would considerably improve the quality of sacks made in Thailand. Because the profitability of such trading arrangements turns on improvements in transportation facilities, it is not possible at present to offer precise quantitative prescription at this time.

166. The supply of jute and jute goods in the 1970's will be subject to a variety of political and other factors which are difficult to predict. However, basic economic forces suggest certain general trends. It is likely that the geographic center of the jute trade will continue to shift towards Asia and away from the developed world. The markets for jute products will probably be found in regions closer to producing regions in the absence of a vigorous program of marketing and research and development. If such a trend develops, it will have important adverse implications for the hard-currency foreign exchange earnings of a significant portion of the developing world.

167. The current supply position of the world jute trade is summarized in the table below. India and Bangladesh play predominant roles in raw fiber production, each accounting for about one third of the total. Demand in India absorbs enough production so that exports of jute goods from India and Bangladesh are roughly equal.

Table 27: SUPPLY OF JUTE AND JUTE GOODS[/a], 1970
(Thousands of metric tons)

| | JUTE | | | JUTE GOODS | | |
|---|---|---|---|---|---|---|
| | India | Bangladesh | World Total | India | Bangladesh | World Total |
| Production | 1,129 | 1,321 | 3,460 | 1,099 | 587 | 3,289 |
| Domestic Consumption[/b] | 1,155 | 658 | 2,522 | 514 | 21 | 2,230 |
| Exports | -26 | 625 | 908 | 549 | 566 | 1,147 |

/a Jute goods production is normally less than raw jute production because: (i) village consumption is not counted; (ii) there is a wastage factor of 5-6 percent in manufacturing. In addition, changes in stock positions can cause discrepancies in any given year.

/b Includes stock adjustments.

Source: FAO, IJMA, BJMA.

168. A projection of trade to 1980, with all the uncertainty which necessarily inherent in it, is useful to help understand current trends. These are a few basic inputs to the projection. The demand

Table 28: SUPPLY PROJECTIONS FOR JUTE AND JUTE GOODS /a IN 1980
(Thousand of metric tons)

| | JUTE | | | JUTE GOODS | | |
|---|---|---|---|---|---|---|
| | India | Bangladesh | World Total /b | India | Bangladesh | World Total /b |
| Production | 1,125 | 1,400 | (3,850) | 1,248 | 685 | (3,590)<br>(3,770) |
| Domestic Consumption | 1,325 | 725 | 3,300 | 798 | 40 | (2,643)<br>(2,628) |
| Exports | 200 | 675 | (603)<br>(558) | 450 | 645 | ( 947)<br>(1,142) |

/a Jute goods production is normally less than raw jute production because: (i) village consumption is not counted; (ii) there is a wastage factor of 5-6 percent in manufacturing. In addition, changes in stock positions can cause discrepancies in any given year.

/b Upper bracketed figure refers to Alternative I while lower bracketed figure refers to Alternative II (see Tables 3 & 4).

analysis presented in Chapter II has been taken as a key against which the supply considerations of this chapter have been matched. Thus, Tables 15 and 16 of Chapter II are summarized in Table 28 above. The advantage of Bangladesh over India in producing raw jute is reflected in the projected export of raw jute to India. Production of raw jute in India is not expected to increase. With world import demand projected to remain roughly constant, and with a large increase in domestic demand projected for India, it is assumed that Bangladesh will increase exports of jute goods. Most of the increment will probably be carpet backing for the U.S. and perhaps other developed countries.

169. Although the quantity of exports of raw jute from Bangladesh is predicted to increase by about 8 percent during the decade, and the quantity of manufactures by 19 percent, predicted price declines suggest that export earnings may increase by smaller amounts. One factor operating against this trend is the expected increasing importance of carpet-backing in the mix of exported goods. Since carpet-backing earns about 50 percent more foreign exchange than sacking and 25 percent more foreign exchange than hessian, it is distinctly possible that Bangladesh may enjoy a reasonable increase in foreign exchange earnings, and that India may maintain foreign exchange earnings from jute. Since current output levels are only about one-half of feasible capacity, it should be noted that projected increases in demand do not call for increased capacity, but rather for increased utilization of current capacity. Further, with almost 25 percent of total costs in Bangladesh now incurred on account of interest, depreciation, and other essentially fixed costs, an increase in capacity utilization to 75 percent of feasible capacity could lower unit costs by 5 to 10 percent immediately. It would surely be worth considerable effort to increase

productivity per loom both in Bangladesh (which is about 75 percent of 1969/70 levels) and in India (both countries operate at less than 50 percent of feasible capacity) before investing in new plant and equipment. This is especially true since machinery costs during the past several years have been increasing because of increase in costs of production on the one hand, and a strong demand on the other. New equipment is being installed in Africa and several Asian countries especially indonesia, which to dates have mostly imported finished products.

170. It is important to note that production costs in India and, especially Bangladesh, are higher than they need be, costs relative to producers in Western Europe are low, largely because labor costs in Western Europe are far higher. However, as emphasized in Chapter II, the main competition is with synthetics, and unless costs are reduced, the future position of jute will be weak indeed.

171. Market-sharing arrangements, especially between India and Bangladesh, should be carefully explored. Given the prospects for slow growth of jute goods exports from producing countries, efficiency in capital investments allocation would call for a joint production planning exercise between India and Bangladesh for which a market-sharing arrangement would be an important corollary. The area of direct competition in the export markets between jute goods produced in India and Bangladesh is in fact quite narrow. India has a large and growing domestic market for sacking and is only a residual supplier in world markets now largely supplied by Bangladesh. Production and export of hessian goods from India is much more diversified (in terms of quality composition) than those from Bangladesh, and competition is largely limited to standard hessian products. The two countries compete in carpet-backing, but this market has potentially good growth prospects which, other things being equal, would make market-sharing arrangements easier. An overall agreement on production and external marketing is technically feasible. One example of a market-sharing arrangement (offered solely for illustrative purposes) might be that India produce the non-standard hessian items in exchange for assuring a part of the carpet-backing market to Bangladesh. Bangladesh might agree to the sale of specific quantities of raw jute to India as part of a market-sharing agreement. The danger inherent in such an overall agreement lies, of course, in the possibility that jute might then be priced less competitively vis-a-vis synthetics, so that a necessary precondition for any successful market-sharing arrangement would be a far greater degree of awareness of and responsiveness to world market conditions than has been demonstrated in the past.

## F. Buffer Stocks

172. Since one of the crucial differences between jute and its competitors is variability in supplies, the creation of buffer stocks of jute and/or jute products has been frequently as an important element in increasing (or maintaining) jute's market. There are already sizeable buffer stocks of both jute goods and raw jute throughout the world. These are, for the most part, in private hands, and most buffer stock proposals seem to be aimed at increasing the existing stocks with cost borne by producing governments.

173. Government and semi-public buffer stocks already exist, of course, but these are largely the result of domestic considerations rather than world market considerations. In Bangladesh, the growth of public sector marketing corporation has been considerable and is detailed in Volume II. In India, the first attempt to create a buffer stock was through the Jute Buffer Stock Agency (JBSA) which was operated by the jute mills. The JBSA was unsuccessful, however, and its activities were taken over by the State Trading Corporation (STC). However, the STC soon encountered the same difficulties previously faced by the JBSA, namely, an inability to acquire large enough stocks to effectively counter variations in crop size. During the 1971/72 season, a Jute Corporation of India was set up to attempt to conduct sizeable stabilization operations. Domestic considerations are important, but a world market orientation might well lead to a different kind of operation than would a domestic consideration.

174. Ideally, one would want a buffer stock of jute goods maintained in consuming countries as the surest safeguard against fluctuations in supply. Other possibilities include stocks of jute goods in producing countries, stocks of raw jute in consuming countries with productive capacity (i.e., not the U.S.), and stocks of raw jute in producing countries.

175. As the simplest proposal to explore, one might consider buffer stocks of raw jute in Bangladesh. Over the last decade, production has averaged 6.4 million bales, with a standard deviation of about .9 million bales. It turns out that a buffer stock about 1 million bales could have eliminated all fluctuations, one of 500,000 bales would have left only 2 years with shortfalls (of 20,000 bales in 1968/69 and 300,000 bales in 1964/65) while a stock of 250,000 bales would have left 3 years with shortfalls (the 2 above plus 1963/64 with a shortfall of 15,000 bales, although then the shortfall in 1964/65 would have been 775,000 bales). A 250,000 bale or, say, 50,000 ton, buffer stock would have required about $15 million in capital. (These and the figures below refer to capital costs of the buffer stock itself and exclude warehousing and other storage costs.) The cost to the Government on an annual basis would have consisted of (i) interest on capital tied up; (ii) plus reduced sales in "surplus" years; (iii) minus increased sales in "deficit" years. For the 1960's, the costs would have come to about $3-4 million in interest charges (at 10 percent interest) minus say $1 million on account of items (ii) and (iii). Therefore, the annual cost of a buffer stock would probably not have been great but capital requirements, and, more specifically, access to capital in surplus years to accumulate stocks, might have posed a serious problem.

176. On a worldwide scale, the above numbers should be multiplied by a factor of about 3, so a capital requirement of about $40-50 million is indicated. The requirement of the more optimal solution of a buffer stock of jute goods might easily reach $55-65 million.

177. The operations of a buffer stock would pose many problems. If the buffer stock were of jute goods, sophisticated decisions would need to be made regarding the exact composition of goods purchased and sold, and these requirements plus the impact of buffer stock movements on profitability of current manufacturing seem to preclude any possibility of establishing such

a buffer stock. Stocks of raw jute would be simpler to operate and could rely on relatively automatic rules known to everyone. However, it would still need to be a sophisticated operation for an industry in which producing countries have difficulty (i) in ascertaining current market information (ii) in operating existing enterprises (iii) in raising capital. Therefore, it would seem best not to encourage creation of a buffer stock at present, but to reserve the option for a later date when (and if) a well-functioning international center might sponsor such activities.

## G. Research and Development [1/]

### Agricultural Research

178. Most of the agricultural research on jute is carried out in India and Bangladesh, while research on kenaf is mainly conducted in Thailand. Agricultural research work on jute in Nepal is still embryonic and current efforts are principally directed toward basic improvements of production techniques.

179. Jute agricultural research in India is largely conducted by the Jute Agricultural Research Institute (JARI) and the Technological Research Laboratories (TRL) which are controlled and financed by the Indian Council of Agricultural Research. In 1969-70 the allocation to the JARI was around $241,000 and that to the TRL around $228,000. The research effort of the two organizations is mainly directed towards selection and breeding of better strains of jute giving higher yields. Evolution of new strains is obtained both by selection and crossing and also by induced mutation. Demonstration to the farmers of better methods of cultivation by increased use of proper fertilizers, line sowing, proper spacing of the plants, better control of pests and diseases, improvements in the retting and extraction of the fiber is another important part of the work carried out by the two organizations. According to recent information, India's research effort to improve yields per acre has produced two new mutants - evolved from hybrid crossing - which would be released in 1973/74.

180. Some agricultural research work is also carried out by the Indian Jute Industries Research Association (IJIRA) which is jointly financed and managed by the Indian jute industry and the Indian Council of Scientific and Industrial Research. In 1969/70 the ICSIR was providing $148,000 to the budget of the IJIRA, while the contribution of the industry was $182,000. The main purpose of the IJIRA, however, is industrial research.

181. Agricultural research in Bangladesh is largely the province of the Jute Research Institute of the Bangladesh Central Jute Committee. The Committee was first organized in 1951. The Jute Research Institute is organized into six scientific disciplines - Botany, Agronomy, Soil Science, Plant Pathology, Entomology, and Microbiology. A small statistics unit is attached to the Institute. There are five research sub-stations - Kishoreganj, Rangpur, Chandina, Faridpur and Jessore and one out-station, Tarabo, which are being used by the JRI to conduct location tests on varieties, fertilizer

---

1/ The Report of the UNDP Jute Fact Finding Mission of 1970-71 contains a useful description and analysis of this topic.

requirements, etc. Two Foundation Seed Farms, one at Chetla (400 acres) another at Nasipur (800 acres) are equipped to supply Foundation Seed (mother seed) to the registered seed growers. Besides the activity mentioned, the JRI also conducts simple field trials in 24 subvention centers. It plans to add about 24 more centers.

182. The development of the capital at Dacca substantially reduced the area of the research farm of the Central Institute at Tejgaon and proposals have been made for setting up a new experimental farm of 85 to 100 acres about 10 miles away.

183. The JRI has submitted to the government development plans estimated to cost Tk. 28.53 million during 1972/73 to 1976/77, or about $750,000 per year. Included in the program submitted are proposals for augmenting professional and support staff in all the scientific disciplines, sub-stations and the proposed regional stations, purchase of laboratory and agricultural equipment, training of technical personnel from various fields abroad, development of all the research and foundation seed farms and enlargement of field research facility at the central station by the addition of a 100-acre experimental farm 10 miles away.

184. The JRI has also been made responsible for production of the bulk of improved seed for use by the jute farmers of Bangladesh. A scheme for production of improved seed during the fourth plan period through registered growers at a net cost of Tk. 23.98 million is under consideration by the Government.

185. Research on kenaf in Thailand is mainly on the applied, practical side: spacing of the plants in the field, improvement of seeds and improvements of cultural practices. Research is carried out under a Cooperative Research Program which embraces a number of disciplines and organizations but the center of research is based at the Applied Scientific Research Corporation of Thailand (ASRCT).

186. Agricultural jute research in Nepal is carried out by the Biratnagar (Tarahara) Agricultural Station which operates under the Department of Agricultural Education and Research. The work of the Station does not include any fundamental research. It has been concentrated to date on seed improvement and multiplication, use of fertilizers and insecticides and general improvement of cultural practices. A sum of $100,000 has been allocated to the Station for the purchase of equipment and strengthening of research under an Asian Development Bank loan directed to the modernization of the Nepalese jute manufacturing industry, but little, if any, progress has so far been made.

Technical Research and Product Development

187. Jute technical research and product development are almost exclusively concentrated in the two major producing countries. Very little work is currently being done outside India and Bangladesh. Thailand has extensive laboratory facilities, but the work there is almost exclusively concentrated on kenaf fiber. No research and development work is conducted in Nepal.

The British Jute Trade Research Association Laboratories have recently stopped research on jute products and aside from the specific research project on jute carpet backing conducted at the Georgia Technical University under the sponsorship of the U.S. Jute Carpet-Backing Council, no research and development work is carried out in developed countries.

188. The most important research and development effort is currently being pushed forward in India where the JARI, the JTL and the IJIRA have three separate research and development laboratories. While technical research is only a relatively small portion of the activities of the JARI, both the government-financed JTL and the government-industry-financed IJIRA conduct a fairly extensive program of technical research and product development. In addition to that, the Government of India, through the Market Development Fund, makes a number of ad hoc grants to assist export-oriented projects. One of the most successful areas of work of these laboratories has been the introduction of extensive quality control schemes throughout the industry. Applied technical research has concentrated on: the upgrading of fiber properties, the mechanism of degradation and chemical-biological methods of prevention, investigation into batching oil and moisture application and yarn treatment. According to recent information during the past year about 50,000 tons of upgraded jute fiber were converted into better quality carpet-backing and clean hessian.

189. Product development efforts have been attempted in several directions: decorative fabrics and wall coverir needle-deflection-free carpet backing cloth, utilization of jute sticks for wall boards, utilization of jute in plastics reinforcement and fire retardancy. In spite of some promising results in each of these fields, no real breakthrough has yet been achieved. In machine technology research is being carried out for improving carding techniques, modernizing drawing frames to produce a more even yarn and converting existing machines to improve spinning efficiency.

190. In Bangladesh, technical research and product development is conducted by the Technological Wing of the Jute Research Institute, which was established in 1967. The Bangladesh Council for Scientific and Industrial Research (BCSIR) also conducts lectures, research and product development and is controlled by the Ministry of Agriculture. The BCSIR has been working on the development of jutton, a fiber made of cotton and jute that may find use as a replacement for cotton cloth. However, further work needs to be done on establishing commercially feasible production processes.

191. Outside the two main producing countries, research and development efforts are virtually nil, except for the research project being conducted by the U.S. Jute Carpet Backing Council in collaboration with Georgia Tech. University and IJIRA for the development of deflection-free carpet-backing cloth. These efforts have met a considerable degree of success and this new backing cloth has been successfully tested on narrow gauge tufting machines in the Deering Milliken plant in the United States.

Jute International

192. At the time this report is being written, a new organization, called Jute International (JI) is being formed. JI was formulated at a conference held in Dacca from January 15 - 19, 1973. While it is still too early to specify details of JI, the basic structure will include a sizeable research and development component as well as a marketing and technical services component. The Board of Directors will include representatives from the 4 or 5 major producing countries in addition to several other officials.

193. The establishment of JI is certainly a most welcome event. Concerted and coordinated action in research and development and marketing is long overdue, especially since local efforts in research and development have in large part needlessly duplicated efforts in other countries, and since marketing and customer relative activities have, with only a few exceptions, been less than adequate. JI deserves the strong support not only of producer countries but also other countries and organizations that have any interest in a growing world jute market.

Table 29: INDIA - NUMBER OF LOOMS

| | 1968/1 | 1970/1 | 1972/1 |
|---|---|---|---|
| Hessian | 28,641 | 21,186 | 22,701 |
| Sacking | 14,454 | 11,475 | 12,134 |
| Carpet-Backing | 3,113 | 6,287 | 6,227 |
| Other | 2,579 | 1,662 | 1,938 |
| TOTAL | 48,787 | 40,610 | 43,045 |
| (One make looms) | 176 | 152/2 | - |
| GRAND TOTAL | 48,963 | 41,032 | 43,045 |

---

/1 January first of year shown.

/2 Add 270 looms for which classification was not available.

Table 30: WESTERN EUROPE: NUMBER OF LOOMS

| | 1968 | 1970 | 1971 |
|---|---|---|---|
| Germany | 2,441 | 2,291 | 2,125 |
| Belgium | 2,822 | 1,218 | 1,208 |
| France | 2,476 | 2,183 | 1,871 |
| Italy | 2,337 | 1,432 | 958 |
| Netherlands | 762 | 708 | 422 |
| Austria | 254 | 192 | 110 |
| Denmark | - | - | - |
| Spain | 2,934 | 2,728 | 2,624 |
| Ireland | n.a. | n.a. | n.a. |
| Norway | - | - | - |
| Portugal | 987 | 1,005 | 951 |
| U.K. | 5,298 | 3,384 | 2,054 |
| Sweden | 92 | 58 | 54 |
| Switzerland | - | - | - |
| TOTAL | 20,403 | 12,908 | 12,377 |

Table 31 : EXPORT OF SACKING FROM INDIA AND PAKISTAN

(000 tons)

| Year | India (1) | Pakistan /1 (2) | Total (1)+(2) (3) | Indian share (1)/(3) (4) in % |
|---|---|---|---|---|
| 1957 | 429.7 | 60.4 | 490.1 | 87 |
| 1958 | 345.8 | 78.5 | 424.3 | 81 |
| 1959 | 354.6 | 135.7 | 490.3 | 72 |
| 1960 | 312.9 | 123.8 | 436.7 | 71 |
| 1961 | 283.7 | 140.2 | 423.9 | 67 |
| 1962 | 292.2 | 164.5 | 456.7 | 64 |
| 1963 | 242.6 | 157.5 | 400.1 | 60 |
| 1964 | 234.9 | 157.6 | 392.5 | 60 |
| 1965 | 283.5 | 181.1 | 464.6 | 61 |
| 1966 | 173.3 | 234.6 | 407.9 | 42 |
| 1967 | 185.5 | 232.9 | 418.4 | 43 |
| 1968 | 93.6 | 242.7 | 336.3 | 28 |
| 1969 | 48.2 | 248.2 | 296.4 | 16 |
| 1970 | 79.4 | 140.3 | 219.7 | 36 |
| 1971 | 115.3 | 73.6 | 188.9 | 61 |

/1 Refers to Jute Year (July-June).

Sources: DCI&S - Calcutta, IJMA.
Pakistan Jute Mills Association.

Table 32 : EXPORT OF HESSIAN FROM INDIA AND PAKISTAN

(000 tons)

| Year | India (1) | Pakistan /1 (2) | Total (1)+(2) (3) | Indian share (1)/(3) (4) in % |
|---|---|---|---|---|
| 1957 | 399.1 | 29.7 | 428.8 | 93 |
| 1958 | 399.4 | 36.9 | 436.3 | 91 |
| 1959 | 430.5 | 50.7 | 481.2 | 89 |
| 1960 | 391.4 | 61.9 | 453.3 | 86 |
| 1961 | 357.9 | 61.4 | 419.3 | 85 |
| 1962 | 457.4 | 65.7 | 523.1 | 87 |
| 1963 | 463.8 | 71.4 | 535.2 | 86 |
| 1964 | 487.8 | 66.8 | 554.6 | 88 |
| 1965 | 448.1 | 79.5 | 527.6 | 85 |
| 1966 | 372.8 | 95.9 | 468.7 | 79 |
| 1967 | 382.3 | 103.0 | 485.3 | 78 |
| 1968 | 338.2 | 155.2 | 493.4 | 68 |
| 1969 | 251.7 | 195.2 | 446.9 | 56 |
| 1970 | 282.6 | 188.1 | 470.7 | 60 |
| 1971 | 309.4 | 90.2 | 399.6 | 77 |

/1 Refers to Jute Year (July-June).

Sources: DCI&S - Calcutta, IJMA.
Pakistan Jute Mills Association.

Table 33 : EXPORTS OF CARPET BACKINGS FROM INDIA AND PAKISTAN

(000 tons)

| Year | India (1) | Pakistan /1 (2) | Total (1)+(2) (3) | Indian Share (1)/(3) (4) in % |
|---|---|---|---|---|
| 1957 | 8.0 | neg | 8.0 | 100 |
| 1958 | 19.2 | " | 19.2 | 100 |
| 1959 | 30.1 | " | 30.1 | 100 |
| 1960 | 35.3 | " | 35.3 | 100 |
| 1961 | 41.6 | " | 41.6 | 100 |
| 1962 | 57.7 | " | 57.7 | 100 |
| 1963 | 88.3 | " | 88.3 | 100 |
| 1964 | 106.6 | 1.2 | 107.8 | 99 |
| 1965 | 100.0 | 6.5 | 106.5 | 94 |
| 1966 | 131.5 | 13.2 | 144.7 | 90 |
| 1967 | 141.6 | 19.4 | 161.0 | 87 |
| 1968 | 179.8 | 25.0 | 204.8 | 87 |
| 1969 | 219.3 | 29.2 | 248.5 | 88 |
| 1970 | 138.6 | 39.2 | 177.8 | 80 |
| 1971 | 251.3 | 4.3 | 255.6 | 98 |

/1 Except for 1969, refers to the jute year (July-June).

Sources: DCI&S - Calcutta, IJMA.
Pakistan Jute Mills Association.

Table 34 : EXPORTS OF JUTE GOODS FROM INDIA AND PAKISTAN

(000 tons)

| Year | India (1) | Pakistan /1 (2) | Total (1)+(2) (3) | Indian Share (1)/(3) (4) in % |
|---|---|---|---|---|
| 1957 | 873.5 | 90.4 | 963.9 | 90 |
| 1958 | 806.2 | 115.8 | 922.0 | 87 |
| 1959 | 874.0 | 188.4 | 1062.4 | 82 |
| 1960 | 810.4 | 190.7 | 1001.1 | 81 |
| 1961 | 759.8 | 204.9 | 964.7 | 79 |
| 1962 | 874.4 | 233.1 | 1107.5 | 79 |
| 1963 | 874.6 | 234.2 | 1108.8 | 79 |
| 1964 | 931.2 | 234.2 | 1165.4 | 80 |
| 1965 | 929.2 | 282.4 | 1211.6 | 77 |
| 1966 | 746.1 | 361.8 | 1107.9 | 67 |
| 1967 | 768.5 | 370.7 | 1139.2 | 67 |
| 1968 | 671.4 | 454.0 | 1125.4 | 59 |
| 1969 | 569.9 | 484.9 | 1054.8 | 54 |
| 1970 | 500.6 | 386.7 | 887.3 | 56 |
| 1971 | 676.0 | 192.1 | 868.1 | 78 |

/1 Except for 1969, refers to the jute year (July-June).

Sources: DCI&S - Calcutta, IJMA.
Pakistan Jute Mills Association.

Table 35: DISTRIBUTION OF EXPORTS OF JUTE MANUFACTURES FROM INDIA
(000 metric tons)

| Country | 1960/61-1962/63 Av. | % of Total | 1963/64-1965/66 Av. | % of Total | 1969/70-1968/69 Av. | % of Total | 1969/70-1971/72 Av. | % of Total |
|---|---|---|---|---|---|---|---|---|
| United States | 276.3 | 33.0 | 345.0 | 35.7 | 306.8 | 43.9 | 271.3 | 43.9 |
| USSR | 26.0 | 3.1 | 110.7 | 11.4 | 106.7 | 15.3 | 86.2 | 13.9 |
| Canada | 42.7 | 5.1 | 48.7 | 5.0 | 44.0 | 6.3 | 35.9 | 5.8 |
| Australia | 61.3 | 7.3 | 57.3 | 5.9 | 40.1 | 5.7 | 25.9 | 4.2 |
| United Kingdom | 43.0 | 5.1 | 43.3 | 4.5 | 24.6 | 3.5 | 12.4 | 2.0 |
| Egypt | 20.7 | 2.5 | 45.0 | 4.7 | 13.9 | 2.0 | n.a.s. | n.a.s. |
| New Zealand | 16.0 | 1.9 | 17.8 | 1.8 | 10.6 | 1.6 | 11.2 | 1.8 |
| Belgium | 8.7 | 1.0 | 5.7 | 0.6 | 8.2 | 1.2 | n.a.s. | n.a.s. |
| Netherlands | 5.7 | 0.7 | 5.3 | 0.5 | 6.1 | 0.9 | n.a.s. | n.a.s. |
| Indonesia | 20.0 | 2.4 | 6.0 | 0.6 | 5.9 | 0.8 | n.a.s. | n.a.s. |
| West Germany | 13.0 | 1.6 | 7.7 | 0.8 | 5.2 | 0.7 | n.a.s. | n.a.s. |
| Peru | 6.7 | 0.8 | 5.0 | 0.5 | 3.9 | 0.6 | n.a.s. | n.a.s. |
| Argentina | 32.0 | 3.8 | 41.0 | 4.2 | 2.8 | 0.4 | 6.6 | 1.1 |
| Nigeria | 21.3 | 2.5 | 7.0 | 0.7 | 2.0 | 0.3 | n.a.s. | n.a.s. |
| Cuba | 38.3 | 4.6 | 16.0 | 1.7 | - | - | n.a.s. | n.a.s. |
| Others | 205.6 | 24.6 | 205.8 | 21.3 | 118.3 | 16.9 | 168.5 | 27.3 |
| Total | 847.3 | 100.0 | 967.3 | 100.0 | 699.1 | 100.0 | 618.0 | 100.0 |

n.a.s. = not available separately (included in others).

Source: CEC, Industrial Fibres, various issues.
Indian Jute Mills Association, Summary of Jute and Gunny Statistics (various issues).

Table 36: DISTRIBUTION OF EXPORTS*OF JUTE MANUFACTURES FROM BANGLADESH
(000 metric tons)

| Country/Region | 1961/62-1963/64 Av. | % of Total | 1964/65-1966/67 Av. | % of Total | 1967/68-1969/70 Av. | % of Total | 1970/71 | % of Total | 1971/72 | % of Total |
|---|---|---|---|---|---|---|---|---|---|---|
| United States | 30.3 | 12.8 | 46.2 | 15.1 | 95.2 | 20.5 | 113.9 | 29.3 | 59.1 | 26.7 |
| East Africa | 23.0 | 9.7 | 50.0 | 16.4 | 83.7 | 18.0 | 51.1 | 13.2 | 54.8 | 24.8 |
| Australia | 38.7 | 16.3 | 37.0 | 12.1 | 48.4 | 10.4 | 25.6 | 6.6 | 4.5 | 2.0 |
| West Africa | 20.3 | 8.6 | 43.6 | 14.3 | 32.5 | 7.0 | 22.3 | 5.7 | 4.5 | 2.0 |
| United Kingdom | 9.0 | 3.8 | 11.0 | 3.6 | 26.2 | 5.6 | 22.1 | 5.7 | 12.7 | 5.7 |
| Netherlands | 3.7 | 1.5 | 4.3 | 1.4 | 15.0 | 3.2 | 12.6 | 3.2 | 6.9 | 3.1 |
| Argentina | 5.7 | 2.4 | 10.4 | 3.4 | 14.6 | 3.1 | 23.1 | 6.0 | 13.3 | 6.0 |
| Turkey | 0.1 | 0.3 | 10.1 | 3.3 | 14.0 | 3.0 | 8.0 | 2.1 | 3.5 | 1.6 |
| New Zealand | 1.5 | 0.6 | 2.4 | 0.8 | 11.7 | 2.5 | 9.3 | 2.4 | 5.7 | 2.6 |
| Chile | 5.0 | 2.1 | 6.4 | 2.1 | 9.3 | 2.0 | 9.5 | 2.4 | 5.7 | 2.6 |
| Canada | 5.0 | 2.1 | 3.8 | 1.2 | 9.2 | 2.0 | 10.8 | 2.8 | 4.5 | 2.0 |
| Belgium | 0.9 | 0.4 | 1.3 | 0.4 | 8.7 | 1.9 | 10.0 | 2.6 | 9.8 | 4.4 |
| Peru | 8.3 | 3.5 | 6.2 | 2.0 | 6.5 | 1.4 | 5.1 | 1.3 | 4.0 | 1.8 |
| Burma | 14.3 | 6.0 | 16.8 | 5.5 | - | - | - | - | 8.7 | 3.9 |
| Cuba | 9.7 | 4.1 | - | - | - | - | - | - | - | - |
| South Africa | 33.7 | 14.2 | - | - | - | - | - | - | - | - |
| Others | 27.2 | 11.5 | 55.9 | 18.3 | 89.4 | 19.3 | 64.7 | 16.7 | 23.3 | 10.5 |
| Total | 237.0 | 100.0 | 305.4 | 100.0 | 464.4 | 100.0 | 388.1 | 100.0 | 221.0 | 100.0 |

*Excluding interwing trade.

Source: BJMA, Monthly Summary of Jute Goods Statistics, various issues.

Table 37: EXPORT OF RAW JUTE FROM BANGLADESH TO FOREIGN COUNTRIES OTHER THAN PAKISTAN (BY DESTINATION)

(Figures in '000' tons)

| Countries | Period | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1962/63 | 1963/64 | 1964/65 | 1965/66 | 1966/67 | 1967/68 | 1968/69 | 1969/70 | 1970/71 | 1971/72 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1. European Economic Community | | | | | | | | | | |
| West Germany | 49.9 | 30.0 | 33.9 | 56.1 | 38.8 | 59.7 | 49.4 | 64.0 | 23.0 | 27.5 |
| France | 65.3 | 63.7 | 42.2 | 58.3 | 29.6 | 36.7 | 28.7 | 34.5 | 17.1 | 5.2 |
| Italy | 38.1 | 29.0 | 11.3 | 24.0 | 18.8 | 20.4 | 12.0 | 14.9 | 6.4 | 7.2 |
| Belgium | 90.6 | 72.7 | 65.9 | 122.2 | 56.4 | 87.3 | 70.1 | 55.7 | 34.8 | 69.4 |
| Netherlands | 14.9 | 16.4 | 14.8 | 20.8 | 16.2 | 26.8 | 21.9 | 19.2 | 9.5 | 5.6 |
| 2. Other West Europe | | | | | | | | | | |
| United Kingdom | 142.4 | 128.7 | 104.4 | 131.8 | 84.5 | 105.9 | 82.8 | 84.3 | 51.4 | 59.7 |
| Ireland (Eire) | 8.2 | 5.8 | 6.7 | 9.0 | 5.9 | 6.1 | 7.0 | 4.9 | 1.8 | — |
| Portugal | 17.4 | 18.7 | 14.7 | 17.7 | 14.3 | 19.6 | 17.9 | 20.1 | 18.5 | 12.3 |
| Sweden | 5.7 | 3.9 | 4.3 | 4.0 | 1.5 | 4.5 | 2.9 | 3.9 | 5.0 | 1.9 |
| Greece | 4.6 | 3.9 | 3.7 | 5.0 | 3.1 | 31.4 | 1.4 | 2.4 | 1.8 | — |
| Austria | 2.3 | 3.6 | 2.0 | 4.2 | 2.3 | 1.8 | 9.7 | 1.4 | 0.1 | 2.3 |
| Spain | 23.9 | 23.7 | 18.2 | 27.1 | 25.8 | 26.4 | 0.8 | 17.8 | 11.0 | 22.9 |
| 3. USSR and East Europe | | | | | | | | | | |
| USSR | 17.5 | 8.3 | 6.5 | 13.3 | 11.5 | 9.1 | 16.4 | 18.4 | 6.6 | 17.6 |
| Poland | 15.6 | 19.4 | 16.2 | 19.5 | 19.4 | 16.4 | 15.9 | 19.7 | 17.2 | 10.5 |
| Czechoslovakia | 12.3 | 17.0 | 8.0 | 13.8 | 15.6 | 17.5 | 11.1 | 14.9 | 11.5 | 8.1 |
| Yugoslavia | 9.3 | 16.6 | 8.0 | 13.3 | 10.4 | 5.8 | 7.8 | 9.1 | 6.2 | 6.2 |
| Rumania | 1.9 | 3.3 | 3.0 | 3.0 | 3.6 | 3.7 | 4.9 | 5.6 | 4.5 | 3.9 |
| 4. North America | | | | | | | | | | |
| Canada | 5.4 | 8.0 | 1.5 | 10.1 | 2.7 | 8.8 | 2.2 | 4.1 | 1.4 | 0.7 |
| USA | 45.0 | 60.4 | 22.9 | 43.0 | 18.8 | 36.6 | 18.0 | 14.5 | 9.5 | 7.3 |
| Mexico | 0.5 | 0.2 | 0.3 | 0.5 | -- | -- | 0.6 | 0.1 | 0.1 | 0.5 |
| 5. Latin America | | | | | | | | | | |
| Argentina | 2.0 | 5.1 | 2.4 | 1.7 | 1.9 | 1.6 | 2.6 | 2.8 | 4.8 | 0.6 |
| 6. Asia | | | | | | | | | | |
| India | 52.7 | 72.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| Burma | 7.5 | 10.9 | 18.8 | 8.7 | 9.1 | 4.9 | 0.1 | -- | -- | -- |
| Japan | 39.2 | 39.7 | 28.8 | 30.4 | 21.1 | 28.4 | 22.7 | 26.2 | 17.4 | 15.4 |
| Mainland China | 13.4 | 30.4 | 74.0 | 52.8 | 69.6 | 44.7 | 30.4 | 77.6 | 51.7 | 8.0 |
| 7. Africa | | | | | | | | | | |
| South Africa | 21.9 | 30.2 | -- | -- | -- | -- | -- | -- | -- | -- |
| West Africa | 4.8 | 5.2 | -- | -- | -- | -- | -- | -- | -- | -- |
| East Africa | 5.1 | 6.0 | -- | -- | -- | -- | -- | -- | -- | -- |
| Morocco | 4.8 | 4.2 | 3.6 | 5.8 | 4.2 | 4.7 | 4.7 | 5.3 | -- | 3.3 |
| UAR | 24.3 | 22.4 | 17.5 | 12.0 | 13.1 | 16.3 | 18.4 | 22.0 | 51.7 | 8.0 |
| 8. Australia New Zealand | | | | | | | | | | |
| New Zealand | 0.6 | 0.8 | 0.8 | 0.7 | 0.7 | 0.9 | 1.0 | 1.0 | 0.5 | 0.8 |
| Australia | 5.8 | 4.6 | 5.1 | 4.2 | 5.1 | 4.6 | 4.5 | 4.4 | 6.2 | 2.2 |
| 9. Other Unspecified Countries | 23.6 | 33.2 | 51.3 | 54.4 | 96.6 | 52.9 | 114.7 | 66.3 | 64.7 | 47.2 |
| TOTAL | 774.2 | 794.4 | 597.1 | 772.5 | 608.4 | 662.8 | 578.7 | 521.4 | 397.7 | 353.5 |

Source: Bangladesh Jute Association; Narayanganj, Dacca.

South Asia/Bangladesh Division
March 8, 1973

Table 38: THAILAND - DIRECTION OF RAW JUTE EXPORTS

(In percentages)

| | Thailand/1 |
|---|---|
| United Kingdom | 4 |
| Belgium | 7 |
| Germany | 3 |
| France | 4 |
| United States | 2 |
| Japan | 20 |
| Netherlands | 1 |
| Spain | 2 |
| Italy | 5 |
| Portugal | 3 |
| Poland | 1 |
| Egypt | 1 |
| India | 36 |
| Others | 11 |
| TOTAL | 100 |

/1 Average of seasons ended 1966-69.

Source: UNCTAD.

DOCUMENT OF INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

**For Exclusive Use of Bank Group Staff**



CONFIDENTIAL

Report No. 114-BD

# THE WORLD JUTE ECONOMY

(in two volumes)

## VOLUME II

## PRODUCTION IN BANGLADESH

April 4, 1973

South Asia Department

## CURRENCY EQUIVALENTS

| | | |
|---|---|---|
| US $ 1.00 | = | Takas (T) 7.28 |
| T 1.00 | = | US $ 0.137 |
| T 1 million | = | US $ 137,000 |

## INITIALS AND ACRONYMS

| | | |
|---|---|---|
| AEJI | - | Association of European Jute Industry |
| BCJC | - | Bangladesh Central Jute Committee |
| BCSIR | - | Bangladesh Council for Scientific and Industrial Research |
| BJA | - | Bangladesh Jute Association |
| BJMC | - | Bangladesh Jute Manufacturing Corporation |
| BJMC | - | Bangladesh Jute Marketing Corporation |
| BJPSC | - | Bangladesh Jute Price Stabilization Corporation |
| BJRI | - | Bangladesh Jute Research Institute |
| BJTC | - | Bangladesh Jute Trading Corporation |
| IJCS | - | Intensive Jute Cultivation Scheme |
| IJIRA | - | Indian Jute Industries Research Association |
| IJMA | - | Indian Jute Mills Association |
| JARI | - | Jute Agricultural Research Institute |
| TRL | - | Technological Research Laboratories |

# THE WORLD JUTE ECONOMY

## VOLUME II: PRODUCTION IN BANGLADESH

### Table of Contents



(This report was prepared by mission consisting of M. Lav (Chief), E. Grilli, J. Harrison, K. J. Hong, and C. Ladonne (all general economists), R. Morrison (Industrial Consultant), and M. S. Sarma (Agriculturalist, FAO/IBRD). Field work was conducted in major producing and consuming countries from November 22, 1972 to January 15, 1973.)

VOLUME II: PRODUCTION IN BANGLADESH

TABLES, CHARTS AND MAPS

## TABLES, CHARTS AND MAPS

## TABLES, CHARTS AND MAPS

# JUTE PRODUCTION IN BANGLADESH

## SUMMARY

### Introduction

1. While all jute producing countries face problems, Bangladesh is in a particularly precarious position, since it will depend on jute exports for about three-fourths of all foreign exchange earnings - at least for the next 5-10 years. Some important steps have been taken to improve production and to increase efficiency, but much remains to be done. The following paragraphs summarize the findings of Volume II.

### Jute Manufacturing in Bangladesh

2. Jute manufacturing has acquired a key position in Bangladesh, both in terms of domestic production and employment and in terms of foreign exchange earnings. The strategy followed in the past years was to increase foreign exchange earnings by increasing the proportion of manufactured jute exports. This was made possible by a system of differential exchange rates that gave much higher returns to exports of manufactures than to exports of raw jute, even though value added in manufacturing was typically very low. About one-half of the crop is now processed domestically. Significant increases in manufacturing output are unlikely in the near future as the industrial structure was severely shaken by events leading to independence. The industry was nationalized after liberation, and it is reasonable to expect that it will take some time before efficient management and operating practices can be developed for this relatively complex industry.

3. Production levels have returned to about 80 percent of pre-war levels but this is still less than one-half of capacity. There are major problems likely to prevent a further rapid increase in output. Shortages of spare parts persist. Continuing labor unrest also limits productivity, as numerous strikes and other labor activity diminish work hours and upset mill schedules. There is no uniform labor code, so that an agreement by management in one mill with unions in that mill will lead to a round of negotiations in neighboring mills.

4. The most pressing short-term problem, however, is the lack of both accurate market information and a mechanism to translate market information into production schedules and appropriate prices. As a result, many types of hessian and sacking are produced for which there is little demand. Government pricing policies are relatively inflexible and prevent mills from disposing of inventories which are now at double the average levels of the late 1960's. Contract negotiations for sales by mills require approval by a central board which does not, however, offer accurate market advice. Price levels are too high.

5. One of the most important issues of pricing policy is clearly the exchange rate. The jute industry moved from a position of considerable protection offered by the bonus voucher multiple exchange rate regime which insured low-cost raw jute to domestic manufacturers, to one of no protection under the unitary rate imposed January 1, 1972, while simultaneously facing a revaluation in effective rates from 8.6 Rupees per dollar to 7.28 Takas

per dollar. Since June 1972, the Taka has been floating with the Pound Sterling at a rate of about 7.6 Takas to the dollar. The impact of this revaluation on the industry's profit position has been quite severe. Although many measures could be taken to increase profitability, it may well be too much to expect a profitable operation in the short run under the current exchange rate system.

6. A number of other problems particularly shortages of management expertise and skilled labor also restrict industrial efficiency. Several reforms in the system could substantially improve the situation:

(i) Mills should either be allowed to negotiate and conclude their own contracts with foreign purchasers, or else a strong central organization should be established to negotiate contracts for mills. This organization should have good overseas contacts and a continuous flow of market information.

(ii) A uniform labor code should be established. It would be inappropriate to discuss the details of such a labor code here, but the key point to be emphasized here is uniformity, at least among mills in a given region, rather than any specific labor policy.

(iii) A zonal orientation (Dacca, Chittagong, and Khulna) of the industry has been tentatively established, but to date the functions by zone appear to be limited to data collection. The zonal orientation should be strengthened to include:

(a) a common inventory for spare parts;
(b) a model mill which (i) is well managed; (ii) has efficient quality control; (iii) has efficient batching; and (iv) could provide on-the-job training for staff of other mills in the zone;
(c) a zonal quality control center; and
(d) other services, such as assistance in accounting and auditing for other mills in the zone.

(iv) Consideration might also be given to strengthening government control at the zonal level. The problem of coordinating production activities from Dacca are manifold, despite the dedicated efforts of officials. An organization by zone might well prove more manageable for production control than one central organization. Since this point concerns production, the suggested reorganization would be consistent with either option suggested in (i) above.

Domestic Marketing in Bangladesh

7. The recent large increase in the public sector role in internal marketing from about one-fifth to about one-third of raw jute purchases this year at the secondary market level (which was necessary to fill the vacuum left by departed Pakistanis) has given impetus to demands for "complete nationalization" of the domestic jute trade. (While "complete nationalization" has a number of definitions, the most common usage refers to trade from secondary markets onwards to exports of raw jute or sales to jute mills.) However, there are a number of indications which suggest: (a) the private sector is more efficient than the public sector and (b) that private sector trade in jute is not monopolistic and on the contrary appears extremely competitive. Further, given the management constraint in public sector enterprises (i.e., jute mills), it would seem more efficient to allocate any management and technical expertise in the jute sector to already existing public sector enterprises rather than to expand the public sector marketing corporations. In these circumstances, an expansion of the public sector marketing corporations is likely to be costly to farmers, mills, and the jute sector in general. If it can be clearly demonstrated that monopoly returns accrue to middlemen (even though there is generally free entry into the market) then, given that the public sector is less efficient than the private sector, it might be best to implement a program of, say, higher license fees (to tax away these monopoly returns), easier credit to promote more competition, and perhaps, some marketing facilities such as warehouses.

Agricultural Production in Bangladesh

8. The supply of jute fiber, always volatile, is now particularly precarious. Decades of neglect to the technological base of jute fiber production, combined with exchange rate and agricultural production policies which discriminate against jute, severe (but hopefully short-term) food shortages, and major technological advances in rice production, have significantly decreased the relative profitability of jute production. The impact of these developments can be viewed as increasing the relative cost of jute production, implying that at any given price level, less jute will be supplied than before these developments. Consequently, if present conditions continue, one can expect farmers to plant significantly less jute acreage, leading to a nearly proportional reduction in the supply of jute fiber. And yet the preceding discussion suggests that the demand for jute is shifting so that raw jute prices should fall if jute and jute goods are to compete on the international market. If this happens, without other compensating adjustments, the relative profitability and the supply of jute will shrink still further.

9. Improving jute fiber production is of crucial importance to the economy of Bangladesh in terms of both production efficiency and equity. Raw jute plays a key role in the economy of Bangladesh as the major input for Bangladesh's major industry, and as the primary commodity export (earning, per acre, sufficient foreign exchange to purchase more rice than is grown on 2.5 to 3.0 acres). The socio-economic importance of jute, however,

extends beyond this. It is a major source of cash income for Bangladesh's rural population. Some 45 percent of the farmers grow jute and during the season it occupies about 20 percent of the area under crops. Since jute production is concentrated predominantly on the smallest farms and since it is highly labor intensive (jute production uses about 110 man-days per acre while aus paddy uses only 65), the deterioration of jute production has been felt most strongly by the poorer segments of the rural population - the smallest farmers and the hired laborers. Efforts to improve the profitability of jute production are likely to have their greatest beneficial impact on these groups.

10. Since jute competes with rice for the use of farmer's land, the relative domestic prices of jute and rice are crucial determinants of the supply of jute fiber. During 1971/72, raw jute production in Bangladesh decreased by one-third from the average of recent years, but the devaluation of the Taka one year ago made possible a 55 percent rise in raw jute prices and enabled raw jute production to return this year to a normal level of 6.5 million bales, despite very high rice prices. Increases in rice prices since last summer, however, suggest that next year's jute crop may be smaller than the current year's. Since jute is a labor-intensive crop and production is concentrated on small farms, any lowering of the relative price of jute would have its greatest adverse effect on the poorer segments of the rural population.

11. There are three policy and program areas affecting the supply of jute fiber: pricing policies, extension and input programs and policies and longer-term research programs. Each of these is discussed in terms of the present situation and alternative possibilities.

Pricing Policy

12. Pricing policy is discussed extensively in Chapter II. The major point is that the domestic foreign prices of jute and the exchange rate must be at levels which allow jute to compete with rice at home and synthetics abroad. To compete with synthetics, the export price of jute must fall to about £90-95 per metric ton now and to about £80 in the next few years. This compares to current prices of about £114 per metric ton and to the indicative FAO price of £109 86 per metric ton. A decrease of the recommended magnitude might diminish export earnings in the short-run, but in the light of world market demand conditions, the mission feels that a price decrease is essential to protect the long-term market for jute.

13. At the recommended lower prices and at present exchange rates, jute is not competitive with aus paddy, the rice crop that competes most directly with jute for the use of the farmer's scarce land. An exchange rate adjustment could allow both a decrease in the export price and an increase in farmgate price. The analysis suggests that an exchange rate which would allow the export price to fall to about £95 per ton and the farmgate price to rise from 47 to about 55 Takas a maund, would substantially improve the competitive

position of jute relative to paddy. The other major area of pricing policy which affects the relative profitability of jute is input subsidies 1/. As demonstrated in the report, these subsidies introduce a substantial bias against jute cultivation. Their removal would make jute farming more competitive with paddy farming.

14. Of the various policies and programs discussed in this section, only pricing policies can be put into effect immediately and begin to have an impact in the short run. Moreover, in the absence of an appropriate price policy, other programs, such as the intensive cultivation scheme for jute, have little chance of success.

Extension and Input Supply

15. The Government of Bangladesh has devised an Intensive Jute Cultivation Scheme (IJCS) which is designed to increase production from the current level of 6.5 million bales to 9.7 million bales in three years. The program is ambitious and is based on rapidly expanding the area covered by a package of inputs from the 250,000 acres targeted (but not fully covered) this year to 1.7 million acres (all within the existing jute acreage of 2.4 million acres). The program consists of several components: (a) somewhat improved varieties of seeds (of which D-154 is most important); (b) fertilizers; (c) pesticides; (d) seed drills (which promote line sowing thereby reducing weeding costs); and (e) extension.

16. The program has been reviewed critically by the Government and as a consequence its scale and pace of expansion are likely to be curtailed. One basic problem is that the production target of 9.7 million bales of raw jute by 1974/75 is high in the context of world demand projections, even given possible barter arrangements with India or alternative policies regarding prices and the exchange rate. Even if the target is accepted, the chief means of achieving it require considerable improvement. The mission found that the package of recommended inputs is not widely available even in the .25 million acres currently in the program, and hence suspects that the yield gains of up to 50 percent reported in these areas may be spurious and more the result of selecting better areas and farmers for the program than the result of any real technological progress. The program relies on a stagnant technological base, implying the need for greater research efforts for jute agriculture.

17. Improvements are required in each of the components of the program if it is to attain its targets. The main variety of seed now distributed is scarcely better than other local varieties, although widespread farmer's acceptance of the program's seed is good evidence of the high quality of packaging, processing, and quality control. The mission's main concern about

1/ This assumes that neither the rice price nor the jute marketing margin are amenable to change through policy activity.

seeds is that the rapid increase in production and distribution now planned may cause some serious deterioration in seed quality. Fertilizer, probably the most effective component of the scheme, is both heavily subsidized and in short supply, so that farmers (having learned the usefulness of the input) pay several times the official price to obtain black market supplies. In these circumstances, there is no need to continue subsidies, which in any event encourage smuggling of fertilizer to India. Further, since improved rice is more fertilizer-responsive than jute, the subsidy is a net transfer away from the jute sector. Since it is typically the smaller and poorer farmers who grow most of the jute, this subsidy probably works the wrong way in terms of income distribution. In addition, more research is required to determine optimal dosages. Pesticides are now given away free and with inadequate technical support are likely to be used in a dangerous and indiscriminate way. Extension work, a crucial input to any successful program, requires considerable strengthening. The program now relies heavily on model farmers who must tend their own farms in addition to their extension work. There should be significant returns to developing an improved extension force. The improved cultivation practices recommended (timely sowing and line sowing) face severe practical problems. This suggests that the Government should continue to place low priority on procurement of seed drills until these problems are resolved.

18. All this indicates that raw jute production targets be reduced and the planned coverage of the Intensive Cultivation Scheme be made more realistic. As an alternative to expanding the area of coverage, greater attention could be given on a smaller area to raising yields, reducing unit costs, which would make jute production more competitive with both paddy and synthetics.

Jute Research

19. The mission found that agricultural, industrial and market research in jute are seriously inadequate. Agricultural productivity in jute has not increased for decades. Nor have there been any important improvements in converting raw fiber to jute goods. Insufficient market information is available to enable firms to adjust production and prices to changing situations. It should be no surprise that the well-financed and directed research effort in synthetic substitutes has left the jute trade at such a competitive disadvantage. To compete with synthetics in the longer run, productivity in jute fiber production and processing must increase substantially. This will not occur until the impact of a vigorous, well-organized jute research program is felt.

20. Although a major improvement in jute research is imperative, it will not be easy to bring about. The Jute Research Institute (JRI) in Bangladesh has serious problems discussed in the report. Even fairly routine fertilizer response trials have not been carried out in a way useful to either planners or farmers. Coordination between the agricultural and

industrial wings of the Institute is minimal or non-existant. The same is true for coordination with other relevant research organizations, particularly the Atomic Energy Commission and the Bangladesh Rice Research Institute (BRRI). Establishing close coordination among these organizations is essential for a productive research effort. The UNDP proposal to establish an International Center for Jute Research and Development appears to offer the most effective vehicle for improving the research situation both for Bangladesh and the other major producing countries.

Conclusions

21. This report suggests policies and programs for the development of jute production in Bangladesh which, if carried out quickly and forcefully could substantially improve the position of jute and insure a stable supply at an adequate price to meet the projected demand. The major areas of policy activity discussed in the text are i) more flexible pricing policies, a more uniform labor policy, and a strong zonal organization in the manufacturing sector; ii) exchange rate and pricing adjustments for both raw jute and jute goods production; iii) program to improve productivity in raw jute production and iv) a more vigorous, well financed jute research effort. Few of these policy suggestions will be easy to impplement. But the mission was impressed by the sober concern of Government officials, private and public executives, and farmers alike for the position of jute. There seems to be a realization that the time has come to take decisive and even drastic action. This could be the most hopeful development in jute in many years.

# THE WORLD JUTE ECONOMY

## VOLUME II: PRODUCTION IN BANGLADESH

## I. THE JUTE MANUFACTURING INDUSTRY IN BANGLADESH

1. The most important change in the world supply of jute goods over time has been the increased production in Pakistan. The first looms were installed in 1952, and by 1960/61, 7,849 were operating. In the next decade, the Government policy of expanding loomage, backed by strong incentives, succeeded in increasing the number of operating looms to 22,546 in 1969/70 or an increase of 11 percent per year. Production over the decade increased from 248,701 tons in 1960 (10 percent of the world total) to 620,866 tons in 1969/70 (17 percent of the world total), an increase of about 10 percent per year.

2. The focus of this expansion was on traditional markets of sacking and hessian which accounted for over 90 percent of production until 1967/68, and over 85 percent thereafter. These markets were not dynamic, and the increase in output was largely at the expense of Indian exports. Exports of sacking from India and Bangladesh totaled 424,000 tons in 1960/61, of which Pakistan accounted for 140,000 tons, or 33 percent. By 1969/70 sacking exports from the two countries had declined to 296,000 tons, of which Pakistan supplied 248,000 tons, or 84 percent. The hessian export market for India and Pakistan remained roughly constant throughout the decade at an average of 447,000 tons. Within that stagnant market, Pakistan's exports rose from 61,000 tons to 195,000 tons.

3. The first jute mill established in East Pakistan was the privately-owned Bawa Jute Mill which had 10 hessian and 125 sacking looms which began operations on May 18, 1951. The next mill to begin producing was the Adamjee Jute Mill which, with 1,700 hessian looms and 1,300 sacking looms was (and still is) the largest jute mill in the world. The industry expanded rapidly until 1958, when a total of 14 mills with 7,849 looms were operating. Twelve of these, including the Adamjee Mill, were established with assistance from the Pakistan Industrial Development Corporation, which provided 39 percent of the total capital investment of Rs. 205 million. The average size of these mills was 405 hessian looms and 240 sacking looms, or, excluding the Adamjee Mill, 289 hessian looms and 144 sacking looms. The two privately-financed mills averaged 127 hessian looms and 247 sacking looms. At this time, the average Indian mill had a total of 645 looms.

4. No new mills were established from 1958 to 1963 as the industry consolidated its position. However, the Second Five-Year Plan (1960/65-1964/65) called for an additional 10,000 looms, of which 6,750 were to be public-sector financed through the East Pakistan Industrial Development Corporation. From 1963 to 1967, 21 new mills went into production. Of these, 4 mills had 250 looms for sacking and 250 looms for hessian, while 13 mills had 125 looms for sacking and 125 looms for hessian. In addition, 593 broad-

looms were installed, of which 543 were located in the 14 mills established from 1951 to 1958. This emphasis on smaller mills has continued to the present, and today there are 74 mills with 18 units producing carpet-backing, hessian, and sacking, 14 producing only carpet-backing, 34 units producing only hessian and sacking, 1 unit producing only hessian, 6 mills producing specialty items, and 1 mill not yet in production. The average size of a mill is currently about 375 looms. By 1969/70, one half of the raw jute crop was being processed by the domestic industry.

5. The mills which were established first were run by non-Bengalis who often had considerable business experience. This trend in non-Bengali management continued and by 1970, 44 mills were run by non-Bengalis. However, the Government of Pakistan made some attempts to encourage Bengali ownership, and smaller-sized mills were planned to allow Bengalis who had only limited access to capital to establish mills.

6. There were many sound reasons for establishing a jute manufacturing industry in East Pakistan. Raw materials were, of course, plentiful, alternative investment opportunities appeared to be limited, and, with a large unemployed or underemployed labor force, the need was great for increased industrial employment in the province. These were essentially regional considerations. At the national level, the strongest motivation may well have been the expectation of increasing foreign exchange earnings by converting raw jute to jute products. Additionally, given the strong political motivation of the times it was perhaps inevitable that Pakistan would try to deprive India of its raw jute supply.

7. The foreign exchange regime was the key element in a policy package which included tax concessions, access to capital, and other incentives and which was instrumental in establishing a profitable jute industry in East Pakistan and which also had a strong impact on inter-wing capital flows in Pakistan. The differential effective exchange rates which were imposed on exports of raw jute and exports of jute manufactures were the major element in the policy package designed to protect the infant industry and to allow it to compete with the well-established and relatively efficient Indian industry. The main element of the differential exchange rate regime in the 1950's was an export tax on raw jute which varied between 11 and 16 percent ad valorem. However, the export tax on raw jute was decreased to about 4 percent in the middle 1960's and eliminated in 1967/68, as differential exchange rates came to rely on the bonus voucher system.

8. Bonus vouchers 1/ were issued for a wide variety of goods. Primary commodities, including raw jute, received lower bonus rates while industrial exports including jute manufactures received higher rates. For example, in 1970/71, raw jute exporters were entitled to bonus vouchers worth 10 percent

1/ For a detailed discussion, see Bruton and Bose, The Pakistan Export Bonus Scheme, Monograph No. 11 (Karachi; Pakistan Institute of Development Economics, 1963).

of their exchange earnings. Thus, for each dollar earned, the exporters earned 4.76 Rupees plus a bonus voucher with a face value of .476 Rupees. Since in 1970/71 the market valued bonus vouchers at 1.8 times their face value, the exporter received .86 Rupees on the open market for his bonus vouchers. This brought his earnings to 5.62 Rupees for each dollar of foreign exchange. For exporters of jute manufactures, operating at a 45 percent bonus voucher rate, the effective exchange rate was 8.61 Rupees to the dollar. Of course, after liberation this system was replaced by one with a unitary exchange rate, originally pegged at T 7.28 per dollar, but about T 7.6 dollar at present as a result of floating with the pound sterling. The new system thus represents a revaluation for exports of jute manufactures but a devaluation for exports of raw jute as compared to the bonus voucher system.

9. The degree of protection given to manufacturers by differential exchange rates, or alternatively, the implicit tax level on raw jute, varied by year depending on the level of bonus vouchers given to raw jute exports and exports of jute manufactures as well as the market value of bonus vouchers From 1959/60 to 1970/71, jute manufactures enjoyed bonus voucher receipts for exports, while exporters of raw jute first received bonus vouchers in 1970/71. The table below gives effective exchange rates for exports of raw jute (Columm 2) and jute manufactures (Columm 3). However, since raw jute comprised about 50 percent of the cost of jute manufactures, the effective exchange rate for manufacturing was higher than the effective exchange rate on jute goods by an amount equal to the difference between the effective exchange rate on jute manufactures and the effective exchange rate on raw jute. This effective exchange rate for manufacturing is given in Columm 4. Finally, the implicit tax rate on raw jute can be calculated as the difference between the effective exchange rate value added minus the effective exchange rate on raw jute divided by the effective exchange rate on value added (Columm 5).

Table 1 : EFFECTIVE EXCHANGE RATES FOR JUTE AND JUTE MANUFACTURES

| | (1) Export Tax on Raw Jute as % Ad Valorem | (2) Effective Exchange Rate on Raw Jute (Rs./dollar) | (3) Nominal Exch. Rate on Jute Mfgs. (Rs./dollar) | (4) Effective Exch. Rate on Jute Mfgs. (Rs./dollar) | (5) Implicit Tax on Raw Jute % |
|---|---|---|---|---|---|
| 1952/53 | 15.5 | 2.86 | | | |
| 1953/53 | 13.5 | 2.92 | | | |
| 1954/55 | 12.7 | 2.95 | | | |
| 1955/56 | 12.9 | 4.14 | | | |
| 1956/57 | 11.7 | 4.19 | | | |
| 1957/58 | 11.1 | 4.22 | | | |
| 1958/59 | 11.6 | 4.20 | | | |
| 1959/60 | 12.7 | 4.14 | 5.50 | 6.86 | 40 |
| 1960/61 | 7.1 | 4.42 | 5.55 | 6.68 | 33 |
| 1961/62 | 9.8 | 4.28 | 5.68 | 7.08 | 39 |
| 1962/63 | 10.7 | 4.24 | 5.72 | 7.20 | 41 |
| 1963/64 | 11.2 | 4.22 | 5.60 | 6.98 | 40 |
| 1964/65 | 4.2 | 4.55 | 5.60 | 6.68 | 32 |
| 1965/66 | 4.7 | 4.52 | 5.58 | 6.64 | 32 |
| 1966/67 | 4.0 | 4.56 | 5.82 | 7.08 | 36 |
| 1967/68 | -- | 4.76 | 7.30 | 9.84 | 52 |
| 1968/69 | -- | 4.76 | 7.66 | 10.56 | 55 |
| 1969/70 | -- | 4.76 | 8.19 | 11.62 | 59 |
| 1970/71 | -- | 5.62 | 8.61 | 12.46 | 55 |

10. The above computations indicate that Pakistan levied an implicit tax on raw jute exports of about 30 to 40 percent from 1959/60 to 1966/67 and above 50 percent from 1967/68 to 1970/71. This, on an export which until the middle 1960's, contributed about one-half of all Pakistan's foreign exchange earnings.

11. There were many important implications of this policy. On a regional level, farmer incomes were reduced while jute manufacturers were afforded a high degree of protection. Since most manufacturing was controlled by non-Bengalis, profits, which are estimated at about 10-15 percent of sales 1/,

1/ See (a) Industrialization of Pakistan, The Record, The Problem, and The Prospects, IBRD, March 10, 1970 (SA-11a), and (b) Survey of Jute Manufacturing Units, Industrial Development Bank of Bangladesh (no date).

were largely remitted to the West Wing. These were an important component of the flow of resources from the East Wing to the West Wing, a flow which may have reached Rupees 1 billion in the late 1960's 1/. Profit levels apparently remained high even in those periods (i.e., 1968) when value added on some products, especially sacking, was negative. Quite obviously, there were few incentives for efficient mill management. Production per loom declined from 31.7 tons per year in 1960/61 to 27.5 tons per year in 1969/70, compared to a feasible output level in excess of 55 tons per year. This is an industry which did not suffer from shortages of raw materials.

12. On the international level, the differential treatment of exports of raw jute and jute manufactures had serious implications. While Pakistan was establishing a jute manufacturing industry but still exporting most of the jute crop as raw jute, the high level of implicit taxation on raw jute caused both smaller crops and higher international prices of raw jute. Users of raw jute, especially in Western Europe, were faced with the choice of continuing to manufacture jute products or of switching to the production of synthetic substitutes. Pakistan's policy could only encourage them to take the latter course. Had Pakistan imposed a smaller exchange rate differential between raw jute and jute manufactures by offering a higher exchange rate for raw jute exports, the end-use markets would have been better protected for the day when increased manufacturing output in Pakistan could supply them.

13. The policy of establishing a profitable and rapidly growing jute manufacturing industry which would successfully compete with other producers, especially India, strongly shaped the product mix of Pakistan's industry. Sacking and hessian were large markets which required a relatively simple technology and a relatively low degree of quality control, and Pakistan quickly expanded in these areas. Unfortunately, the high level of protection for domestic industry minimized market signals that would have limited expansion, and by the late 1960's value added in manufacturing was reduced to very low or even negative values while profits remained high. It was only in the late 1960's that Pakistan turned to carpet-backing production in any appreciable quantities. This was a growing market that should have received earlier attention.

14. At independence, Bangladesh had a large well-established jute industry. It now employs about 150,000 persons, accounts for perhaps 40 percent of foreign exchange earnings, and is a potentially major source of government income. It is also an industry with many problems, some of which are short-term in nature, and others which are likely to remain for a considerable time.

15. The events leading to and immediately following independence caused a complete stoppage in production. The basic structure of the industry changed when, shortly after the new Government assumed power, about two thirds of all mills including the largest and best-run were nationalized as abandoned property

1/ Some Aspects of Inter-Wing Resource Transfers in Pakistan, by Roger Norton, USAID/Dacca, mimeo, 1968.

while the remaining mills have been subject to an ill-defined joint control exercised by the former owners and the Government. More recently, Government has assumed ownership of all mills.

16. The jute industry was nationalized as part of the Government's program to nationalize all medium- and large-scale industry. The Ministry of Industry established a Nationalized Industry Division, which currently has 11 sector corporations. The Bangladesh Jute Mills Corporation (BJMC) operates as a form of holding company for all jute mills. It is responsible for assigning managers to mills and for mills production and profitability. Export orders are received by the BJMC and allocated to mills, although a consumer has the option of choosing a specific mill if he pays a premium. Prices are set by BJMC in consultation with other Government agencies. The main officers of BJMC are: Chairman, Secretary, and Financial, Marketing and Technical Managers. The degree of financial autonomy of each mill is not yet clearly defined, and it remains to be seen whether profits (or losses) accrue to the BJMC, or to individual mills, and exactly who will approve and provide for capital expenditures. Current expenditures are determined at the mill level, in accordance with certain guidelines set up by the BJMC.

17. Cost levels[1/] now are high compared to the past levels for several reasons. First, introducing the uniform exchange produced 53 percent devaluation for raw jute, and as a result domestic jute prices have increased by about 50 percent. This has removed the large subsidy from the Bangladesh jute manufacturing industry and should be an important incentive for greater levels of efficiency. Second, mills have had to borrow large amounts of working capital from banks in order to finance operations. This stems both from the political requirements of keeping a large number of employees on payrolls when the mills were not operating early in calendar 1972, but more importantly from the inability of many mills to sell inventories which are currently at about 120,000 tons, which are double the levels of the late 1960's. If this had been a planned build-up of buffer stocks, it might have been somewhat justified, but it is instead the result of unplanned production of large quantities of goods (mainly hessians) for which there is little demand at price levels imposed by the Government. Interest charges are thus high, and low levels of productivity mean that charges per ton are higher than they need to be. Unit costs could be reduced by 10 percent or so by an increased capacity utilization.

18. The current cost structure was outlined in Volume I, but will be summarized here. The information is the result of a sample survey (for July-October 1972 period) and is presented only as an indication of the true picture. Indeed, one of the important requirements is a more accurate data collection system.

---

1/ Tables 2 and 16 through 19 summarize the relevant cost data.

Table 2 : PRODUCTION COSTS OF JUTE PRODUCTS

(Takas per metric ton)

| | | % | Hessian | % | Sacking | % | Carpet-Backing |
|---|---|---|---|---|---|---|---|
| A. | Raw Material | 44 | 1,750 | 53 | 1,396 | 44 | 2,176 |
| B. | Conversion Costs | | | | | | |
| | (a) Wages and Salaries | 26 | 1,024 | 22 | 564 | 20 | 969 |
| | (b) Others /a | 30 | 1,223 | 25 | 649 | 36 | 1,613 |
| | Total | 56 | 2,247 | 47 | 1,213 | 56 | 2,632 |
| C. | Total Manufacturing Costs (A+B) | 100 | 3,997 | 100 | 2,609 | 100 | 4,808 |
| D. | Selling Price | | 3,700 | | 2,600 | | 4,600 |
| E. | Quantity produced by sample mills in tons (July-October 1972) | | 22,985 | | 24,126 | | 6,981 |
| F. | Percentage of total output (July-October 1972) | 38.4 | | 28.8 | | 38.6 | |

/a Includes stores, interest, depreciation, administration, selling costs, and others.

Source: Mission estimates based on sample survey.

19. Several considerations suggest that the cost structure reflected in the sample survey may not be typical of the industry as a whole. First, most mills simply do not have cost data readily available, and the fact that a mill was in a position to provide cost and production data suggests above-average management in itself. Second, mills in the sample showed a much higher than average rate of capacity utilization which implies lower than average unit cost structure. On this count alone, unit costs in the sample mills may well be 10 to 15 percent below unit costs in the industry. Nevertheless, an empirical investigation of costs based on the sample survey and other information yields some interesting insight.

Table 3: MANUFACTURING CAPACITY UTILIZATION

| | Hessian | Sacking | Carpet-Backing |
|---|---|---|---|
| Capacity utilization for sample mills(%) | 57.9 | 53.7 | 51.6 |
| Capacity utilization for industry (%) | 43.6 | 46.6 | 34.3 |

20. The most important fact brought out by the above table is that, according to mission estimates, mills are suffering losses in all three product lines. This estimate is verified by preliminary estimates of losses by the BSMC for its mills during the first half of 1972/73. The pressures to raise prices in such a situation are understandable, but such action would be severely detrimental to the long-term jute market. In fact, the world market survey of Volume I presents the clear need to lower export prices. The following discussion will indicate areas where efficiency can be increased, costs lowered, and will suggest some implication of price decreases which are so clearly called for by world market considerations.

21. The simpler technology required for sacking is reflected in lower conversion costs; about half those of hessian and carpet-backing, and the higher percentage of total costs accounted for by raw materials. The more complex production process for carpet-backing accounts for the high proportion of costs (36%) for capital and overhead. An important component of "others" in each case is interest charges. Mills have an average of 10 million Takas debt to the banking system, and interest charges on this debt (about 8.5-9 percent) comprise about 6 percent of total costs. These interest charges are, of course, internal transfers within the economy and by themselves do not represent costs to Bangladesh. However, the large inventory accumulation which is the cause of much of the debts is costly to the country on at least three counts. First, inventory sales at a later date will bring foreign exchange earnings in the future which is worth less than foreign exchange earnings today, with the differential determined by the national time discount rate. Second, the inventories are improperly stored and deteriorating in quality over time. Third, the large accumulation of inventories has actually encroached on working areas within mills, thus impinging on work space needed for production activities. If mills were allowed to sell unwanted inventories at lower than currently approved prices, much of this burden would be eliminated. Of course, simply dumping the excess inventory on the world market might suppress world prices drastically, and careful attention should be paid so that inventory levels are only gradually reduced.

22. However, a number of factors which cause high costs have existed for years. Batching costs, that is, the cost of obtaining a given quality input of raw jute, are higher than they need be. This stems from the fact that many mills which produce carpet-backing are not integrated with hessian and sacking production so that lower quality fiber which could be used in producing lower quality products is wasted. The reverse is true for mills which produce only hessian and sacking but not carpet-backing -- some fiber purchased is of higher quality which could yield higher returns if used for carpet-backing.

23. Mills are on the average too small. Larger mills operate at 5-10 percent lower cost levels than smaller mills. There appears to be some savings possible by operating larger units, for example: (i) which result from spreading overhead costs among a larger number of mills, and (ii) buying raw jute more efficiently, etc. However, this is not a pressing short-term consideration.

24. The mission attempted to ascertain whether age was an important factor in cost structure, but the results of this investigation were mixed. For hessian and carpet-backing costs appeared to be lower for new mills but for sacking costs appeared to be lower for older mills. The number of mills which provided data was fairly small, however, and it is likely that differences in age were really proxies for other variables such as size and more important, the differences noted were not large. It does not, therefore, appear that mill age, at least in the less than 20-year range applicable to Bangladesh, is an important cost factor.

25. However, in the short- and medium run, the strongest possibilities for lowering costs appear to be in the area of management, finance, quality control and other non-physical factors rather than the area of plant and machinery. The current system and policies have been evolved quickly to meet an emergency situation. Production was at a standstill after liberation and the Government acted quickly to facilitate recovery . Production has now approached approximately 80 percent of pre-war levels but remain at less than 40 percent of capacity utilization, and has not increased for several months. It is time to look closely again at the situation to determine what improvements can be made. One possibility would be to allow mills to negotiate their own contracts, as was the case before nationalization. The larger mills had, in the past good overseas contacts and some of these have been maintained. Smaller mills would have greater difficulties with such an arrangement. Alternatively, the BJMC itself could establish stronger overseas contacts which could provide more accurate market information. In the short run, this might best be done by collaborating with India, which now has several overseas offices. In the longer term, the proposed International Center for Jute would appear to be the best source of market information, and the potential services from the Center should be a valuable addition to pricing policies of the BJMC.

26. Perhaps the most important short-term factor which needs to be carefully considered is marketing pricing policy. There is a pressing need to obtain an accurate, continuous flow of information about market situations. The Bangladesh Jute Mills Corporation has sent missions overseas to gather information, but an occasional mission cannot be expected to generate information sufficient for optimal pricing policies. The large inventories currently held, especially of hessians, is evidence that even short-term market information is insufficient to plan production. Yet, this is merely the simplest and first step required in a comprehensive market strategy. As discussed in Volume I, the mission found that prices are too high and that reductions are called for. But more important, a mechanism needs to be established to evaluate market conditions and translate these into pricing and production schedules.

27. A strong case for lower export prices of jute manufactures has been made in Chapter II. While the current revenue position of jute mills, as indicated by Table 2 , may appear to suggest that price reductions would have a serious adverse effect on profitability, this need not be the case, even within the current exchange rate framework. This conclusion emerges from two different kinds of consideration. First, the world demand for jute goods is distinctly price elastic, that is, a decrease in prices is estimated to cause a more than proportionate increase in demand. The associated increase in demand is important because with serious underutilization of capacity, an increase in output can have a strong influence on lowering unit costs. Chapter II suggests that a one percent price decline of jute products relative to the price of synthetics products on the world market is associated with a roughly 2 percent increase in the quantity demanded 1/ for hessian, sacking, and carpet-backing. This empirical estimate is consistent with numerous comments from the trade that demand for jute products is very sensitive to price. Furthermore, if the price elasticity of demand is taken as -2 for the world trade, then exports from Bangladesh almost certainly face a demand curve which is more sensitive to price changes. For purposes of this analysis, it will be conservatively assumed that the world demand curve elasticity of -2 applies to Bangladesh. Second, a number of cost elements in Bangladesh's jute industry are higher than need be, as suggested by a comparison of current cost levels in the Indian jute industry. For illustrative purposes, this analysis will focus on stores, which account for 4 to 7 percent of the total costs in Bangladesh today and which are up to three times higher than in India. The cost of stores is clearly influenced by import and other policies, and it should be possible to reduce the costs of this item considerably. If the cost of stores, which comprise only a small fraction of total costs, could be lowered to Indian levels, then the possibility of increased revenues associated with price decreases would be greatly enhanced. Obviously, a similar analysis is possible for other inputs.

---

1/ See Volume I, page 13, Footnote 1, and page 19, Footnote 1, which suggest that 1 percent decline in carpet-backing price is associated with a 2.3 percent increase in demand and that a 1 percent decline in sacking and hessian price is associated with a 2.2 percent increase in demand.

28. The analysis starting with the proposition that a one percent decline in the price of jute goods relative to the price of synthetics would increase the quantity demanded by two percent. As indicated in Tables 4 and 6 of Volume I (reproduced below), a one percent decline in the relative price hessian and sacking would require a one percent decline in the price of hessian and sacking, whereas a one percent decline in the relative price of carpet-backing would require a decline of .92 percent in the price of carpet-backing.

Table 4: U.S. MARKET PRICES OF HESSIAN AND POLYPROPYLENE CLOTH FOR BAGS

(cents/square yard)

| | Hessian 40" - 10 oz. (spot New York) | Polypropylene Cloth Replacement (delivered) |
|---|---|---|
| 1966 | 15.6 | n.a. |
| 1967 | 14.1 | 20.0 |
| 1968 | 13.8 | 16.0 |
| 1969 | 15.2 | 14.5 |
| 1970 | 15.5 | 13.0 |
| 1971 | 18.1 | 13.5 |
| 1972 | 22.1 | 14.0 |

Source: Fiber Market News; and interview data.

Table 5: U.S. MARKET PRICES OF JUTE AND POLY-PROPYLENE PRIMARY BACKING, 1966-1972

(cents per square yard)

| | Average selling prices of jute primary backing | Average selling prices of PP primary backing |
|---|---|---|
| 1966 | 21.75 | 22 |
| 1967 | 20.50 | 19 |
| 1968 | 20.00 | 18 |
| 1969 | 22.25 | 18 |
| 1970 | 18.75 | 17 |
| 1971 | 19.50 | 16 |
| 1972 | 23.25 | 18 |

Source: Trade sources

Further, since transport costs account for 14 percent, 15 percent and 18 percent of C.I.F. costs of carpet-backing, hessian and sacking respectively, a C.I.F. price decline of .92 percent for carpet-backing requires a decline of .98 percent in the F.O.B. price, while one percent declines for hessian and sacking C.I.F. prices require declines of 1.09 percent and 1.13 percent, respectively for hessian and sacking F.O.B. prices.

Table 6: RELATIONSHIP BETWEEN CIF AND FOB PRICES

| | Relative Price Decline (percent) | Implied CIF Price Decline (percent) | Implied FOB Price Decline (percent) |
|---|---|---|---|
| Carpet-backing | 1 | 0.92 | 1.05 |
| Hessian | 1 | 1.00 | 1.15 |
| Sacking | 1 | 1.00 | 1.18 |

29. Each of these price decreases is estimated to cause a 2 percent increase in quantity demanded. The impact on unit costs will of course vary as the composition of costs (as among fixed, raw materials and other costs) varies for carpet-backing, hessian, and sacking as well as the current output levels in relation to capacity. The table below gives the cost composition, in percentage, for hessian, sacking, and carpet-backing (Column 1), the factor of proportionality (Column 2) by which costs are assumed to decline. Column 3 gives the implied percentage cost reduction for two percent increase in output. Column 4 gives the total percentage cost reduction per unit of output for each of the products. At this stage of the analysis it is assumed that stores required per unit of output will decline by one half of the increase in output, that is, the factor of proportionality is assumed to be one half. The second stage of the analysis will differ by assuming that the cost of stores can be reduced to the costs incurred by Indian mills.

Table 7 : UNIT COST REDUCTIONS IMPLIED BY A TWO PERCENT INCREASE IN OUTPUT

| Product | | Cost Structure in % | Factor of Proportionality | Unit Cost Reduction for a 2% Increase Output, in % | Total Cost Reduction by Product, in % |
|---|---|---|---|---|---|
| 1. Sacking: | Fixed Costs | 21 | 1 | .42) | |
| | Labor | 21 | ½ | .21) | .65 |
| | Stores | 4 | ½ | .02) | |
| | Raw Materials | 54 | 0 | .00) | |
| 2. Hessian: | Fixed Costs | 25 | 1 | .50) | |
| | Labor | 26 | ½ | .26) | .81 |
| | Stores | 5 | ½ | .05) | |
| | Raw Materials | 44 | 0 | .00) | |
| 3. Carpet-Backing: | Fixed Costs | 28 | 1 | .56) | |
| | Labor | 20 | ¼ | .10) | .73 |
| | Stores | 7 | ½ | .07) | |
| | Raw Materials | 45 | 0 | .00) | |

For each product, fixed costs per unit are assumed to decline proportionally to increase in output; stores are assumed to decline by only one half the percentage increase in output; and unit costs of raw materials are assumed constant. Labor costs are assumed to decline by one half of the percentage increase in output for hessian and sacking, but by only one fourth for carpet-backing where skilled labor is in short supply. The unit price and cost computations are summarized below, along with a computation of the change in revenue per unit of output.

| | Sacking | Hessian | Carpet-Backing |
|---|---|---|---|
| Unit cost decrease (percentage) | .65 | .81 | .73 |
| Unit price decrease (percentage) | 1.18 | 1.15 | 1.05 |
| Change in revenue per unit (percentage) | -.53 | -.34 | -.32 |

Thus, given the above assumptions, for each percentage point decline in the price of hessian and carpet-backing, revenue is predicted to fall by about one quarter of a percent, while for sacking, the fall is predicted to be about one half a percent. According to the simplified assumptions of this presentation, any given percentage price change would induce a strictly proportional change in revenue, so that if one is considering a 10 percent reduction in the price, say, carpet-backing, revenue would decline by 3.2 percent. Clearly, however, for large price changes the proportionality factors would need some adjustment.

30. If one makes the further assumption that the cost of stores can be reduced to levels prevailing in the Indian jute industry, the revenue prospects improve greatly. This is an important consideration on several counts. First, stores are now abnormally expensive in Bangladesh because of the stock rundown which occurred in the last several years and current import constraints. Second, stores which are by themselves only a small percentage of costs could serve as an illustration for the effects of similar cost changes in other areas, i.e., power.

Table 8: HYPOTHETICAL COST STRUCTURE OF BANGLADESH INDUSTRY WITH COST OF STORES AT INDIAN LEVELS

| | Hessian | | Sacking | | Carpet-backing | |
|---|---|---|---|---|---|---|
| | Takas/ton | % | Takas/ton | % | Takas/ton | % |
| Raw Materials | 1750 | 45 | 1396 | 55 | 2176 | 46 |
| Conversion Costs | 2116 | 55 | 1150 | 45 | 2575 | 54 |
| Of which: | | | | | | |
| Wages and Salaries | (1024) | (27) | ( 564) | (22) | ( 969) | (20) |
| Stores | ( 62) | ( 2) | ( 37) | ( 1) | ( 263) | ( 6) |
| Interest | ( 245) | ( 6) | ( 118) | ( 5) | ( 401) | ( 8) |
| Depreciation | ( 238) | ( 6) | ( 135) | ( 5) | ( 350) | ( 7) |
| Other | ( 547) | (14) | ( 296) | (12) | ( 592) | (13) |
| Total | 3866 | 100 | 2546 | 100 | 4751 | 100 |
| Actual Costs | 3997 | | 2609 | | 4808 | |
| Cost Reduction (%) | 3.3 | | 2.4 | | 1.1 | |

Source: Table 23, Volume I.

The unit cost reductions for a 2 percent increase in output implied by this cost structure are given below. The table is computed as was Table 7 , except that unit costs of stores are assumed to be constant for changes in output.

Table 9 : UNIT COST REDUCTIONS IMPLIED BY A TWO PERCENT INCREASE IN OUTPUT HYPOTHETICAL COST STRUCTURE

| Product | Cost Structure in % | | Factor of Proportionality | Unit Cost Reduction For a 2% Increase Output, in % | Total Cost Reduction by Product, in % |
|---|---|---|---|---|---|
| 1. Sacking | Fixed Costs | 23 | 1 | .46 | |
| | Labor | 24 | ½ | .24 | |
| | Stores | 2 | 0 | 0 | .70 |
| | Raw Materials | 51 | 0 | 0 | |
| 2. Hessian | Fixed Costs | 26 | 1 | .52 | |
| | Labor | 27 | ½ | .27 | .79 |
| | Stores | 2 | 0 | 0 | |
| 3. Carpet-Backing | Fixed Costs | 28 | 1 | .56 | |
| | Labor | 20 | ¼ | .10 | |
| | Stores | 6 | 0 | 0 | .66 |
| | Raw Materials | 46 | 0 | 0 | |

31. For the price changes required to produce a 2 percent increase in quantity demanded unit prices and costs are summarized below along with the implied change in revenue per unit output

Table 10.: REVENUE CHANGES FOR PRICE DECREASE REQUIRED TO INCREASE DEMAND BY 2 PERCENT HYPOTHETICAL COST STRUCTURE

| | Sacking | Hessian | Carpet-Backing |
|---|---|---|---|
| Unit Cost Decrease (%) | .70 | .79 | .66 |
| Unit Price Decrease (%) | 1.18 | 1.15 | 1.05 |
| Change in Revenue Per Unit (%) | -.48 | -.36 | -.39 |

32. Since the lowered unit costs of stores would decrease unit costs by 3.3 percent for hessian, 2.4 percent for sacking, and 1.1 percent for carpet-backing (see Table 8 ), the price decrease now allowable which would leave revenues unchanged at current levels can now be computed. The above calculations indicate that a price decrease of 5 percent for sacking, 9 percent for hessian, and 3 percent for carpet-backing would leave the Bangladesh jute industry no worse off, in terms of net revenue, than it is today. The industry would be better off in the sense that by supplying a larger quantity of goods at a lower price, it would be helping to preserve the world jute market. Of course, other cost items could be lowered, and the exercise herein presented is simply an illustration of the possibilities which exist.

33. One of the most important issues of pricing policy is clearly the exchange rate. The jute industry moved from a position of considerable protection offered by the bonus voucher multiple exchange rate regime to one of no protection under the unitary rate imposed January 1, 1972, while simultaneously facing a revaluation ineffective rates from 8.6 Rupees per dollar to 7.6 Takas per dollar. The impact of this on the industry's profit position has been quite severe. Although many measures could be taken to increase profitability, it may well be too much to expect a profitable operation in the short run under the current exchange rate system.

34. Aside from pricing policy, there are other areas in which reform could have an important impact on profitability and efficiency. Concerning mill management, one of the greatest difficulties appear to be labor-management relations. There are proposals to establish 5-member boards with 2 labor representatives, 2 management representatives, and 1 official from the BJMC. Increased worker participation in and responsibility for mill management should help reduce strikes and gheraos but the proposal probably

does not go far enough. Piece-rate wages which are in effect to some extent now for certain categories of workers could be an important production incentive if expanded to cover more workers.

35. Skilled labor has always been a key constraint to efficient production, and is a more serious constraint today than it has been in the past. A training program for labor, even at the mill level could greatly improve production. Typically, skilled workers are hesitant to train by themselves possible replacements, so that a BJMC organized program with proper incentives is crucial if the shortage of skilled labor is to be remedied. Some consideration might be given to the establishment of three separate corporations, one for each zone. The BJMC, despite considerable efforts by capable staff, is apparently not able to function efficiently as one central organization. This should not come as a surprise - efficient management from Dacca of 76 units throughout the country is a considerable task. The prospects for increased efficiency from three smaller corporations, which could then be coordinated at the national level, are intriguing and should be closely examined.

36. As important as any particular labor policy which may be formulated, however, is the requirement for a uniform labor code. The current situation is characterized by individual unions, limited to one mill, negotiating with the management of that mill. When agreements in one mill are reached, workers in neighboring mills compare the resulting agreement with their own and in cases where their benefits to not match they quite understandably seek parity. Thus, each labor agreement in one mill leads to a round of further negotiations in other mills with the result that management and labor are constantly at odds. A uniform labor code would go a long way towards freeing management to concentrate on mill efficiency and costs rather than on continuous labor negotiations. Another aspect of this situation of tenuous management-labor relations is that managers are frequently shifted from one mill to another when their situation becomes difficult. Thus, managers find it difficult to become fully acquainted with a particular mill and mill efficiency suffer considerably. Weak management is a general problem, and there would be large return to a management training program.

37. Apart from management-labor relations, it appears that certain difficulties are inherent in the current management arrangement. Efficient central control and coordination of the 76 mills from Dacca is almost impossible. The BJMC has divided the industry into 3 zones. The Dacca zone has 36 mills, Chittagong has 20 mills, and Khulna with 18 mills. Zonal managers are resident in Dacca and make only infrequent visits to mills under their jurisdiction. There would be merit in strengthening the zonal aspects of the BJMC which now appear to be most concerned with data collection.

38. Specifically, each of the three zones could contain a model mill which could be used for on-the-job training for both workers and management in other mills. With management and worker inefficiency a key production constraint, this sort of training could be most useful. Second, each zone could contain a common inventory of spare parts for mills in the zone. With persistent shortages of spare parts, a zonal inventory should be an efficient way to economize. This is especially true with components which, while critical to the operation of a loom, rarely break down. In the past, mills had to keep these components in stock even though turnovers were very low.

39. One of the potentially most important aspects of a zonal orientation of the BJMC could be the establishment of quality control centers from each of the three zones. Quality control is one of the weakest aspects of the current situation - apart from a few mills, it is almost completely absent. In the competitive market facing jute products today, product reliability is a crucial determinant of customer choice and, therefore, improvements in quality control are urgently required.

40. There are a number of other activities in which each zonal office could participate. The most important might be the provision of accounting and auditing services to mills in the zone. It is difficult to estimate the exact extent to which accounts are now kept, but it is clear that accurate information is difficult to collect. A uniform account system implemented with the help of a zonal official could be of great use not only in regulating production and costs but also in planning and policy formulation.

41. Beyond these short- and medium-run suggestions, a longer-term policy is of critical importance for Bangladesh. The outline of such a policy was discussed in Chapter II. It is to be hoped that the medium-term plan now under preparation in Bangladesh recognizes the urgency of the situation and devotes sufficient planning and implementation resources to the jute manufacturing sector. Beyond this, support for the International Center for Jute is a key element in any long term jute plan. The proposed center offers a strong hope for the kind of marketing and technical improvements so urgently needed and the support thus far exhibited by the GOBD for jute center is both welcome and commendable element of an outward looking policy towards jute.

42. The importance of operating a profitable jute manufacturing industry in Bangladesh cannot be overemphasized. It is the one large-scale industry which has sufficient domestically produced raw materials. The BJMC should contribute to Government revenues, not impose a drain on them as is currently the case. The situation is urgent and should be carefully studied by the Government. The mission feels that if the steps recommended above are implemented, the returns to the Government would indeed be significant and would help turn the jute manufacturing sector into an important source of revenue and would help safeguard foreign exchange earnings.

Table 11 : PRODUCTION OF JUTE GOODS IN BANGLADESH

| uly-June | Looms | Hessian | | Sacking | | Carpet Backing | Others | Total Production | Raw Jute Consumption (Lakh Bales) |
|---|---|---|---|---|---|---|---|---|---|
| | Operating | 000 Yds. | Tons | 000 Yds. | Tons | Tons | Tons | Tons | |
| 1964-65 | 10,007 | 293,907 | 81,121 | 475,325 | 193,176 | 6,459 | 8,356 | 289,112 | 17.03 |
| 1965-66 | 11,800 | 391,763 | 106,367 | 675,781 | 279,137 | 14,191 | 9,665 | 409,360 | 23.82 |
| 1966-67 | 13,073 | 394,376 | 110,060 | 637,988 | 263,699 | 19,664 | 10,288 | 403,711 | 23.65 |
| 1967-68 | 16,371 | 501,940 | 139,853 | 804,531 | 334,282 | 24,516 | 13,898 | 512,549 | 30.03 |
| 1968-69 | 19,099 | 678,476 | 188,780 | 684,286 | 285,353 | 27,127 | 17,226 | 518,486 | 30.28 |
| 1969-70 | 21,508 | 842,529 | 234,608 | 713,028 | 297,361 | 33,008 | 22,510 | 587,487 | 34.22 |
| 1970-71 | 23,577 | 761,810 | 211,200 | 451,330 | 190,777 | 40,503 | 27,797 | 470,277 | 27.65 |
| 1971-72 | 14,636 | 361,189 | 103,589 | 286,127 | 119,138 | 28,029 | 8,327 | 259,083 | 15.61 |

Source: Bangladesh Jute Mills Association

Table 12: CHITTAGONG REGION

Jute Mills in Bangladesh
as of October 31, 1972

| Mill | Position of Looms | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Installed | | | | Operating | | | |
| | Hessian | Sacking | Broadloom | Total | Hessian | Sacking | Broadloom | Total |
| 1. Amin Jute Mills Ltd. | 549 | 175 | 207 | 931 | 549 | 175 | 207 | 931 |
| 2. M.M. Jute Mills Ltd. | - | - | 65 | 65 | - | - | 38 | 38 |
| 3. R. R. Jute Mills Ltd. | - | - | 65 | 65 | - | - | 35 | 35 |
| 4. Hafiz Jute Mills Ltd. | 450 | 190 | - | 640 | 342 | 175 | - | 517 |
| 5. Hafiz Textile Mills | - | - | 60 | 60 | - | - | 58 | 58 |
| 6. Dawood Jute Mills Ltd. | - | - | 52 | 52 | - | - | - | - |
| 7. Chittagong Jute Mfg. | 837 | 223 | 120 | 1180 | 791 | 204 | 100 | 1095 |
| 8. Victory Jute Products | 375 | 121 | - | 496 | 360 | 81 | - | 441 |
| 9. A. K. Khan Jute Mills | 125 | 125 | - | 250 | 124 | 119 | - | 243 |
| 10. Anowara Jute Mills | 203 | 117 | 69 | 389 | 175 | 100 | 46 | 321 |
| 11. Delta Jute Mills | 172 | 141 | - | 313 | 167 | 135 | - | 302 |
| 12. Gul Ahmed Jute Mills | 150 | 100 | 65 | 315 | 136 | 96 | 32 | 264 |
| 13. Kashem Jute Mills | 173 | 84 | - | 257 | 157 | 77 | - | 234 |
| 14. Moqbular Pahman Jute | 164 | 86 | - | 250 | 164 | 63 | - | 227 |
| 15. S. K. M. Jute Mills | - | - | 65 | 65 | - | - | 54 | 54 |
| 16. Sultana Jute Mills | - | - | 65 | 65 | - | - | 39 | 39 |
| 17. W. Rahman Jute Mills | 250 | 250 | - | 500 | 203 | 151 | - | 354 |
| 18. Star Alkaid Jute Mills | 179 | 125 | - | 304 | 92 | 84 | - | 176 |
| 19. Hamedia Jute Mills | - | - | - | - | - | - | - | - |
| Total | 3627 | 1737 | 833 | 6197 | 3260 | 1460 | 609 | 5329 |

Source: Bangladesh Jute Mills Association

Table 13: KHULNA REGION

Jute Mills in Bangladesh
as of October 31, 1972

| Mill | Position of Looms | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Installed | | | | Operating | | | |
| | Hessian | Sacking | Broadloom | Total | Hessian | Sacking | Broadloom | Total |
| 1. Star Jute | 560 | 200 | - | 760 | 553 | 192 | - | 745 |
| 2. Purbachal Jute | - | - | 65 | 65 | - | - | 34 | 34 |
| 3. Eastern Jute | 139 | 117 | 32 | 288 | 139 | 69 | 20 | 228 |
| 4. Jessore Jute | 300 | 100 | 50 | 450 | 287 | 97 | 11 | 395 |
| 5. Crescent Jute | 695 | 330 | 85 | 1110 | 695 | 330 | 85 | 1110 |
| 6. Peoples Jute | 696 | 289 | 79 | 1073 | 458 | 282 | 41 | 781 |
| 7. Afil Jute | 125 | 125 | - | 250 | 91 | 90 | - | 181 |
| 8. Ajax Jute | 125 | 125 | - | 250 | 111 | 103 | - | 214 |
| 9. Aleem Jute | 125 | 125 | - | 250 | 106 | 114 | - | 220 |
| 10. A. R. Hawlader | 150 | 100 | - | 250 | 146 | 93 | - | 239 |
| 11. Mohseen Jute | - | - | 65 | 65 | - | - | 64 | 64 |
| 12. Noapara Jute | 150 | 25 | 32 | 207 | 135 | 21 | 5 | 161 |
| 13. Rajshai Jute | 130 | 23 | - | 153 | - | - | - | - |
| 14. Sonali Jute | 270 | 125 | - | 395 | 244 | 118 | - | 362 |
| 15. Platinum Jute | 560 | 315 | 32 | 907 | 522 | 233 | 21 | 776 |
| 16. Daulatpur Jute | 158 | 92 | - | 250 | 158 | 69 | - | 227 |
| 17. Qaumi Jute | 253 | 247 | 25 | 525 | 211 | 202 | 18 | 431 |
| 18. Carpeting Jute | - | - | 75 | 75 | - | - | 14 | 14 |
| Total | 4436 | 2347 | 540 | 7323 | 3856 | 2013 | 313 | 6182 |

Source: Bangladesh Jute Mills Association

Table 14: DACCA REGION

Jute Mills in Bangladesh
as of October 31, 1972

| Mill | Position of Looms | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Installed | | | | Operating | | | |
| | Hessian | Sacking | Broadloom | Total | Hessian | Sacking | Broadloom | Total |
| 1. Adamjee Jute | 2192 | 828 | 225 | 3245 | 2030 | 839 | 124 | 2993 |
| 2. Bawa Jute | 233 | 17 | 43 | 293 | 233 | 9 | 31 | 273 |
| 3. Latif Bawany | 450 | 250 | 120 | 820 | 375 | 58 | 82 | 515 |
| 4. Karim Jute | 147 | 310 | 57 | 514 | 147 | 276 | 39 | 462 |
| 5. Nishat Jute | 225 | 100 | 25 | 350 | 208 | 85 | 23 | 316 |
| 6. UnitedJute | 250 | 250 | - | 500 | 224 | 227 | - | 451 |
| 7. Meghna Jute | 125 | 125 | - | 250 | 114 | 115 | - | 229 |
| 8. Chandpur Jute | 125 | 125 | - | 250 | 114 | 115 | - | 1220 |
| 9. Bangladesh Jute | 275 | 225 | - | 500 | 275 | 225 | - | 500 |
| 10. Allied Jute | - | - | 50 | 50 | - | - | 38 | 38 |
| 11. Sonarbangla Jute | 50 | - | - | 50 | 30 | - | - | 30 |
| 12. Jabbar Jute | 125 | 125 | - | 250 | 106 | 102 | - | 208 |
| 13. Alhaj Jute | 150 | 100 | - | 250 | 57 | 20 | - | 77 |
| 14. Alijan Jute | 125 | 125 | - | 250 | 106 | 107 | - | 213 |
| 15. Ashraf Jute | 196 | 74 | - | 270 | 180 | 74 | - | 254 |
| 16. Cooperative Jute | 135 | 124 | - | 259 | 126 | 114 | - | 240 |
| 17. Dacca Jute | 225 | 126 | 27 | 378 | 194 | 114 | 7 | 315 |
| 18. Fauji Chatkal | 175 | 75 | - | 250 | 128 | 75 | - | 250 |
| 19. Gausia Jute | 150 | 100 | | 250 | 128 | 89 | - | 217 |
| 20. Janata Jute | 165 | 85 | - | 250 | 165 | 85 | - | 250 |
| 21. Koninoor Jute | 134 | 116 | - | 250 | 134 | 81 | - | 215 |
| 22. Mashrique Jute | - | - | 50 | 50 | - | - | 27 | 27 |
| 23. National Jute | 132 | 118 | 65 | 315 | 132 | 105 | 26 | 263 |
| 24. Pubali Jute | 156 | 94 | - | 250 | 156 | 94 | - | 250 |
| 25. N. Askari Jute | 150 | 100 | - | 250 | 150 | 82 | - | 232 |
| 26. Sattar Jute | 181 | 101 | - | 282 | 181 | 101 | - | 282 |
| 27. Nabarun Jute | 150 | 100 | - | 250 | 121 | 87 | - | 208 |
| 28. Taj Jute Backing | - | - | 50 | 50 | - | - | 31 | 31 |
| 29. Broad Burlap | - | - | 50 | 50 | - | - | - | - |
| 30. Manwar Jute | - | - | 44 | 44 | - | - | - | - |
| 31. Mymensingh Jute | 260 | 170 | - | 430 | - | - | - | - |
| 32. New Dacca | - | - | - | Twine | - | - | - | - |
| 33. Sarwar Jute | - | - | - | -do- | - | - | - | - |
| 34. N. A. Malek Jute | - | - | - | -do- | - | - | - | - |
| 35. Hossain Jute | - | - | - | -do- | - | - | - | - |
| 36. Associated Bagging (cotton bagging) | - | - | - | - | - | - | - | - |
| 37. Bangladesh Fabric ( -do- ) | - | - | - | - | - | - | - | - |
| Total | 6681 | 3963 | 806 | 11450 | 5861 | 3279 | 428 | 9568 |

Source: Bangladesh Jute Mills Association

Table 15 : NUMBER OF LOOMS INSTALLED AND OPERATING

| Month | Installed 1/ | | | | Operating (percentage) | | | |
|---|---|---|---|---|---|---|---|---|
| | Hessian | Sacking | Carpet-Backing | Total | Hessian | Sacking | Carpet-Backing | Total |
| July | 14482 | 8046 | 2221 | 25109 | 84% | 77% | 66% | 80% |
| August | 14586 | 8213 | 2194 | 24993 | 86% | 81% | 61% | 82% |
| September | 15093 | 8414 | 2325 | 25832 | 84% | 79% | 59% | 80% |
| October | 14744 | 8047 | 2179 | 24970 | 88% | 84% | 62% | 84% |

1/ Includes some installed but under trial or not yet commissioned, which are about 3% of total.



Table 16 : PRODUCTION (TONS)

| Month | Hessian | Sacking | Carpet-Backing | Total | Percentage of Feasible Capacity | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Hessian | Sacking | Carpet-Backing | Total |
| July | 14970 | 21653 | 4767 | 43131 | 46 | 51 | 35 | 49 |
| August | 15699 | 22337 | 4341 | 44824 | 48 | 53 | 31 | 48 |
| September | 13889 | 19504 | 4399 | 39812 | 39 | 43 | 37 | 41 |
| October | 15194 | 20350 | 4662 | 42606 | 41 | 43 | 36 | 41 |

Source: Bangladesh Jute Mills Association

Table 17 : PRODUCTION COSTS IN BANGLADESH

Mills Classified by Size

(Takas/metric ton)

| | | Hessian | | Sacking | | Carpet-Backing | |
|---|---|---|---|---|---|---|---|
| | | 500 Looms | 500 Looms | 200 Looms | 200 Looms | 65 Looms | 65 Looms |
| A. | Raw Material | 1,800 | 1,666 | 1,367 | 1,434 | 2,182 | 2,158 |
| B. | Conversion Costs | | | | | | |
| | a) Wages & salaries | 815 | 956 | 604 | 513 | 906 | 1,159 |
| | b) Others 1/ | 1,375 | 1,385 | 654 | 661 | 1,655 | 2,072 |
| | Total | 2,190 | 2,341 | 1,258 | 1,174 | 2,561 | 3,231 |
| C. | Total Manufacturing Costs (A + B) | 3,990 | 4,007 | 2,625 | 2,608 | 4,743 | 5,389 |
| | Quantity Produced (tons) | 14,304 | 8,681 | 13,532 | 10,594 | 5,225 | 1,756 |
| | Capacity Utilization(%) | 58 | 58 | 53 | 59 | 52 | 51 |

1/ Includes stores, power, interest, depreciation, administration, selling and other expenses.

Source: Mission Sample Survey

## Table 18: PRODUCTION COSTS IN BANGLADESH

Mills Classified by Area

(Takas/metric ton)

| | Hessian | | | Sacking | | |
|---|---|---|---|---|---|---|
| | Khulna | Chitta-gong | Dacca | Khulna | Chitta-gong | Dacca |
| A. Raw Material | 1,720 | 1,823 | 1,600 | 1,345 | 1,503 | 1,310 |
| B. Conversion Costs | | | | | | |
| a) Wages & salaries | 1,099 | 947 | 910 | 615 | 481 | 565 |
| b) Others 1/ | 1,274 | 1,186 | 1,070 | 677 | 608 | 717 |
| Total | 2,373 | 2,133 | 1,980 | 1,292 | 1,089 | 1,282 |
| C. Total Manufacturing Costs (A + B) | 4,093 | 3,956 | 3,580 | 2,637 | 2,592 | 2,592 |
| Quantity Produced (tons) | 12,172 | 8,861 | 1,952 | 13,654 | 8,331 | 2,141 |
| Capacity Utilization (%) | 66 | 53 | 43 | 54 | 67 | 39 |

1/ Includes stores, power, interest, depreciation, administration, selling and other expenses.

Table 19 : PRODUCTION COSTS IN BANGLADESH

Mills Classified by Age[1]

(Takas/metric ton)

| | Hessian | | Sacking | | Carpet-Backing | |
|---|---|---|---|---|---|---|
| | Old | New | Old | New | Old | New |
| A. Raw Material | 1,773 | 1,720 | 1,367 | 1,434 | 2,188 | 2,159 |
| B. Conversion Costs | | | | | | |
| a) Wages & Salaries | 1,029 | 1,018 | 604 | 513 | 976 | 960 |
| b) Others[2] | 1,128 | 1,348 | 654 | 661 | 1,596 | 1,993 |
| Total | 2,157 | 2,366 | 1,258 | 1,174 | 2,572 | 2,953 |
| C. Total Manufacturing Costs (A + B) | 3,930 | 4,086 | 2,625 | 2,608 | 4,760 | 5,112 |
| Quantity Produced (tons) | 13,062 | 9,923 | 13,532 | 10,594 | 4,088 | 2,893 |
| Capacity Utilization (%) | 55 | 62 | 53 | 59 | 52 | 51 |

---

/1 Old mills defined as mills over 15 years old.

/2 Includes stores, power, interest, depreciation, administration, selling and other expenses.

Table 20 : PRODUCTION COSTS IN BANGLADESH

Mills Classified by Degree of Integration/1

(Takas/metric ton)

| | Hessian | | Sacking | | Carpet-Backing | |
|---|---|---|---|---|---|---|
| | Fully Integrated | Non Integrated | Fully Integrated | Non Integrated | Fully Integrated | Non Integrated |
| A. Raw Material | 1,746 | 1,756 | 1,383 | 1,419 | 2,161 | 2,246 |
| B. Conversion Costs | | | | | | |
| a) Wages & Salaries | 981 | 1,090 | 582 | 534 | 960 | 1,012 |
| b) Others/2 | 1,177 | 1,292 | 631 | 701 | 1,665 | 2,208 |
| Total | 2,158 | 2,382 | 1,213 | 1,235 | 2,625 | 3,220 |
| C. Total Manufacturing Costs (A + B) | 3,904 | 4,138 | 2,596 | 2,654 | 4,786 | 5,466 |
| Quantity Produced (tons) | 13,861 | 9,124 | 15,222 | 8,904 | 5,755 | 1,226 |
| Capacity Utilization (%) | 52 | 70 | 55 | 57 | 52 | 50 |

/1 Fully Integrated defined as mill producing hessian, sacking, and carpet-backing.

/2 Includes stores, power, interest, depreciation, administration, selling and other expenses.

Source: Mission Sample Survey of Mills.

## II. JUTE FIBER PRODUCTION IN BANGLADESH

43. The supply of jute fiber, always volatile, is now particularly precarious. Decades of neglect to the technological base of jute fiber production, exchange rate and agricultural production policies which discriminate against jute and rapid increases in the profitability of rice production (arising from recent rice price increases and major technological advances in rice cultivation) have all combined to decrease significantly the relative profitability of jute production. The impact of these developments can be viewed as increasing the relative cost of jute production, implying that at any given price level, less jute will be supplied than before these developments[1/]. Consequently, if present conditions continue, one can expect farmers to plant significantly less jute acreage, leading to a nearly proportional reduction in the supply of jute fiber. And yet the preceding analysis (see Volume I ) suggests that the demand for jute is shifting so that raw jute prices should fall if jute and jute goods are to compete on the international market[2/]. If this happens, without other compensating adjustments, the relative profitability and the supply of jute will shrink still further.

44. Arresting the continued deterioration of jute fiber production is of crucial importance to the economy of Bangladesh in terms of both production efficiency and equity. The role of raw jute as the major input for Bangladesh's major industry, and as the primary commodity export (earning, per acre, sufficient foreign exchange to purchase more rice than is grown on 2.5 to 3.0 acres), has been stressed in other parts of this report. The socio-economic importance of jute, however, extends beyond this. It is a major source of cash income for Bangladesh's rural population. Some 45 percent of the farmers grow jute and during the season it occupies about 20 percent of the area under crops. Since jute production is concentrated predominantly on the smallest farms (Table 21 ) and since it is highly labor intensive (jute production uses about 110 mandays per acre while aus paddy uses only 65), the decline in the profitability of jute production is likely to be felt most strongly by the poorer segments of the rural population - the smallest farmers and the hired laborers. Efforts to improve the profitability of jute production are likely to have their greatest beneficial impact on these groups.

---

1/ These developments can be viewed as a leftward shift in the jute supply curve.

2/ This can be viewed as a leftward shift of the jute demand curve.

Table 21: BANGLADESH JUTE ACREAGE BY FARM SIZE

| Size of Farms | All Farms | | FARMS REPORTING JUTE | | | | |
|---|---|---|---|---|---|---|---|
| (Acres) | Total Number | Total Area Acres | Number | Total | Total Cropped | Jute Area | Jute as % of Total Cropped |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Bangladesh Average size of farm 3.538 | 6,139,480 | 21,725,827 | 2,728,880 | 10,201,020 | 14,472,688 | 1,304,511 | 9 |
| Under 0.5 | 802,630 | 204,496 | 128,200 | 37,274 | 51,279 | 13,830 | 27 |
| 0.5 to under 1.0 | 689,840 | 499,144 | 232,310 | 170,360 | 259,414 | 38,579 | 15 |
| 1.0 to under 2.5 | 1,677,410 | 2,826,355 | 819,250 | 1,380,153 | 2,145,338 | 226,139 | 11 |
| 2.5 to under 5.0 | 1,615,020 | 5,734,739 | 868,460 | 2,969,210 | 4,434,826 | 407,129 | 9 |
| 5.0 to under 7.5 | 698,450 | 4,192,948 | 365,030 | 2,077,695 | 2,961,752 | 256,324 | 9 |
| 7.5 to under 12.5 | 442,360 | 4,158,797 | 221,430 | 1,950,524 | 2,635,154 | 215,688 | 8 |
| 12.5 to under 25.0 | 167,790 | 3,066,199 | 83,840 | 1,277,290 | 1,613,479 | 122,452 | 8 |
| 25.0 to under 40.0 | 21,370 | 632,622 | 8,620 | 239,185 | 275,720 | 18,248 | 7 |
| 40.0 and over | 4,610 | 410,527 | 1,740 | 99,329 | 95,726 | 6,122 | 6 |

Source: Bangladesh Agricultural Census 1960

## A. Past Trends in Jute Fiber Supply

45. Table 22 presents the jute area, production and yields for both India and Bangladesh from 1947/48 to the present. The first point demonstrated by the table is the dramatic increase in India's jute production immediately after partition. This increase in Indian fiber production was the direct result of a rapid expansion of jute acreage, fueled by high prices for jute as traditional sources of supply for Indian mills were cut off after partition. Between 1947/48 and 1951/52 jute acreage in India grew from 650,000 acres to over 1.95 million acres. At the same time, the Indian Government encouraged farmers through a widespread "Grow More Jute" campaign, aimed at increasing yields through the use of better seeds, chemical fertilizers and improved cultivation practices such as timely sowing and line sowing. In spite of this effort, there was no noticeable increase in the yield of Indian jute. Jute acreage in Bangladesh declined after partition and then recovered somewhat. In more recent years, area and production in both countries have continued to fluctuate widely in response to changing market and weather conditions. Together, India and Bangladesh now account for about 70 percent of the world's production of jute and related fibers - a decline from a level of about 85 percent in the early 1950's (Table 23 ). While India's share of world production of such fibers has remained fairly steady at about one-third since the early 1950's, Bangladesh's share has declined from nearly 60 percent in 1950/51 to about 35 percent in the late 1960's. This difference has been captured largely by other producing countries, particularly Thailand, whose jute and kenaf production rose rapidly in the early 1960's to meet the needs of Indian jute mills. As trade relations between India and Bangladesh are normalized, a potential exists for increased exports of Bangladesh jute replacing both Thailand kenaf and possibly Indian raw jute production in the Indian market.

46. A second major feature of jute production emphasized by Table 22 is that jute yields have been stagnant. There is even an apparent downward movement of jute yields in Bangladesh, although this may be the result of distortions introduced by changes in the methods of estimating crop production and acreage introduced between 1962 and 1964. Moreover, jute acreage was controlled by law before 1959/60. This could have led to under-reporting of acreage and artificially high yields in the earlier years. Nevertheless, it is probably safe to say that jute yields have not increased for decades. The stagnant yields reflect, in turn, a stagnant technological base, inadequate research and poor extension.

Table 22: RAW JUTE PRODUCTION: BANGLADESH AND INDIA

| | Area (Million Acres) | | Production (Million Bales) | | Yield (Bales per Acre) | |
|---|---|---|---|---|---|---|
| | Bangladesh | India | Bangladesh | India | Bangladesh | India |
| 1947/48 | 2.06 | .65 | 6.84 | 1.64 | 3.3 | 2.5 |
| 1948/49 | 1.88 | .84 | 5.84 | 2.03 | 2.9 | 2.4 |
| 1949/50 | 1.56 | 1.16 | 3.33 | 3.08 | 2.1 | 2.7 |
| Three Years' Average | 1.83 | .88 | 5.22 | 2.25 | 2.8 | 2.6 |
| 1950/51 | 1.71 | 1.41 | 6.01 | 3.28 | 3.5 | 2.3 |
| 1951/52 | 1.78 | 1.95 | 6.33 | 4.67 | 3.6 | 2.4 |
| 1952/53 | 1.91 | 1.81 | 6.82 | 4.58 | 3.6 | 2.5 |
| 1953/54 | .96 | 1.23 | 3.61 | 3.08 | 3.7 | 2.5 |
| 1954/55 | 1.24 | 1.24 | 4.66 | 2.92 | 3.8 | 2.4 |
| Five Years' Average | 1.52 | 1.53 | 5.49 | 3.71 | 3.6 | 2.4 |
| 1955/56 | 1.63 | 1.74 | 6.50 | 4.19 | 4.0 | 2.4 |
| 1956/57 | 1.23 | 1.91 | 5.51 | 4.28 | 4.5 | 2.2 |
| 1957/58 | 1.56 | 1.74 | 6.20 | 3.97 | 4.0 | 2.3 |
| 1958/59 | 1.53 | 1.81 | 6.00 | 5.15 | 3.9 | 2.8 |
| 1959/60 | 1.38 | 1.69 | 5.55 | 4.49 | 4.0 | 2.7 |
| Five Years' Average | 1.47 | 1.78 | 5.95 | 4.42 | 4.1 | 2.5 |
| 1960/61 | 1.52 | 1.55 | 5.62 | 4.09 | 3.7 | 2.6 |
| 1961/62 | 2.06 | 2.27 | 6.97 | 6.29 | 3.4 | 2.8 |
| 1962/63 | 1.72 | 2.09 | 6.30 | 5.39 | 3.7 | 2.6 |
| 1963/64 | 1.70 | 2.15 | 5.88 | 6.02 | 3.5 | 2.8 |
| 1964/65 | 1.66 | 2.07 | 5.33 | 5.96 | 3.2 | 2.9 |
| Five Years' Average | 1.73 | 2.03 | 6.02 | 5.55 | 3.5 | 2.7 |
| 1965/66 | 2.20 | 1.87 | 6.69 | 4.43 | 3.0 | 2.4 |
| 1966/67 | 2.16 | 1.97 | 6.40 | 5.30 | 3.0 | 2.7 |
| 1967/68 | 2.40 | 2.19 | 6.85 | 6.31 | 2.9 | 2.9 |
| 1968/69 | 2.17 | 1.31 | 5.75 | 3.00 | 2.7 | 2.3 |
| 1969/70 | 2.46 | 1.90 | 7.17 | 5.60 | 2.9 | 3.0 |
| Five Years' Average | 2.28 | 1.85 | 6.57 | 4.93 | 2.9 | 2.7 |
| 1970/71 | 2.20 | 1.85 | 6.67 | 4.86 | 2.9 | 2.6 |
| 1971/72 | 1.68 | -- | 4.19 | 6.84 | 3.0 | -- |
| 1972/73 | 2.50 | -- | 6.50 | 5.70 | 2.6 | -- |
| Three Years' Average | 2.13 | -- | 5.79 | 5.80 | 2.7 | -- |

Table 23: RELATIVE SHARE IN WORLD PRODUCTION OF RAW JUTE AND ALLIED FIBERS

(Percentages)

| | USSR & Mainland China | Developing Countries | Bangladesh | India |
|---|---|---|---|---|
| 1950/51 | 5.4 | 94.6 | 59.0 | 32.2 |
| 1951/52 | 11.4 | 88.6 | 48.5 | 35.9 |
| 1952/53 | 12.6 | 87.4 | 47.4 | 36.6 |
| 1953/54 | 10.2 | 89.8 | 41.6 | 43.1 |
| 1954/55 | 9.5 | 90.5 | 47.3 | 38.8 |
| 1955/56 | 11.9 | 88.1 | 43.0 | 41.1 |
| 1956/57 | 11.9 | 88.1 | 40.7 | 42.5 |
| 1957/58 | 13.6 | 86.4 | 42.4 | 39.1 |
| 1958/59 | 12.7 | 87.3 | 39.6 | 43.2 |
| 1959/60 | 14.4 | 85.6 | 39.1 | 39.6 |
| 1960/61 | 13.8 | 86.2 | 38.6 | 35.0 |
| 1961/62 | 9.6 | 90.4 | 35.2 | 40.7 |
| 1962/63 | 12.5 | 87.5 | 32.4 | 44.6 |
| 1963/64 | 12.6 | 87.4 | 30.6 | 44.5 |
| 1964/65 | 12.8 | 87.2 | 33.9 | 39.1 |
| 1965/66 | 15.5 | 84.5 | 35.2 | 31.3 |
| 1966/67 | 13.5 | 86.5 | 30.0 | 33.3 |
| 1967/68 | 14.1 | 85.9 | 32.3 | 35.5 |
| 1968/69 | 20.1 | 79.9 | 39.1 | 26.1 |
| 1969/70 | 15.7 | 84.3 | 35.2 | 34.2 |

Source: Table 5 of Statistical Annex, Nine Volume Sector Study

47. A third factor indicated in Table 22 is that jute yields in Bangladesh are almost invariably higher than those in India. In addition, it is generally recognized that Bangladesh jute - grown on the best jute lands in the world - is of somewhat higher quality than Indian jute. It would appear, therefore, that Bangladesh has a comparative advantage in raw jute production and that increased trade between the two countries might lead to a reduction in India's fiber production and increased imports from Bangladesh. Such a shift would appear to benefit both countries.

48. A fourth characteristic of the supply of jute shown in Table 22 is that jute output and acreage are highly variable. The instability of the supply of jute fiber lessens its competitiveness with synthetics. As one would expect, the large variations in supply are accompanied by large variations in price. The following table shows the extent of these variations in Bangladesh and India. Variations in output and price of this order of magnitude (14-20 percent) pose great difficulties for mill managers in planning and costing their production and give rise to proposals for buffer stocks of fiber to help stabilize the market. Efforts have been made to explain and predict these variations so that steps can be taken to reduce them. The agro-economic factors influencing the supply of jute are discussed and analyzed in Part B of this Chapter.

Table 24: RAW JUTE TREND GROWTH RATE AND FLUCTUATION INDICES FOR SELECTED VARIABLES 1952-70 /a

| | India | | Bangladesh | |
|---|---|---|---|---|
| | Trend Growth Rate | Fluctuation Index | Trend Growth Rate | Fluctuation Index |
| Area | 2.0 | 12.2 | 3.0 | 14.1 |
| Output | 2.3 | 14.3 | 1.2 | 11.1 |
| Yield | 0.3 /b | 5.2 | -1.7 | 7.0 |
| Price | 3.2 | 20.8 | 4.2 | 20.3 |

/a Analysis from Tarapore, Savak S., The Jute Trade of Developing Countries, IMF DM/72/81, October 12, 1972, page 6. The fluctuation index is the average of the percentage deviation (regardless of sign) of the actual data from their trend.

/b Not statistically significant.

49. During the past two years the supply of jute from Bangladesh was understandably unusually unstable. During 1971/72 raw jute production declined by about 35 percent from levels prevailing in the preceding five years. This was due in part to an overt political effort by the pro-independence forces to place pressure on the former regime and in part to the generally unsettled conditions of the country, which induced farmers to grow a crop they could eat rather than a crop they had to sell. After independence, the new Government reversed a number of past policies which has discriminated sharply against jute: the currency was devalued by more than 50 percent; export bonus schemes for jute manufacturers were removed; and a policy decision to remove the export tax on raw jute was made[1]. The devaluation, combined with temporarily high demand for fiber supplies resulting from the previous year's disruptions, enabled domestic raw jute prices to rise by about 70 percent above pre-disturbance levels and led to a rapid restoration of jute acreage and production to the levels prevailing in the five year period before the independence struggle. recovery of jute production took place in spite of very high rice prices. Although this recovery is very hopeful in the short run, as indicated below, it seems unlikely that present levels of acreage and production can be maintained without further policy changes since the rice price has continued to rise rapidly and the export price of raw jute is likely to fall. Nevertheless, the Government has taken positive steps this year to maintain the competitive position of jute and there is no reason to suspect that it will not continue to do so.

## B. Agro-Economic Determinants of Jute Fiber Supply

50. The technical requirements of jute cultivation are important determinants of the supply of jute fiber. Hence a brief description of jute cultivation is in order. The discussion will focus on Bangladesh, the major supplier of jute fiber. Where relevant, comparisons with India will be made. Jute is grown widely throughout much of Bangladesh. Although it uses less than 10 percent of the total cultivated area, it covers about 25 percent of the area cultivated during the jute season. It grows best on loamy or sandy soils, in damp heat, during the long summer daylight hours. The jute plant utilizes about 35 inches of water during the growing season, but showers are also critically important during the sowing season (February-May) to permit fine tillage of the soil to ensure germination. The adequacy and timing of these showers affects the amount of land sown to jute in a given year. An ample supply of water must also be available after the harvest (in late summer or autumn) for retting (soaking the cut plant for about 2 weeks to remove the fiber from the jute stick). Moreover, the major jute species, Capsularis, (white jute) can withstand several feet of flooding after it has grown. Olitorius

1/ Although this last decision was taken on November 15, 1972, at the time of the jute mission it was not in effect. Exporters were still paying the export tax, but were anticipating a rebate.

(Tossa jute, the higher quality fiber grown on about 25-30 percent of the jute area) cannot tolerate flooding. These factors, the need for water and the flood tolerance of the major jute varieties, account for the spatial distribution of jute cultivation in Bangladesh. Jute is grown primarily on medium or medium-low lands in the flooded areas in the central districts bordering the major rivers. The area sown to jute of each variety by District for the year 1970-71 (the most recent relatively normal jute year) is presented in Table 25 . The districts are grouped into the three traditional jute-growing regions: Jat (east of the Jamuna River and north of Noakhali), Northern (mostly north of the Ganges and west of the Jamuna rivers) and District (mostly south of the Ganges and west of the Meghna rivers). (See Map I). By and large, the Jat area produces jute of better quality and yield. It corresponds roughly to the region of Brahmaputra alluvium, which, along with Teesta silts, seems to be most favorable for jute. Consequently, jute occupies a much greater proportion of the land cultivated during the jute-aus season in the Jat areas than in the other areas. The percentage of jute area in Olitorius jute varies considerably among these regions, ranging from 16 percent in Jat areas to over 60 percent in District area. The rainfall also varies considerably among these regions, with the Northern area usually receiving about 20 percent less rain than the other regions. With such varied agro-climatic conditions one would expect considerable differences in the supply response in the different regions.

51. Rice, which is planted on about 70 percent of area cultivated during jute season, is the major crop competing with jute for land. Typical cropping patterns for jute and alternative crops are shown in Chart I . Usually aus is regarded as the paddy crop most directly competitive with jute, because their growing seasons are similar. Capsularis is an earlier jute crop, and depending on the pre-monsoon rainfall, it is planted on lower lands in February or March for harvest in June to August. When harvested early, it can be followed by transplanted aman paddy. In areas subject to mild or moderate flooding, capsularis is an alternative to aus, but also to a crop of broadcast aman. In some areas an early jute crop is competitive with boro paddy, which is planted in November in low areas when flood waters recede, and harvested in April, overlapping the jute growing season. Since boro is a small portion of the total paddy crop in unirrigated areas, this competition is not widespread. Olitorius jute, less resistant to flooding and planted on higher ground, is planted in April/May and harvested in August/September. If planted earlier, it branches profusely with a severe reduction in yield. Therefore, on these less flooded grounds, olitorius competes mainly with aus paddy, or with a mixed crop of broadcast aus and aman. Because of its later growing season, olitorius can also be competitive with transplanted aman, especially with the new IRRI varieties which should be transplanted in July/August. Since olitorius is grown on higher land, however, where transplanted aman is not likely to be grown without irrigation, this type of competition may not be too important. In general, since jute and rice compete for the use of the farmer's land, the relative profitability of jute and rice production is a central element in determining the supply of jute.

Table 25 : AREA SOWN TO CAPSULARIS AND OLITORIUS JUTE BY DISTRICT AND REGION, 1970-71

| | Capsularis | Olitorius | Total |
|---|---|---|---|
| | (Thousands of Acres) | | |
| JAT AREA | | | |
| Dacca | 149 | 42 | 191 |
| Mymensingh | 378 | 64 | 442 |
| Tangail | 100 | 21 | 121 |
| Comilla | 118 | 20 | 138 |
| Area Total | 745 | 147 | 892 |
| NORTHERN AREA | | | |
| Bogra | 34 | 23 | 57 |
| Rangpur | 336 | 38 | 374 |
| Dinajpur | 103 | 6 | 109 |
| Rajshahi | 26 | 43 | 69 |
| Area Total | 499 | 110 | 609 |
| DISTRICT AREA | | | |
| Noakhali | 29 | 1 | 30 |
| Sylhet | 28 | .3 | 28.3 |
| Chittagong and Chittagong Hill Tracts | .6 | .2 | .8 |
| Bakerganj | 20 | 10 | 30 |
| Khulna | 14 | 28 | 42 |
| Jessore | 20 | 146 | 166 |
| Faridpur | 93 | 144 | 237 |
| Pabna | 56 | 32 | 88 |
| Patuakhali | 1 | 1 | 2 |
| Kushtia | 3 | 72 | 75 |
| Area Total | 265 | 433 | 698 |
| GRAND TOTAL | 1509 | 691 | 2200 |

52. Both jute and rice crops can be followed by a wide variety of supplemental crops, depending on hydrology and soil conditions. Therefore, it is difficult to draw up lists of alternative cropping patterns. Jute is usually followed, if not by transplanted aman, by rabi cereals, oilseeds, pulses, or fodder crops. The same holds true, by and large, for aus and aman crops, if only one rice crop is sown. Except in those cases in which jute is followed by transplanted aman or aman is followed by boro, the nature of the following crop is largely extraneous in calculating the relative farm benefits of jute and competing rice crops. An exception to this generalization would arise in calculating the relative returns of producing jute and sugarcane, which is grown as a twelve-month crop in Bangladesh.

53. Several factors emerge from this general discussion as important determinants of the size of the jute crop:

(i) Weather factors, particularly the amount and timing of pre-monsoon showers, strongly influence the amount of land committed to jute. Rains at this time also assist the planting of aus paddy and as a result there is a positive correlation between the total amount of jute and aus acreage planted each year. Adequate supplies of water are also essential after the jute harvest for retting. If water is not available after harvest, the size of the jute crop is not affected much, but the quality of fiber, the price, and hence the farmer's return and the nation's export earnings are.

(ii) Soil and hydrology conditions, are also important in determining the size of the jute crop. There are two sorts of areas where it may be difficult, if not impossible, for rice to compete with jute. First, there are considerable areas which, because of early flooding, are unsuitable for either aus or transplanted aman paddy. Estimates of this area range from about 750,000 acres to about 1 million acres. Second, there may be areas which are suitable for a jute-transplanted aman cropping pattern but are not suitable for transplanted aman-boro rotation because of inadequate winter moisture. The acreage with such conditions has not been estimated. Jute acreage in Bangladesh has never sunk below 900,000 acres even in the most unfavorable of times, indicating a floor to jute acreage below which the supply of jute would be highly inelastic. The introduction of irrigation, drainage and flood control projects, however, could drastically change this situation, making cropland now suitable only for jute more suitable for two crops of rice. In such a situation,

jute acreage would fall sharply in the project area. This has been borne out from experience with past irrigation-flood control projects. The strong implication is that if jute acreage is to be held at present levels, priority should be given to those drainage and flood control projects in areas which do not grow jute.

(iii) With weather constant and on lands where both jute and paddy crops are possible, the relative profitability of the two crops is of critical importance in determining the supply of jute. The relative profitability will depend in turn on (a) the prices of jute and rice; (b) crop technology (and hence yields); (c) the inputs used on the two crops; and (d) the input prices. The relative profitability of jute and rice is calculated in Annex 1 under a variety of assumptions. The following paragraphs explain and summarize the results of the analysis.

54. It should be emphasized that the cost and return calculations must be interpreted with caution. They are used here more to indicate, in a rough fashion, the results of alternative policies than to serve as the basis for specific policy recommendations. The calculations have been carried out using the best data available to the mission at the present time, however, while it is felt that these data provide a reasonable reflection of reality, the results are quite sensitive to relatively small changes in the parameters. Major events in recent years - dramatic increases in the prices of rice and jute, the introduction of an improved rice technology, growing population pressure - have significantly altered prices and factor relationships. Hence the parameter estimates used here - some of which are drawn from studies carried out more than a decade ago - should be scrutinized with care. Moreover, the same parameters are assumed to apply throughout the country even though there are some significant regional variations. Accurate data on crop production costs and returns would be of great benefit to the nation's planners. A series of farm management studies, with a carefully developed methodology (perhaps similar in design to those carried out by the Government of India) could provide this information.

55. Cost of production data for jute and competing paddy crops have been calculated for each crop at three levels of technology (and hence three levels of yield and three levels of input use) and five different methods of pricing inputs. The three levels of jute technology are (i) present (traditional) technology, which is assumed to yield 15 maunds[1] of fiber per acre and use no modern inputs; (ii) seed plus fertilizer technology, which yields an assumed 18.5 mds. of fiber using recommended dosages of fertilizer and moderately improved seed; and (iii) a hypothetical potential technology using fertilizer, better seed, pesticides, and better cultivation practices, and assumed to yield 25 mds. of fiber. Three roughly

1/ One maund (1 md.) equals about 82.2 lbs.

comparable levels of rice technology are assumed: (i) traditional technology with yields of 16 mds. of paddy for aus and using no modern inputs; (ii) high-yielding variety seed and fertilizer technology, using new seeds and chemical fertilizer and yielding 25 mds. per acre; and (iii) high-yielding variety seed and fertilizer technology plus irrigation and water control facilities, yielding 45 mds. of paddy per acre. The five methods used for pricing inputs are: (i) pricing all inputs at prices actually paid by farmers (Cost A); (ii) same as (i) with input subsidies removed (Cost B); (iii) same as (ii) with labor priced at 50 percent market wages, thus indicating both the economic cost of labor (assuming shadow wage rates are 50 percent of financial rates) and the out-of-pocket payments by the farmers for labor (since farmers hire about 50 percent of the total labor input on their farms (Cost C); (iv) same as (iii) with the foreign exchange costs of modern inputs priced at 10 Takas per dollar (Cost D); and (v) same as (iii) with input subsidies restored, thereby indicating out-of-pocket expenditures by farmers (Cost E).

56. Returns of jute and paddy cultivation were calculated by applying a variety of price assumptions to the yields assumed for each technological level. Three export prices of jute were assumed. The first is the present export price level of £112 or, once export taxes are deducted, $224 per metric ton 1/. The second is £95 (or $228) per metric ton, assuming no export taxes, a high estimate based on the analysis in Volume I of the just price to which jute should fall now to compete with current prices of synthetic substitutes. It is assumed the export tax is removed. The third price is £80 (or $192) per metric ton, assuming no export taxes, and represents a price to which jute fiber is likely to have to fall in three or four years to stay competitive with substitutes. For each of the export prices two exchange rates, the present one of 7.0 Takas per dollar and a hypothetical one of 10 Takas per dollar, are employed to illustrate the impact of alternative policies under the different pricing assumptions. Farmgate prices are then calculated by applying the alternative exchange rates to the various export prices and deducting the normal farmgate to terminal market processing and marketing margin, which is about 25-30 Takas per maund, or about 35 percent of current F.O.B. costs. 2/ Only one farmgate price for paddy is assumed. It was obtained by converting the current coarse rice prices

1/ The decision to remove these taxes (which amounts to about $23 per metric ton) was made on November 15, but has not yet been implemented.

2/ The range of farmgate jute prices obtained can be used to assess roughly the effects of other alternative assumptions not specifically considered. For example, if the export price of jute declined to £65 ($156) per ton and the exchange rate were 15 Takas per dollar, the farmgate price would become 57 Takas per maund. The effect of this set of assumptions on the relative returns to jute production would lie somewhere between the impact of the set of assumptions that imply a farmgate price of 55 Takas (i.e. a $226 export price and a 10 Takas/$ exchange rate) and those which imply a price of 59 Takas (i.e. a $244 export price and a 10 Takas/$

(68 Tk/maund) intc paddy prices (using the standard conversion factor of 1.5) and subtracting transport and milling charges (about 6 Tk/maund). The results conform closely with findings from farmer interviews carried out by the mission in the field. The paddy rice is quite high - more than double world market prices - yet there seems little likelihood that it will decline in the near future. As each paddy crop was harvested this year the anticipated seasonal decline in prices did not materialize. This suggests that with the disruptions before independence and the bad crops in 1972, stocks have become seriously depleted. Import requirements are expected to remain high and there is little hope that this situation will change soon.

57. **The results of the various cost and return calculations are shown in detail in Annex 11 and are summarized in Table 26 below. Table 26 shows the difference per acre between the net returns to producing jute and the net returns to producing aus paddy under the range of assumptions about technology, jute prices, exchange rates and costing methods described above. A positive number indicates the amount (in Takas) by which the returns to jute production exceed returns to aus paddy production. A negative number indicates the amount by which returns to jute production are less than returns to aus paddy. For the sake of simplicity of presentation, jute is compared only with aus paddy in the summary table. (This is appropriate both because aus is the major competing with jute and because the comparisons of jute with other paddy crops in Annex 1 indicate very similar results). Also for simplicity the returns to jute at a given level of technology are compared with the returns to aus at the same level of technology. Since paddy technology is currently more advanced than jute technology, and has spread more widely, this comparison actually tends to overstate the profitability of jute with respect to aus. Moreover, the yield increases assumed for the improved rice technologies are based on much more reliable, field-tested data. The yield increases postulated for improved jute technologies are based on less reliable data from small experimental plots are special programs with unusually high supervision inputs.**

58. With these caveats (and those of paragraph 54 above) in mind, several important implications can be drawn from Table 26. First, at an FOB price of $226 per metric ton or lower and using the present exchange rate, the net return to jute is lower than the net return to aus at any of the assumed levels of technology under all the methods of costing. In other words, if jute prices fall to levels now competitive with synthetic substitutes, paddy production will be more profitable than jute production at the present exchange rate. If on the other hand, the exchange rate were adjusted to 10 Takas per dollar, jute production at the $226 price would have a return higher than (or only very slightly less than) paddy production for the first two levels of technology under any of the methods used for pricing inputs. At the $226 price, jute production would have a higher return than paddy production at all three levels of technology, if input subsidies were removed. At the medium-run jute

Table 26 : DIFFERENCE BETWEEN PER ACRE RETURNS TO JUTE AND AUS PADDY PRODUCTION

| | Jute FOB Export Price $/ton | Exchange Rate Tk/$ | Farmgate Jute Price Tk/md | Net Return to Jute Minus Net Return to Aus Paddy: Traditional Technology Tk/acre | New Seed & Fertilizer Technology Tk/acre | Potential Technology Tk/acre |
|---|---|---|---|---|---|---|
| A. INPUTS PRICED AT : FINANCIAL PRICES | | | | | | |
| | $ 244 | 7.9 | 47 | - 32 | - 159 | - 520 |
| | $ 226 | 7.9 | 43 | - 88 | - 233 | - 620 |
| | $ 190 | 7.9 | 36.4 | -187 | - 356 | - 785 |
| | $ 244 | 10.0 | 59 | +155 | + 63 | - 220 |
| | $ 226 | 10.0 | 55 | + 89 | - 11 | - 320 |
| | $ 190 | 10.0 | 46.1 | - 42 | - 176 | - 543 |
| B. INPUTS PRICED AT UNSUBSIDIZED PRICES | | | | | | |
| | $ 244 | 7.9 | 47 | - 32 | - 60 | - 173 |
| | $ 226 | 7.9 | 43 | - 88 | - 134 | - 273 |
| | $ 190 | 7.9 | 36.4 | -187 | - 257 | - 438 |
| | $ 244 | 10.0 | 59 | +155 | + 162 | + 127 |
| | $ 226 | 10.0 | 55 | + 89 | + 88 | + 27 |
| | $ 190 | 10.0 | 46.1 | - 42 | - 77 | - 196 |
| C. INPUTS PRICED AT UNSUBSIDIZED PRICES; LABOR SHADOW-PRICED | | | | | | |
| | $ 244 | 7.9 | 47 | + 47 | + 27 | - 130 |
| | $ 226 | 7.9 | 43 | - 9 | - 47 | - 230 |
| | $ 190 | 7.9 | 36.4 | -108 | - 170 | - 395 |
| | $ 244 | 10.0 | 59 | +234 | + 249 | + 170 |
| | $ 226 | 10.0 | 55 | +168 | + 175 | + 70 |
| | $ 190 | 10.0 | 46.1 | + 37 | + 10 | - 153 |
| D. INPUTS PRICED AT UNSUBSIDIZED PRICES; LABOR & FOREIGN EXCHANGE SHADOW-PRICED | | | | | | |
| | $ 244 | 7.9 | 47 | + 47 | + 67 | - 13 |
| | $ 226 | 7.9 | 43 | - 9 | - 6 | - 113 |
| | $ 190 | 7.9 | 36.4 | -108 | - 130 | - 278 |
| | $ 244 | 10.0 | 59 | +234 | + 289 | + 287 |
| | $ 226 | 10.0 | 55 | +168 | + 215 | + 187 |
| | $ 190 | 10.0 | 46.1 | + 37 | + 50 | - 25 |
| E. INPUTS PRICED AT SUBSIDIZED PRICES; LABOR SHADOW-PRICED | | | | | | |
| | $ 244 | 7.9 | 47 | + 47 | - 72 | - 477 |
| | $ 226 | 7.9 | 43 | - 9 | - 146 | - 577 |
| | $ 190 | 7.9 | 36.4 | -108 | - 269 | - 742 |
| | $ 244 | 10.0 | 59 | +234 | + 150 | - 177 |
| | $ 226 | 10.0 | 55 | +168 | + 76 | - 277 |
| | $ 190 | 10.0 | 46.1 | + 37 | - 89 | - 500 |

export price of $190 per metric ton, jute is not competitive with paddy at the present exchange rate. At the 10 Takas per dollar exchange rate and with input subsidies removed, jute appears fairly competitive with aus even at this lower price. While these figures all suggest that an adjustment of the exchange rate would be advantageous for jute production, this should not be interpreted as a recommendation that Bangladesh adopt a 10 Takas per dollar exchange rate. Such a decision should be taken only after an analysis of many factors of which jute production is only one (albeit a very important one). Moreover, the data used here are too rough to allow precise estimate of an appropriate exchange rate and the 10 Takas rate is presented merely as a hypothetical alternative.

59. Second, as the level of technology increases, jute generally becomes less competitive with paddy production. This is particularly true at the projected future price levels of jute. For example, assuming a 10 Taka per dollar exchange rate and a $226 per metric ton export price for jute with inputs costed at financial prices, the return to jute is about 89 Takas per acre greater than the return to rice at the traditional technology level. At the seeds and fertilizer technology level the per acre return to jute is 11 Takas less than the return to paddy and at the potential technology level it is 320 Takas less than the return to paddy. This indicates that the new rice technologies are relatively more productive than the projected new jute technologies. This result can be seen even though the assumptions built into costing these technologies have been made purposely so that returns to rice production are understated and the returns to jute are overstated. Most of the improvements postulated for rice have been replicated on farmers' plots and spread rather widely. The improvements assumed for jute, on the other hand, are based on tentative research results and experience on a relatively small number of farms. There is great uncertainty as to whether the jute technology will spread. Consequently, the summary figures in Table 26 probably understate the relative superiority of the new rice technology and give an optimistic view of the profitability of jute. For jute to continue to compete with rice, therefore, the data strongly suggests the need for an intensive research effort aimed at making jute farming more productive. In addition to increasing yields and lowering unit costs, the research effort could also concentrate on decreasing the competition between jute and rice by developing more rapidly maturing varieties of both crops, thereby facilitating double cropping.

60. Third, the table demonstrates the labor-intensive character of jute production. At traditional technology levels farmers use about 110 mandays per acre to grow jute and 65 mandays per acre to grow broadcast aus paddy. Consequently, when a shadow price (of 50 percent of the market wage) is applied to labor, the relative profitability of jute increases. The size of this increase is less at the higher levels of technology since the difference in per acre labor use on the two crops decreases at these technologies. An analysis of jute and aus

production functions and costs is presented in Annex 2 and provides some justification for a shadow rate for labor. In addition, since jute farmers typically provide about 50 percent of the labor used on their farm from their own family and hire the rest, this shadow price of labor also indicates, roughly, the farmer's out-of-pocket labor expenses for growing jute.

61. The summary table also shows clearly that the current subsidies on agricultural inputs increase the returns to rice production relative to jute production. The government's current policy provides a subsidy of about 50 percent on fertilizers, 100 percent on pesticides and about 100 percent on irrigation. Moreover, since these inputs have a high foreign exchange component, there is an additional subsidy depending on the extent to which the present exchange rate is overvalued. Since these subsidized inputs are used to a much greater extent in rice production than in jute production, these subsidies make jute less competitive with rice. These subsidies distort farmer's production decisions and lead to less jute being produced at a given price than would otherwise be the case. The impact of these subsidies becomes more severe as the level of technology increases, since more subsidized inputs are used at the higher levels of technology. For example, with inputs subsidized, jute is not competitive with paddy for any of the assumed jute prices at the highest level of technology. With these subsidies removed, jute is competitive at an export price of $226 per metric ton and a 10 Takas per dollar exchange rate (Costs B, C & D). With the subsidies removed, jute is reasonably competitive with aus paddy even at the $190 per ton price and 10 Takas per dollar exchange rate. At that price and with labor and foreign exchange shadow priced, jute nets only 25 Takas per acre less than aus at the highest level of technology. The removal of these subsidies would help the competitive position of jute. It would also help dampen the effect of the relative superiority of improved rice technology on jute production discussed above in paragraph 59 . At present jute prices and exchange rates the return to jute drops from 32 Takas an acre less than paddy at traditional levels of technology to 520 Takas less at the potential technology with the present subsidies (Cost A). With these subsidies removed, the return to jute drops to only 173 Takas per acre less than aus (Cost B). The subsidies are now a heavy financial burden on the government. Farmers seem fully aware of the benefits of fertilizer and irrigation, so subsidizing these inputs to increase their use no longer seems necessary. Moreover, farmers reported significant black market activities in fertilizer sales, suggesting, at least, that the subsidies are not having any generally beneficial income distributional effects.

62. Table 27 provides an alternative way of demonstrating how the current distortions between the domestic and world market prices of rice affect the relative profitability of jute production. In this table, the net returns to jute production (with labor and foreign exchange shadow-priced and other inputs unsubsidized) are compared with the net returns to rice cultivation; (a) with rice valued at domestic farmgate paddy prices and (b) with rice valued at world market prices ($130 per metric ton, landed in Chittagong). At present exchange rates, and with domestic rice prices, rice cultivation is highly competitive with jute cultivation. If rice were valued at world market prices, however, it is much less profitable than jute even with low jute export prices and a 10 Taka per dollar exchange rate. If the exchange rate were 12.1 Taka per dollar, the world market and domestic prices would be equated and jute would be much more profitable than rice production. This suggests that if the distortions between the world market and domestic prices of rice were reduced, the price of jute could fall significantly and still be highly competitive with rice production.

Table 27: NET RETURNS TO JUTE AND RICE PRODUCTION: DOMESTIC AND INTERNATIONAL PRICES (INPUTS PRICED AT UNSUBSIDIZED PRICES: LABOR AND FOREIGN EXCHANGE SHADOW-PRICED)

| FOB Jute Export Price | Exchange Rate | Net Return to Jute (Traditional Technology) (Takas/Acre) | Net Return to Rice (Traditional Technology) (Takas/Acre) | |
|---|---|---|---|---|
| | | | Domestic Prices | World Market Prices |
| $244 | 7.9 | 352 | 305 | 90 |
| 226 | 7.9 | 296 | 305 | 90 |
| 190 | 7.9 | 197 | 305 | 90 |
| 244 | 10.0 | 539 | 305 | 193 |
| 226 | 10.0 | 473 | 305 | 193 |
| 190 | 10.0 | 342 | 305 | 193 |
| 244 | 12.1 | 725 | 305 | 305 |
| 226 | 12.1 | 646 | 305 | 305 |
| 190 | 12.1 | 487 | 305 | 305 |

63. There have been many studies of the jute supply response to changes in jute prices or changes in the jute-price ratio. These studies are summarized in Annex 3. Covering a period of reasonably stagnant technology and input prices, these studies essentially show the impact of a change in the relative profitability of jute and rice on the supply of jute. In general these studies demonstrate that jute is price inelastic, so that a one percent change in the price of jute (or in the jute-rice price ratio) leads to a less than one percent change in the supply (or acreage) of jute. Moreover, the studies suggest that farmers respond to price changes only partially in the short run so that the full impact of a price change on supply is not felt for several seasons. While these conclusions are probably still valid, the equations on which they are based are now probably of little use in attempting to estimate the supply response of jute. As Chart II indicates, the relationship between jute acreage and the jute-rice ratio has become much weaker in recent years, particularly after 1965/66. Some of the studies discussed suggest this. A possible explanation of this may be increased double cropping of jute and transplanted aman paddy where an aus crop could not be planted early enough to allow a transplanted aman crop. Since jute is a relatively quick-maturing crop whose yields are not much affected by slightly early harvest, it would be easier and less risky in most non-irrigated areas to double crop (capsularis) jute and transplanted aman than to double crop aus and transplanted aman. Where aus competes with transplanted aman, the competition between jute and rice for land can be decreased by a jute-transplanted aman rotation which allows the farmer to grow both jute and rice. After 1965, cropping intensity and hence the extent of double cropping, rose sharply from 127 percent to 139 percent. The major causes for this appear to be an increase in area planted to jute, boro and aus, while aman acreage (and area under most other crops) changed very little. The area under jute increased more rapidly than the area under aus (31 percent versus 18 percent), suggesting that farmers found a jute-rice double cropping pattern easier to achieve than a rice-rice double cropping pattern. Increased population pressure on the land during the past decade could have made this increase in double cropping essential for survival and also provided the labor to make it possible. The introduction of high-yielding varieties (particularly in the boro season but also in the transplanted aman season) may have made double cropping more worthwhile for the farmers. Whatever the underlying factors, it may be possible that some sort of structural change has taken place in the production of jute and rice which allows a greater supply of jute at a given jute-rice price ratio than earlier data suggests. It could also be that this is just a temporary phenomenon, induced by the severe distortions of the past few years.

64. The past analyses suggests that jute acreage cannot be maintained at present levels given the present jute-rice ratio. This is consistent with the relative profitability analysis in Annex 1 and summarized in

Table 26. To remain competitive with rice, the domestic price of jute must increase. But if domestic prices of jute rise sufficiently to compete with rice, the international jute prices will become too high to compete with synthetics. One route out of this dilemma would be to adjust both the export price and the exchange rate to allow both a decrease in the export price and an increase in the farmgate price.

## C. Implications for Present Policies and Programs

65. There are three policy and program areas affecting the supply of jute fiber: pricing policies, extension and input programs and policies and longer-term research programs. Each of these will be discussed in terms of the present situation and alternative possibilities.

### Pricing Policy

66. Pricing policy has been discussed extensively above, but the major points can be summarized here. To compete with synthetics, the export price of jute must fall to about £90-95 per metric ton now and to about £80 in the next few years. At these prices and at present exchange rates jute is not competitive with aus paddy production. An exchange rate adjustment could allow a decrease in the export price to £95 ($226) per ton and an increase in farmgate price to about 55 Takas per maund. This price would substantially improve the competitive position of jute relative to paddy. The other major area of pricing policy which affects the relative profitability of jute is input subsidies 1/. As demonstrated above, these subsidies introduce a substantial bias against jute cultivation. Their removal would make jute farming more competitive with paddy farming.

67. Of the various policies and programs discussed in this section, only pricing policies can be put into effect immediately and begin to have an impact in the short run. Moreover, in the absence of an appropriate price policy, other programs, such as the intensive cultivation scheme for jute, have little chance of success.

### Extension and Input Supply

68. In recognition of the precarious position of jute cultivation in Bangladesh, the Government has undertaken a major program - The Intensive Jute Cultivation Scheme (IJCS) - to extend technological improvements and provide modern agricultural inputs to a large proportion of Bangladesh's jute farmers. The program is a continuation and expansion of similar Ministry of Agriculture program started in 1970. The approach is a modification of that developed by the Jute Association based on improved cultivation practices and use of modern inputs. The major differences between the two approaches to more intensive jute cultivation are ones of scope (the Ministry of Agriculture targeted a coverage of .25 million acres this year while the Jute Association planned to cover only 15,000 acres) and of intensity of extension effort (roughly 6 Takas/acre under the Ministry of Agriculture scheme versus roughly 160 Takas for the Jute Association scheme). While the Jute Association's scheme has reported good results, it is unlikely that an extension input of this order of magnitude can be replicated on a large scale. Consequently this discussion will concentrate on the Ministry of Agriculture's IJCS program. The primary goal of the program is to raise jute

1/ This assumes that neither the rice price nor the jute marketing margin are amenable to change through policy activity.

production from the 1971/72 level of about 6.5 million bales to about 9.7 million bales within three years. To achieve this, the coverage of the program was planned to expand from the .25 million acres targeted (but not fully covered) in 1972 to 1.7 million acres by 1975, with total jute acreage remaining constant at about 2.5 million acres. It was assumed that in the areas under the program jute yields would increase by 50 percent (3.0 bales per acre to 4.5) as the result of farmers using modern inputs (improved seed, chemical fertilizers and pesticides) and improved cultivation practices (timely sowing and line sowing) brought to them by extension agents. The program was originally budgeted at Taka 59.7 million ($7.6 million).

69. Although the program reflects the Government's serious concern for the jute situation, it suffers from some severe flaws and has been critically reviewed within the Government. As a result its scope is likely to be curtailed. The Evaluation Committee Report on the IJCS was not made available to the mission, perhaps because it was embarrassingly critical. Although it might have been helpful to have access to this report in order to make constructive suggestions and identify possible areas for IDA support, the important point is that the Government is engaged in a frank and critical review and monitoring of the program. A much strengthened and sounder program is likely to result. In reviewing the program and visiting program areas, the mission found a number of weaknesses in the program, most of which are probably well-known to the Government. These are discussed here in hopes of suggesting ways of strengthening the program. Perhaps the most basic problem with the IJCS is its goal to increase raw jute production to 9.7 million bales by 1974/75. In view of world demand projections for jute and jute goods, this target is excessive (see Volume I). It could become realistic only in the longer run and then only if Bangladesh jute production substantially displaces Indian jute production. The target is also not likely to be achieved. The second major problem with the program is that it relies on a package of inputs and cultivation practices based on a relatively stagnant technology. Most of the improvements being propagated have been known for decades. They are strikingly similar in content to those advocated in India's "Grow More Jute" campaign after partition, which, as noted in paragraph 45 above, failed to produce noticeable yield increases. The benefits of the package, assuming it is adopted, seem small and unlikely to produce the 50 percent yield increases postulated by the program. Moreover, in this year at least, there have been inadequate supplies of inputs.

70. The impact of the program on farmer's fields so far is not particularly encouraging. Although farmers in package areas report higher yields than those in non-package and other areas, their yields have declined as the program has expanded and they frequently receive only a fraction of the inputs recommended. Moreover, there is every indication that the farmers in the package program are the better farmers in the better jute growing areas. This, as much as anything else, could explain the higher yields in the package areas. Therefore great care needs to be taken in projecting these yield increases to expanded areas. Each component of the package of inputs was reviewed and some present and potential problems found.

71. Improved Seed: Improved Seed for the IJCS is produced under the direction of the Jute Research Institute (JRI). At the time of the mission, the cost of the Improved Jute Seed Production Scheme was projected to be 35.3 Taka ($4.5 million) over the next 5-Year Plan (1972/73-1976/77). The

system of jute seed multiplication processing, testing and certification seems sound. Seeds are tested for germination, disease and pigmentation. The seed sells fairly well, indicating that farmers feel they can rely on it. Although the seed is processed well, the varieties now being multiplied (mostly the capsularis variety, D-154) are not really very much better than good local seed. Three years' trials at 18 locations in Bangladesh show D-154 producing only 5-6 percent more fiber per acre than the best local seed. The Jute Research Institute does not seem to be taking full advantage of possibly much better varieties which have been developed in their own research program as well as at the Bangladesh Atomic Energy Commission, Dacca University and in India. These may need further testing but these tests should be carried out without delay. The mission's main concern about jute seeds, however, is that the rapid increase in production and distribution now planned (from 30 thousand to 64 thousand maunds in one year to meet the acreage targets mentioned above), may cause serious deterioration in seed quality. It would be most unfortunate if the seed scheme lost the farmer's confidence, for even if the present varieties produced are not outstanding, the scheme could become the instrument for rapid dissemination of really high-yielding varieties when (and if) they become available. While the present organization of the supply of jute seeds seems adequate now and should be maintained in the short run to capitalize on the scheme's good reputation, in the longer run it may make sense to merge the jute seed scheme with the larger general seeds program of the Bangladesh Agricultural Development Corporation (BADC).

72. The Intensive Cultivation Scheme also assumes that farmer-to-farmer transfer of good D-154 seed will occur, on a large scale, rising from zero last year to about 20,000 mds this year to 170,000 mds by 1974/75. A sample study of current farmer-to-farmer seed sales and checks on the purity of these seeds in intensive cultivation blocks should be carried out (perhaps in the context of the farm management studies mentioned above) to determine if these expectations are realistic. This is particularly necessary since in some areas only about half of the BCJC seed required for the package areas was provided last year. In addition the cost of seed production should be reviewed to determine if the price now offered to registered seed growers (120 Takas/md) is appropriate and to determine a desirable sales price for the jute seed. In these early phases of the jute seed program it may be appropriate to continue subsidizing the sale of seed and paying premiums to seed growers, especially since the financial burden of this is quite small. In the longer run, it will probably be best to remove these subsidies, also to introduce price differentials for capsularis and olitorius jute seed sales and production since there is a considerable difference in the cost of producing these seeds.

73. Fertilizer: Of the various components of the package of inputs provided under the IJCS, fertilizer is probably the most certain to be effective. Various fertilizer trials indicate that fertilizer can raise yields of D-154 and other jute varieties by 16-25 percent. One maund of

urea, which unsubsidized would cost about 33 Takas, increases a jute farmer's income by about 95 Takas at present prices. Although countless fertilizer response trials have been carried out, however, they have not been constructed to determine the quantity and mix of N, P and K which is economically optimal for the farmers. Although the research data indicate that jute yields are responsive primarily to Nitrogen, the IJCS recommends a mix of N, P and K. Fertilizer trials are now carried out on excessively small plots with inadequate controls on such variables as residual soil fertility to net out the "hot-house" effect of a research station trial. High priority should be given to determining the effects of various doses of fertilizer on both the yield and quality of fiber so that an economically optimal recommendation can be made. Use of chemical fertilizer for jute was severely hampered during 1972 by the country-wide fertilizer shortage. Of any of the possible policies open to the Government, insuring adequate supplies of fertilizer throughout the country would have the greatest short-term impact on jute yields. Farmers appear well aware of the benefits of fertilizer and are willing to pay three to four times the subsidized fertilizer price (20 Takas per maund of urea) on the black market. As noted before, however, the current fertilizer subsidies introduce a bias against jute cultivation, probably have negative income distribution effects, and encourage black market operations and smuggling of fertilizer into India. Adequate supplies of fertilizer (which should be available this year) and appropriate fertilizer pricing policies would alleviate these problems.

74. Plant Protection: Under the IJCS, sufficient pesticides would be provided free of cost to spray 70 percent of the 1.7 million acre target area twice each year. Since to date virtually no plant protection activity has been carried out in the intensive cultivation area, this provision for pesticides seems excessive. Moreover, the scheme provides no funds for either trained staff or training farmers in the use of pesticides. Merely making available large quantities of pesticide materials to untrained personnel at no cost is at best wasteful and at worst highly dangerous. The delicate ecological balance of Bangladesh, where an excessively high population pressure pushes the use of land and water resources to their outer limits, can ill-afford indiscriminate use of pesticides. The people are dependent on the fish raised in ponds and small water-ways for most of their protein. Chemical pesticides should be used only with great care and greater attention should be given to biological and mechanical means of controlling harmful pests. The cost of two sprayings over an acre is at least 40 Takas. Some fragmentary research reports suggest little yield increase (less than one maund) resulting from spraying. In view of all these considerations, the projected pesticide requirements should be carefully reviewed and reduced to cover only those areas where qualified staff are available to carry out or supervise spraying operations.

75. Cultivation Practices: The major improved cultivation practices propagated by the IJCS are timely sowing and line sowing. Jute, particularly olitorious varieties, are photoperiod sensitive and should be planted within two weeks before or after March 31 for maximum yields. Line sowing enables better control over plant population and much quicker weeding. By providing

all plants with uniform access to light and soil, it promotes a uniform plant population, facilitating retting. These practices have been recommended by extension workers to jute farmers since at least as early as 1907. The fact that they have not been widely adopted should indicate that they involve some difficulty. Timely sowing is difficult to achieve because the calendar date is not the only factor affecting the farmer's planting. Rain in the proper amounts must also be available at the proper time. If it is not, it is difficult to prepare the soil properly. Consequently, jute farmers often are not able to plant on the date with the optimal day length. The critical timing of planting inhibits the spread of the other recommended practice - line sowing. Farmers must try to ensure that their crop is sown within 10-14 days before or after March 31. There may be only 5-10 days during that period when the rains are also right. Broadcasting jute seed takes perhaps half-a-day per acre. The single line seed drills being advocated for line sowing take more than 4 times longer during this critically short period. Consequently, farmers are likely to broadcast their seed - to ensure that it is sown at the right time - and forego the benefits claimed for line sowing. These benefits are primarily labor cost savings during weeding which may not be too valuable to an underemployed small farmer who does the weeding together with his family. By reducing labor requirements, other things being equal, this innovation could have negative income distribution effects. After years of propagating line sowing, India finds that less than 2 percent of her farmers use line sowing and that huge stocks of government procured line sowers lie idle in warehouses. This suggests that the Bangladesh Government (which has in fact supplied very few seed drills to date) should continue to place low priority on providing these implements. Useful work could be done on determining how to perform line sowing more quickly. Alternative designs of 3-6 row seed drills, which could substantially decrease sowing time, should be explored.

76. Irrigation: Although irrigation is not a component of the Intensive Jute Cultivation Scheme, it has been considered in other contexts as a means of assuring adequate moisture during the critical sowing season and sufficient water for retting. The analysis of costs and returns, however, indicates that with irrigation, jute cannot compete with a double crop of transplanted aman-boro paddy. Consequently, the provision of irrigation for jute is likely to lead to the conversion of jute land to paddy land. If jute acreage is to be maintained at present levels, very low priority should be given to irrigation projects in jute growing areas.

77. Extension: The extension effort of the IJCS appears weak and reflects the general severe scarcity of trained agricultural manpower in Bangladesh. At the lowest level in the jute extension system are Extension Agents who are model farmers selected to advise their neighbors on improved practices, in addition to farming their own land. Each Extension Agent is supposed to have responsibility for about 100 acres of jute (probably 150-250 farmers). They are paid 300-400 Takas a year. The concept of using a model farmer as an extension agent is in itself a good one. It has been tried and tested with

some success in Comilla district on other crops. But the approach is being applied poorly in this case. The functions of the model farmers cum Extension Agents are poorly defined and their work seldom supervised. While the Comilla approach has a large training component, these Agents receive minimal training. Directly above the Extension Agent is the Jute Extension Officer, generally responsible for the jute scheme in one or two Thanas. The JEO receives seven days of training in credit, extension methods, plant protection measures and cultural practices. He then trains the Extension Agents. The Jute Extension Officer is responsible to the Assistant Director of Agriculture (Jute) at the district level, who in turn is responsible to the Officer on Special Duty (Jute) and the Additional Director of Agriculture (Jute) in the Ministry of Agriculture at Dacca.

78. It is easy to find fault with the present jute extension system. Training at all levels, but especially for the Jute Extension Officer and the Extension Agent appear highly inadequate. The extension work is divorced from the work of the Jute Research Institute and the Agricultural University. There is little or no coordination with extension efforts for other crops. Those in closest contact with the farmers - the Extension Agents - are farmers themselves, and during busy times will find conflict between farming their own level and providing help to their neighbors. Many of these points are well known to those charged with administering and evaluating the IJCS. For all its difficulties, the system is a creative attempt to break a severe manpower constraint - the lack of trained agricultural personnel. A program of agricultural training should be enacted to ease this constraint. In addition, the mission felt that it might make more sense organizationally and agriculturally to have one general extension agent at the farmers' level rather than separate agents for each crop. These generalists could be backed up at the Thana and District levels and at the Research Institutes and University by subject matter and crop specialists. The appropriate organizational structure for extension, with linkages to research workers and feedback from farmers, could best be developed in the context of reviewing the overall extension needs of the country, rather than in the context of jute alone. Given the serious problems of the present jute extension approach, it should not be expanded until such a review is completed.

Research

79. The mission is firmly convinced that the fundamental cause of the present precarious position of jute on the world market is the inadequate attention given to jute research over the past several decades. While major Western chemical companies spent tens of millions of dollars developing synthetic substitutes for jute, and foundations and aid donors spent large amounts on rice research, jute research, particularly in Bangladesh, was stagnant. Small wonder that today jute can compete neither with synthetics abroad nor rice at home. While the policies suggested in other parts of the report will help the competitive position of jute in the short- and medium-term, the mission is convinced that no improvement in the long-term competitive position of jute is possible without an innovative, vigorous, well-financed and well-staffed jute research program. The fact that at least three or four years are likely to pass before such a program could make a substantial impact is all the more reason for beginning the program immediately.

80. The results of the years of neglect of jute research are evident both in the yields of jute (which have not increased for decades) and in the work program and conditions of the Jute Research Institute. The Institute's budget for the next 5-Year Plan is projected about $3.5 million, about a third of which would pay staff salaries. The staff of the JRI spent a great deal of time explaining their programs and problems to the mission. The basic problems can be summarized as:

(i) Lack of priority: Understandably great priority has been given to rice research. Practically no importance has been attached to jute research. An example of this is the previous regime's confiscation of the JRI's experimental farm lands for the construction of a second capital at Dacca. The capital is still unfinished and the JRI still has no land.

(ii) Lack of direction and leadership: The Bangladesh Central Jute Committee (BCJC) meant to be a high level of jute policy making and coordinating body, has the task of supervising and directing the work of the Jute Research Institute. The mission found no indication of the BCJC's guidance in the research program of the Institute. The Acting Director of the JRI is also the head of the plant pathology division and feels that in his dual capacity he can do neither job as well as it should be done.

(iii) Lack of trained staff: The heads of the divisions of JRI are serious research workers but they could, in varying degrees, profit from modern training in research methods and organization. Below the division heads, the staff qualifications fall sharply as the better workers have been drawn to areas of more active research work.

(iv) Lack of coordination within the JRI: The research work of the JRI follows strict divisional lines with the agronomist and the soil scientist unaware of the new varieties being developed by the botanist. This lack of coordination is considerably better, however, than the apparent hostility between the agricultural research wing and the technological research wing of the Institute. The technological research wing, for example, had refused to test fiber produced under varying fertilizer doses (important for determining the impact of fertilizer on fiber quality) and has sought to separate itself entirely from the JRI. The JRI would do well to develop an inter-discipilinary team approach to solving practical problems facing farmers.

(v) Lack of contact with other domestic research efforts: There is little contact between the JRI and other agricultural research organizations in Bangladesh. This is a serious gap, especially with respect to BRRI, the Bangladesh Rice Research Institute, since the relations between rice and jute production are crucial to the farmer's cropping decisions. Much fruitful inter-Institute research could be carried out to maximize the complementarity and minimize the competition between rice and jute. The JRI substations, which often grow rice anyway, would be ideal for this purpose. The JRI should also strive to improve its working relationships with the Bangladesh Atomic Energy Commission and Dacca University which have reportedly developed, through irradiation and mutation some potentially valuable jute strains.

(vi) Lack of contact with foreign research efforts: Political tensions between the former regime and India prevented any collaboration between the jute research efforts in the two countries, further isolating the JRI. Lack of foreign exchange has prevented the JRI from obtaining an adequate supply of journals and research reports. Ever since independence no effort has been made to exchange information between the Indian and Bangladesh jute research efforts. This should be done as soon as possible.

(vii) Lack of focus on farmer's problems: The research program of the JRI seems far removed from farmers' needs. In part, this may be the result of lack of leadership and direction which has allowed the research staff to pursue their own professional interests. In the future, the work of the JRI should be linked more directly to field problems.

(viii) Lack of adequate facilities: The JRI's facilities need substantial upgrading. The proposed 100 acre experimental farm needs to be purchased and equipped. The Institute needs a large green house so that controlled experiments can be carried out throughout the year. The research substations and the seed farms need further development. Irrigation, drainage and land levelling could increase the JRI's control over experiments on the research farm and protect against crop failure on the JRI's foundation seed farms. A small but well maintained library would be an important asset to the research workers.

81. On January 15, 1973 representatives of the major jute producing countries (Bangladesh, India, Thailand, and Nepal) met in Dacca. The result of this meeting was the establishment (subject to confirmation by individual governments) on an International Jute Center with a Technical Center to be located in Bangladesh. The Center, to be supported with funds from the producing countries and anticipated external assistance, is a clear signal

of the producing countries' concern for the position of jute on the world market. It is an important and necessary step forward and could lead to revitalizing and providing direction to jute research.

82. The development of the Technical Center of the International Jute Center would provide an excellent opportunity for a thorough review of the entire jute research effort in both India and Bangladesh to determine the strengths and weaknesses of the national efforts and how the Technical Center might support or replace them. It may be too much to expect results from the proposed center as impressive as those achieved at IRRI or CIMMYT since the pools of both international expertise and genetic materials for jute research may be more limited than those for foodgrain research. The precise role of the Technical Center and its relations with national research efforts need to be carefully developed. At one extreme, it could replace these efforts; at the other it could serve only as a general coordinator and clearing house. Given the present state of jute research, it would seem appropriate to give the Technical Center the strongest role possible in directing and carrying out jute research.

Conclusion

83. Although the position of jute is now precarious, it is not without hope. As suggested in this section there are policies and programs which, if carried out quickly and forcefully, could substantially improve the position of jute and insure a stable supply at an adequate price to meet the projected demand. It is easier to write about policies and suggest them than it is to carry them out. Nevertheless, the mission was impressed by the sober concern of Government officials, private and public businessmen, and farmers alike for the position of jute. There seems to be a realization that the time has come to take decisive and even drastic action to save the jute trade. This could be the most hopeful development in jute in many years.

MAP I

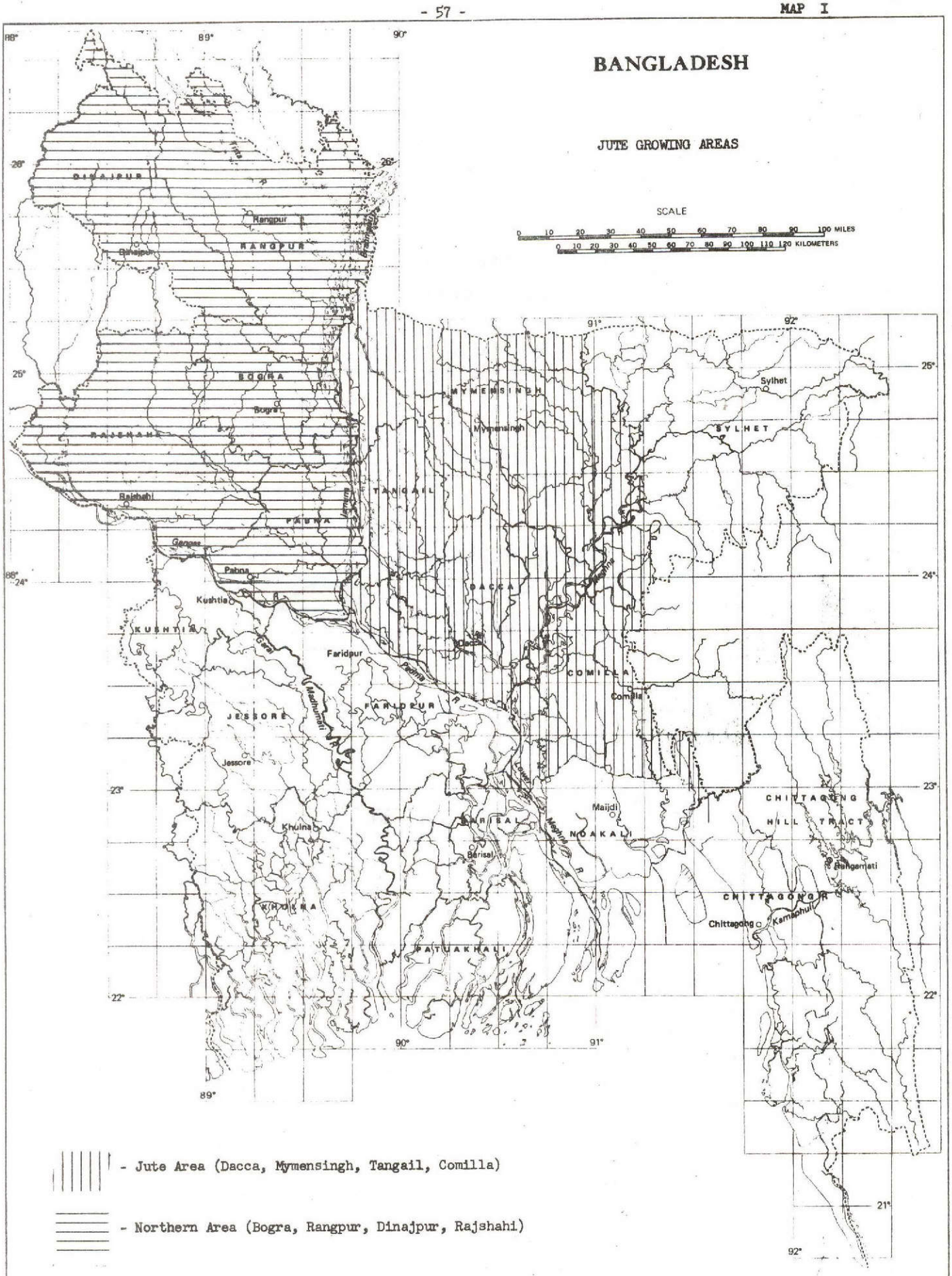
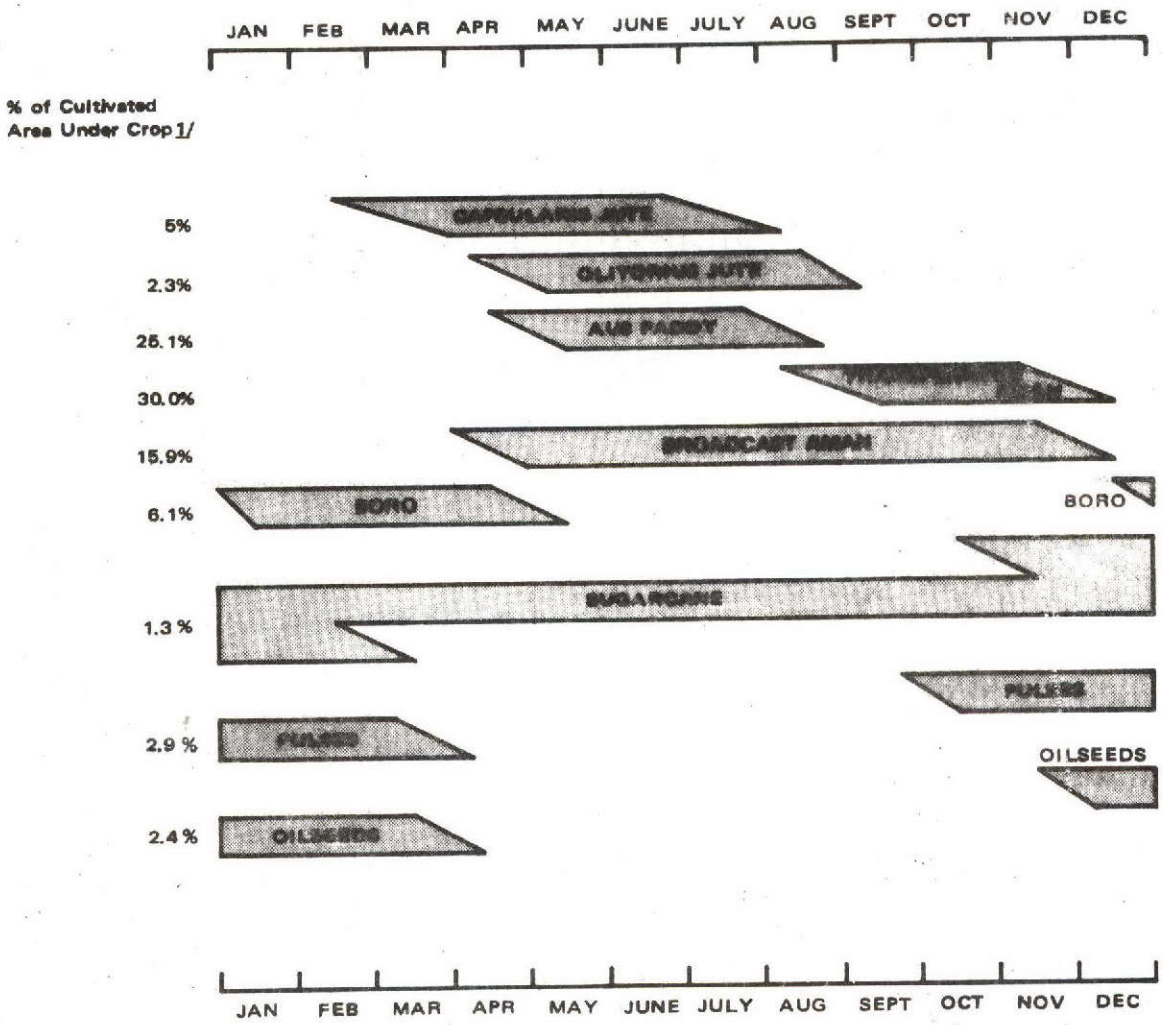

BANGLADESH
JUTE GROWING AREAS
SCALE
0 10 20 30 40 50 60 70 80 90 100 MILES
0 10 20 30 40 50 60 70 80 90 100 110 120 KILOMETERS
DINAJPUR
Rangpur
RANGPUR
Gaibandha
BOGRA
Bogra
RAJSHAHI
Rajshahi
PABNA
Jamuna
Ganges
Pabna
Kushtia
KUSHTIA
Gorai
Madhumati
Faridpur
Padma
FARIDPUR
JESSORE
Jessore
Khulna
KHULNA
MYMENSINGH
Mymensingh
TANGAIL
DACCA
Dacca
Meghna
SYLHET
Sylhet
COMILLA
Comilla
BARISAL
Barisal
Meghna R.
NOAKALI
Maijdi
CHITTAGONG HILL TRACT
Rangamati
CHITTAGONG
Chittagong
Karnaphuli R.
PATUAKHALI
88°
89°
90°
91°
92°
21°
22°
23°
24°
25°
26°
- Jute Area (Dacca, Mymensingh, Tangail, Comilla)
- Northern Area (Bogra, Rangpur, Dinajpur, Rajshahi)
- District Area (all other)

CHART I

## CROPPING PATTERN FOR MAJOR CROPS GROWN IN BANGLADESH

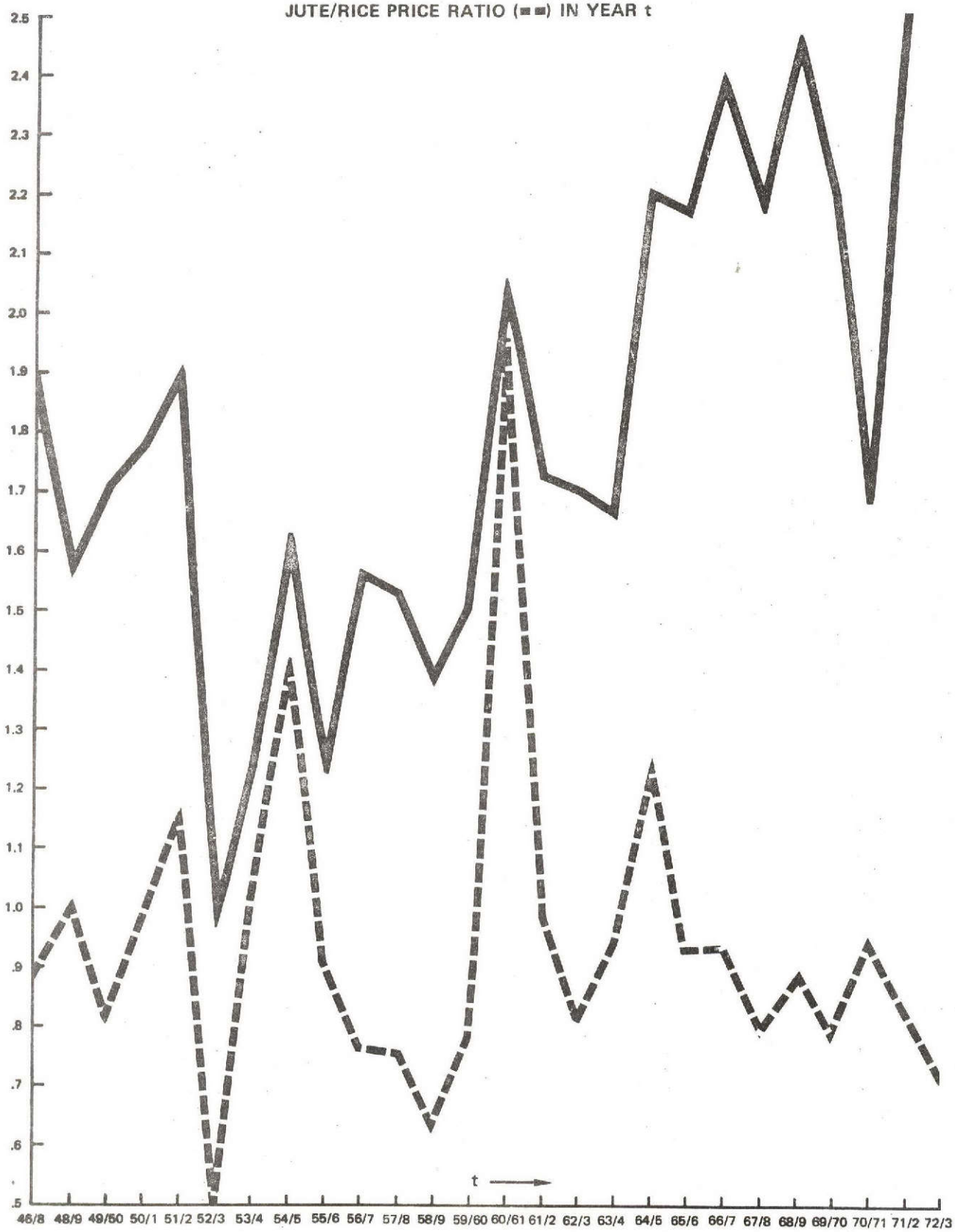



1/ Average 1966/1970

World Bank—7570

CHART II

JUTE ACREAGE (▬) IN MILLIONS OF ACRES IN YEAR t + 1
VS
JUTE/RICE PRICE RATIO (▬▬) IN YEAR t




World Bank—7571

Table 28: JUTE AND RICE PRICES AND JUTE ACREAGES IN BANGLADESH

| | Rice Price/1 | Jute Price/2 | Jute/Rice Price Rates | Jute/3 Acreage (t+1) |
|---|---|---|---|---|
| 1947/48 | 24.12 | 21.50 | .891 | 1.877 |
| 1948/49 | 30.06 | 30.25 | 1.006 | 1.561 |
| 1949/50 | 24.50 | 20.00 | .816 | 1.711 |
| 1950/51 | 19.38 | 19.00 | .980 | 1.779 |
| 1951/52 | 22.12 | 25.75 | 1.164 | 1.907 |
| 1952/53 | 21.00 | 10.25 | .488 | .965 |
| 1953/54 | 15.37 | 15.50 | 1.008 | 1.243 |
| 1954/55 | 11.00 | 15.64 | 1.422 | 1.634 |
| 1955/56 | 20.69 | 18.87 | .912 | 1.230 |
| 1956/57 | 31.56 | 24.09 | .763 | 1.563 |
| 1957/58 | 26.44 | 20.06 | .759 | 1.528 |
| 1958/59 | 25.44 | 16.00 | .629 | 1.375 |
| 1959/60 | 26.52 | 20.90 | .788 | 1.518 |
| 1960/61 | 24.54 | 47.94 | 1.954 | 2.061 |
| 1961/62 | 25.39 | 24.88 | .980 | 1.723 |
| 1962/63 | 27.11 | 21.95 | .810 | 1.700 |
| 1963/64 | 23.85 | 22.52 | .944 | 1.660 |
| 1964/65 | 25.06 | 31.47 | 1.256 | 2.198 |
| 1965/66 | 29.66 | 27.39 | .924 | 2.165 |
| 1966/67 | 38.74 | 36.03 | .930 | 2.400 |
| 1967/68 | 34.64 | 27.58 | .796 | 2.170 |
| 1968/69 | 38.56 | 34.01 | .882 | 2.465 |
| 1969/70 | 38.16 | 29.78 | .780 | 2.200 |
| 1970/71 | 37.56 | 35.35 | .941 | 1.680 |
| 1971/72 | 47.49 | 39.57 | .833 | 2.500 |
| 1972/73 | 68.00 | 49.74 | .731 | |

/1 1947/48-1958/59 Rabbani
1958/59-1971/72 Hpu
1972/73 Bangladesh Bank, msc. reports

/2 Jute Board

/3 Bangladesh Land and Water Resources Sector Study and Jute Board

## III. DOMESTIC MARKETING IN BANGLADESH

84. Domestic marketing procedures in the jute trade involve a long chain of intermediaries and appear to account for about 30-35 percent of the export price of raw jute. This is roughly the same percentage as in India (between growers and Calcutta prices) but considerably above the 10-15 percent figure for domestic marketing costs of sisal, a related fiber, in African countries. The large fraction of costs required for internal marketing services and the apparent inefficiencies related to numerous marketing intermediaries have made domestic marketing the target of numerous reform efforts. The Finlow Committee Report of 1933, the Indian Central Jute Committee Report of 1940, the Jute Enquiry Commission of 1954 (India), and a report by the Dacca University Socio-Economic Research Board in 1961 entitled "Marketing of Jute in East Pakistan" were, to name a few, attempts to find methods to "rationalize" the domestic marketing structure. As might be surmized, a wide variety of suggestions have been offered. However, it appears that, despite some useful reforms, the basic structure of marketing costs has remain unchanged for some time.

85. The marketing chain begins at the farmgate when the typical farmer sells his jute crop to a"bepari" or"faria." (Beparis and farias may own land but are typically not farmers.) The farmer, with perhaps 10 maunds of jute worth about 450 takas or so, usually does not find it worthwhile to travel to the primary market, or"hat"to sell his jute for a higher price. In addition, the bepari or faria may be the farmer's main source of credit - hence, sales are tied to credit repayments. However, there is almost no information on this level of marketing, except that the number 1/ of beparis and farias varies greatly from year to year (see Table 34) and shows a positive correlation with crop size and value. There were an average of 60,000 beparis and farias each year in the 1960's though the number increased to 73,000 in 1972/73. (This may reflect the increased role of the public sector in later marketing stages, a point discussed in para. 89). The large fluctations in numbers make monopoly return to these small traders unlikely - in years with larger more valuable crops, more traders presumably bid down profit margins. This is not to say that beparis and farias do not earn profits, but only that in a market with free entry it is unlikely that returns to trading at this level have a strong monopoly element. In any event, it is difficult to see any government purchasing actively which could operate on a scale large enough and efficient enough at the primary level to benefit farmers and few proposals for government activity at this level have been made.

---

1/ The Jute Board issues licenses for all marketing and processing intermediaries. The number of various intermediaries is taken to be equal to the number of licenses issued.

86. One possibility for improving the farmers' position at this level does exist, that of cooperative marketing of jute. While several attempts at cooperative marketing (dating back at least to 1926) have not proved successful, a strong cooperative movement could incorporate jute marketing as one function. This possibility should be carefully considered if, as expected, cooperatives come to play an increasing role in Bangladesh.

87. The bepari or faria transports jute by bullock-cart or country boat to the primary market, where it is sold as unassorted loose jute to the larger-scale beparis or to the agents of higher intermediaries. Arrivals at the primary market have a strong seasonal trend, with about two thirds of the crop arriving within four months of the harvest. Statistics also indicate that over 75 percent of the crop is usually disposed by the growers during the first six months. This is to be expected, since farmers as well as traders are poor and have little holding power. In the first five months of the 1972/73 season (July-November), jute arrivals at the primary markets amounted to 3.5 million bales, approximately 55 percent of officially estimated total crop of 6.5 million bales in 1972/73. The major function of these middlemen is to collect small amount of jute fiber from each farm and to bring jute to the buying centers where the next higher intermediaries are operating. No processing, storing, or weighing takes place at this level. The standard trading unit is a loose bundle of approximately 20 seers (roughly 41 lbs.). Value determination is usually dependent on the external appearances of the bundle trader's marketing experience and, of course, overall supply and demand.

88. Purchasers at the primary market are aratdars (stockist) and dalals (small brokers). There were an average of 1300 of these annually through the 1960's. Essentially, they are middlemen operating between primary and secondary markets to bring the buyers and sellers in contact with each other (and typically receive payments from both buyers and sellers). They sometimes provide storage or other facilities. This year, the record of license issuance clearly shows a significant decline from some 1400 in 1970/71 to perhaps around 200 in 1972/73. It is likely that a large number of aratdars and dalals were in the past non-Bengali.

89. At the secondary market, purchasers may be either public or private. At present, there are three public sector marketing corporations: Jute Trading Corporation (JTC), Jute Marketing Corporation (JMC), and Jute Price Stabilization Corporation (JPSC). The JTC and JMC have existed for some time, although the JPSC was newly organized in 1971/72. The role of these public sector corporations have become increasingly important, and it is likely that they will account this year for over one half of secondary market purchases as they have moved in to fill the vacuum left by departing non-Bengalis.

90. To facilitate this increase in activity, the number of public sector purchasing centers doubled from 1971/72 to 1972/73, although purchases per center declined by about one third.

Table 29: PUBLIC PURCHASE AND JUTE ARRIVALS AT SECONDARY MARKETS (1968/69 - 1972/73)
(in thousand bales)

| | 1968/69 | 1969/70 | 1970/71 | 1971/72 | 1972/73 (7 - 10) |
|---|---|---|---|---|---|
| Arrivals | 5,616 | 7,178 | 5,680 | 3,230 | 2,685 |
| Purchase by: | | | | | |
| JTC | 396 | 581 | 627 | 481 | 670 |
| JMC | 488 | 640 | 602 | 488 | 466 |
| JPSC | - | - | - | 147 | 309 |
| Total Public | 884 | 1,221 | 1,229 | 1,116 | 1,445 |
| Others* | 4,732 | 5,957 | 4,451 | 2,114 | 1,240 |
| Public purchase as % of Arrival | 15.7 | 17.0 | 21.6 | 34.6 | 53.8 |
| Others purchase as % of Arrival | 84.3 | 83.0 | 78.4 | 65.4 | 46.2 |

* Others include private traders, shippers, and local mills, etc.

Source: Jute Board, 1972

Table 30: PUBLIC SECTOR MARKETING CORPORATIONS

| | No. of Purchasing Centers | | Purchase in Bales | | Average Purchase per Center (bale) | |
|---|---|---|---|---|---|---|
| | 1971/72 | 1972/73 | 1971/72 | 1972/73 (up to Oct.) | 1971/72 | 1972/73 (up to Oct.) |
| JTC | 47 | 49 | 468,213 | 670,165 | 9,962 | 6,769 |
| JMC | 58 | 102 | 472,479 | 466,049 | 8,146 | 4,569 |
| JPSC | 38 | 82 | 142,327 | 308,642 | 3,745 | 3,764 |
| TOTAL | 143 | 283 | 1,083,019 | 1,444,856 | 7,574 | 5,106 |

Source: Jute Board, 1972

91. Given available information, it is impossible to determine whether the public or private sector marketing systems are more efficient. Profit and loss statements for the public sector corporations are not available. Since there are plans for further expansion of the public sector marketing sector, it would be well worthwhile for an organization such as Bangladesh Institute of Development Economics to study the implications of such an expansion. A marketing survey is sorely needed to gather data for cost analysis. Without this, neither income distribution nor the efficiency aspects of an enlarged public sector can be properly assessed.

92. At the secondary markets, jute is sorted and processed into kutcha bales weighing about 320 pounds. Kutcha bales are low density, suitable for domestic transport but not of export quality. There are about 2,000 kutcha balers, though some of these simply rent kutcha press facilities. Kutcha presses are relatively simple, hand-operated, machines. Kutcha pressing facilitates shipment to the next marketing stage which is either a mill or a pucca press.

93. Pucca presses are large electrically operated machines capable of processing about 1 bale per minute. Pucca baling is required for export of raw jute and is useful for domestic train transport. Pucca bales weigh about 400 lbs. There are about 76 pucca presses today in Bangladesh, a number unchanged since 1954/55. Their rated capacity is about 8.5 million bales, although they have never processed more than 3.5 million bales.

94. Before liberation, the export of raw jute was handled by either private traders or the public sector corporations. Contracts were made directly with overseas buyers. The export of jute is now entirely nationalized and channelled through the Jute Export Corporation (JEC), and overseas demands for raw jute are first placed with the JEC. The JEC then allocates the overseas sales among the public sector marketing corporations and other exporters, in reference to their submission of export offers with specifications, e.g., volume and grades. Overseas purchasers now have no control over the specific source of raw jute, a situation which will require increased quality control at the national level to preserve customer confidence. Allotment of orders to these export agents is normally made six weeks prior to the date of shipments.

## Costs of Domestic Marketing

95. The purpose of this section is to give some indicative notions of the costs of domestic marketing. At the first stage, beparis and farias may charge from 1.50 Takas to 3.00 Takas per maund. Costs of handling by other intermediaries before the jute reaches a kutcha press may come to about 2 Takas per maund. Charges at the kutcha press level are estimated at about 5-7 Takas per maund. The Jute Board has supplied the following estimates of kutcha-baling charges:

Table 31: CHARGES AT KUTCHA BALERS LEVEL

| Charges at Kutcha Balers Level | Takas per Maund | |
|---|---|---|
| Importing | 0.12 | |
| Assorting | 0.37 | |
| Staking | 0.25 | |
| Rope making | 0.05 | |
| Bale ticket | 0.05 | |
| Insurance | 0.30 | |
| Delivery | 0.12 | |
| Transport | 2.50 | |
| Misc. | 0.25 | |
| | 4.01 | |
| **Overhead Charges** | | |
| Godown rent | 0.25 | |
| Dunnage | 0.30 | |
| Bank charges | 0.25 | |
| Establishment | 0.60 | |
| | 1.40 | |
| Total | 5.41 | per maund |
| | 27.05 | per bale |

Source: Jute Board, 1972

Cost at Pucca Balers Level

96. Pucca balers and shippers are the final marketing intermediaries within the country. They undertake buying, assorting, storing and exporting jute. Around 40 percent of the nation's baling operation engages in the entire processing steps, i.e., from purchasing of loose jute to production of pucca bales ready for exports, and the rest (60%) deals with processing kutcha jute into pucca bales. Costs for the latter quoted by the Jute Board amount to T 39.05 per bale, equivalent to T 7.81 per maund. Adding to a probable price equivalent to T 58 per maund for purchase of kutcha bales, the total cost to a pucca baler at this stage comes to around T 66 per maund.

Table 32: PUCCA BAILING CHARGES

| Pucca Baling Charges | Takas per bale | |
|---|---|---|
| Pucca assortment | 5.12 | |
| Pressing | 4.75 | |
| Godown rent | 2.00 | |
| Jute Tax | 10.00 | |
| Insurance | 2.00 | |
| Bank Interest | 6.00 | |
| Establishment | 5.50 | |
| Others | 3.68 | |
| Total | 39.05 | 7.81/maund |

Source: Jute Board, 1972

97. After completion of baling process, movement of pucca bales to ports for shipment requires additional expenses, including freight, marine insurance and port charges which together amount to about 3 Takas per maund.

The costs of domestic marketing may be summarized as follows:

| | Low Estimate Takas/maund | High Estimate Takas/maund |
|---|---|---|
| Farmgate to primary markets | 1.5 | 3.0 |
| Primary to secondary market | 2.0 | 4.0 |
| Kutcha baling charges | 5.5 | 7.5 |
| Transport from kutcha press to pucca press | 1.0 | 2.5 |
| Pucca baling charges | 7.8 | 9.0 |
| Transport from pucca press to port | 3.0 | 3.5 |
| | 25.3 | 29.5 |

(The low estimate is based on official sources, especially the Jute Board.)

98. The current export price is about £ 112 per ton (weighted average of all grades), which is equivalent to 79 Takas per maund. If the above high estimate is accurate, farmers receive 49-50 Takas per maund for jute. If the low estimate is correct, farmers may receive 53-54 Takas per maund. The mission's judgment is that the high estimate more closely reflects current costs. If this is so, farmers receive about 65 percent of the export price of raw jute.

Jute Finance

99. The assessment of financial requirements for the jute sector as a whole is made by the Bangladesh Bank and, for 1972/73, is estimated at Taka 113 crores based on 1972/73 crop estimate. Of this, 48 crores are alloted for jute trade and Taka 65 crores for jute mills. As of November 15, 1972, banks credit extended to jute traders amounted to Taka 68 crores some of which is outstanding on account of previous years activities. Nevertheless, jute growers and primary intermediaries seldom have access by the banking facilities.

100. Larger, centrally located traders receive more bank credit than smaller traders. Some bank credit is usually relent to smaller traders, presumably at higher interest rates. The probably adverse income distribution effects of this arrangement notwithstanding, it is difficult to suggest alternative arrangements. Here again, however, a cooperative movement might play an important role. Credit is extended to traders on the basis of a number of factors including (i) volume of jute handled; (ii) capital investment, i.e., at least 25 percent of the total business capital requirement; and (iii) quality and size of storage facilities. For jute exporters, the export orders received from the Jute Export Corporation are an additional criterion for bank credit. Terms of jute credits are: interest at the rate of 8%-9% per annum and 12-months maturity. Normally, the peak drawing season starts at November tapering off around the end of January, but in the current crop year, it seems to be lagging by about one month coinciding with slow jute arrival at the primary markets.

Table 33 : JUTE FINANCE FOR THE 1972/73 JUTE SEASON

1. Estimated peak level requirement of Bank finance

| | | |
|---|---|---|
| Jute Trade | T | 48.00 crores |
| Jute Mills | | 65.00 |
| Total | T | 113.00 crores |

2. Finance arranged from the banking system

| | | |
|---|---|---|
| (a) Bank's own resources | T | 116.17 crores |
| (b) Counter finance, Bangladesh Bank | T | 42.97 crores |
| | T | 159.14 |

3. Position of Jute Finance as of November 15, 1972

| | Jute Trade (T crores) | Jute Mills (T crores) | Total (T crores) |
|---|---|---|---|
| Limited sanctioned | 92.57 | 85.72 | 178.29 |
| Amount outstanding | 67.81 | 83.66 | 151.47 |

Source: Bangladesh Bank, December, 1972

Concluding Remarks

101. The recent expansion of the public sector marketing corporations and the plan for eventual "complete nationalization" of the internal marketing system at least from secondary markets onwards calls for a close examination of this system in respect of its costly nature, efficiency, and income distribution. The institutional changes will be more costly than simple alternative policy changes which would eliminate most of the problems. First of all, there is no strong indication of monopolistic practices carried on by the primary intermediaries. As demonstrated above, a significant number of competitors performing the same services prevent one from holding monopolistic power, and tend to eliminate inefficiency in their operation. If the public sector marketing corporations were to provide direct access to the growers, it would necessarily incur heavier establishment and overhead costs. The problem of ensuring non-monopolistic return to middlemen may well be supported by a scheme of higher license fees and easier credit to provide more competition.

102. Second, a possible area to economize on the costs of internal marketing may well be the link between secondary and terminal markets. By coordinating the kutcha and the pucca baling system, dual charges can be avoided, e.g., godown (warehouse) rent, insurance, bank interest, establishment, and transport costs.

103. Third, if prices paid by the public sector purchasing center were allowed to vary within a wider margin according to the quality of jute, so as to be in line with prices offered by the private traders, it might eliminate the incentive for beparis to sell the higher quality jute to the private traders for the maximum prices through bargaining, and to bring inferior quality jute to the public purchasing centers where there is a guaranteed minimum price.

104. The existing public marketing organization needs to be carefully evaluated before further expansion, particularly in respect to efficiency.

Table 34: STATEMENT SHOWING BY CATEGORY NUMBER OF LICENSES ISSUED/RENEWED FOR THE YEARS FROM 1961-62 TO 1972-73 (UP TO OCTOBER)

| Category of License | 1961-62 | 1962-63 | 1963-64 | 1964-65 | 1965-66 | 1966-67 | 1967-68 | 1968-69 | 1969-70 | 1970-71 (July-June) | 1971-72 | 1972-73 (up to Oct.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Jute Mills | 17 | 20 | 22 | 34 | 45 | 52 | 60 | 75 | 83 | 91 | 99 | 64 |
| 2. Pucca Press | 81 | 79 | 80 | 87 | 82 | 78 | 73 | 75 | 67 | 68 | 69 | 45 |
| 3. (i) Exporter (Raw Jute) | 220 | 224 | 219 | 217 | 219 | 203 | 202 | 191 | 269 | 237 | 122 | - |
| (ii) Exporter (Jute Goods) | - | - | - | - | - | - | - | - | - | - | 82 | 45 |
| 4. Pucca Baler | 304 | 320 | 324 | 440 | 477 | 482 | 455 | 378 | 361 | 358 | 147 | 19 |
| 5. Export Broker | 15 | 12 | 14 | 20 | 22 | 19 | 22 | 18 | 15 | 20 | 17 | 3 |
| 6. Internal Broker | 290 | 268 | 244 | 222 | 256 | 287 | 290 | 235 | 239 | 224 | 118 | 45 |
| 7. Bepari/Faria/Paiker | 69,672 | 54,958 | 51,571 | 55,503 | 66,906 | 74,762 | 75,540 | 57,973 | 63,233 | 62,054 | 27,634 | 72,962 |
| 8. Dalal | 1,191 | 888 | 1,000 | 979 | 1,082 | 1,282 | 1,112 | 860 | 875 | 852 | 481 | 160 |
| 9. Aratdar | 522 | 490 | 581 | 442 | 569 | 602 | 602 | 574 | 591 | 584 | 335 | 18 |
| 10. Kutcha Baler | 2,157 | 1,977 | 2,124 | 1,939 | 2,005 | 2,472 | 2,431 | 2,040 | 2,129 | 2,190 | 1,221 | 2,059 |
| 11. Kutcha Press | 1,156 | 1,108 | 1,188 | 1,143 | 1,163 | 1,310 | 1,221 | 1,077 | 1,053 | 1,015 | 659 | 1,013 |
| 12. Godown | 8,536 | 7,927 | 8,303 | 8,067 | 8,343 | 10,366 | 9,854 | 8,953 | 9,185 | 9,191 | 5,263 | 9,313 |
| TOTAL | 84,161 | 68,271 | 65,670 | 69,093 | 81,189 | 91,915 | 91,862 | 72,449 | 78,100 | 76,884 | 36,247 | 85,751 |

Source: Jute Board

# RELATIVE PROFITABILITY OF JUTE AND PADDY CULTIVATION

1. Since jute competes with paddy for the use of land, the relative profitability of the two crops is an important determinant of the supply of jute fiber. This annex attempts to compare the relative profitability of the two crops.

2. Jute versus Aus Paddy:- Aus is the paddy crop most directly competitive with jute since their growing seasons are so similar (see Chart I ). Consequently, this annex will examine jute-aus competition in detail and extrapolate the findings to other areas of jute-paddy competition. Tables 1 and 2 to this annex calculate production costs per acre for jute and aus paddy respectively. There is no recent farm management study which can yield reliable data. Consequently, the technological coefficients are based on detailed farm level survey work carried out in 1958/59, supplemented as necessary from the input-output coefficients used in the Land and Water Resources Sector Study for the sector sequencing model (Report No. PS-13, Vol. III, Technical Report No. 4, Table 3). These coefficients and the input price data were cross checked by the mission through field interviews. While the estimates used here are probably a reasonable reflection of reality, they should be interpreted carefully.

3. The Tables show per acre production costs calculated in four different ways: Cost A, in which all inputs are priced at financial prices (i.e. prices farmers actually have to pay for the input); Cost B, in which all unsubsidized inputs are priced at financial prices and directly subsidized inputs (fertilizer, irrigation water) are priced at their full cost; Cost C, in which unsubsidized prices are used and labor is shadow-priced (at ½ its market wage); and Cost D, which is the same as C except foreign exchange is shadow-priced as well (at Tk 10 per dollar). Another cost estimate, Cost E is computed by subtracting Cost A from Cost B and subtracting the difference (which equals the total subsidy per acre) from Cost C. Cost E thus roughly approximates a farmer's out-of-pocket expenses. Since he hires about 50 percent of the labor used on his farm, the value of the total labor input at the shadow wage is approximately equal to the value of the hired labor input at the financial (market) wage.

4. In Table 3 the net returns to jute cultivation are calculated. Three different levels of technology are assumed: Traditional, New Seed plus Fertilizer and Potential. For jute traditional technology is essentially the current practice - little or no chemical fertilizer or modern inputs are used. The new seed plus fertilizer technology assumes that D154 is distributed and adequate amounts of fertilizer are used with it. The yield assumption, 18.5 maunds/acre, is lower than what is frequently reported (yields as high as 25-30 maunds are mentioned), but the assumption used here is based on documented research findings which may, if anything, be optimistic. These advances are not yet used widely enough in the field and reporting mechanisms are too crude to provide a reliable indication as

to how well these innovations work on an average farmer's field. The potential technology yield assumption of 25 maunds/acre is even more difficult to base on fact. It is a proxy for what might result if a really effective jute extension effort were combined with adequate input supplies and some modestly higher-yielding jute variety. In contrast with the somewhat hypothetical nature of the assumed higher levels of jute technology, the improved paddy technologies appearing in Table 4 are relatively well documented. Moreover, paddy farmers have tended to move at least towards the new seeds and fertilizer technology, while farmers growing jute are still using a predominately traditional technology.

5. For jute three export price levels are used: £112, £95, and £80 corresponding roughly to the current jute price, the jute price which would compete with synthetics in the short run and the price to which jute should fall in the next 3-4 years to remain competitive.1/ Two different exchange rates, 7.9 and 10.0 Takas/dollar, are applied to the export price. After marketing margins are subtracted, a set of farmgate prices for jute is obtained. These prices are multiplied by the yield levels associated with each assumed technology, yield gross returns on jute fiber. The yield of the by-product, jute stick, is normally about twice the weight of the fiber. This is multiplied by the price of jute stick (Tk 3/maund) and the result added to the gross returns on jute fiber to give total gross returns. The various cost estimates are then subtracted to yield net returns.

6. A similar set of calcualtion is carried out for aus paddy in Table 4, but the computations are simplified since only one price - the current domestic price - is used. The farmgate paddy price was arrived at by working backwards from current rice prices of about 68 Tk/maund for coarse rice. This is equivalent to 45 Tk/maund (68/1.5) for paddy and when a marketing and processing margin of about 7 Takas is deducted the farmgate price becomes 39 Tk/maund. This corresponds closely to prices cited by farmers during the mission's field interviews.

7. In Table 5, the results of Tables 1-4 are brought together. Table 5 is the basis for Table 26 in the main body of Chapter II, Volume II. The basic conclusion is that at present prices and exchange rates, jute production is generally less profitable than aus paddy production. The difference becomes more pronounced as the level of technology increases. Most paddy farmers are probably closer to the new seed and fertilizer technology than to the traditional technology, while most jute farmers tend to use traditional practices in cultivating jute. Hence, comparing returns to jute under the new seed and fertilizer technology with returns to rice at that same technology understates the actual differences between farmers' returns, since they are in fact operating at different levels of technology. Thus, the actual competitive position of jute relative to paddy is even worse than it appears in Table 5.

---

1/ Recent information received after this analysis was prepared suggests the projected prices may be too high.

8. The table demonstrates, however, that when the farmers' out-of-pocket expenses are used as the cultivation costs (Cost E) the competitive position of jute arises from a combination of removing input subsidies (which discriminate against jute), (Cost B) shadow pricing labor, (Cost C) and foreign exchange (Cost D), and changing the exchange rate. If Cost D and the Taka 10 per US dollar exchange rate are used, the net returns to jute are greater than or almost equivalent to the returns to paddy even at the lowest export price ($190 per ton). This suggests that although the competitive position of jute vis-a-vis rice is now precarious, there are policy alternatives available to the Government to improve the situation.

9. Jute versus Broadcast Aman: As Chart I in the text indicates, there is extensive overlap in the growing seasons of jute and broadcast aman paddy. Broadcast aman (sometimes referred to as floating rice) is sown during the early April rains. It grows rapidly to as much as 15 feet depending on the depth of flooding during the monsoon and is harvested in November-December. The Land and Water Resources Sector Study referred to above found that the per acre cost of cultivation of broadcast aman is approximately the same as for aus. The yield, however, is lower (by about a maund per acre) so the net returns to broadcast aman would be about 39 Takas less than the net returns to aus. There is no improved broadcast aman technology in the pipeline and it is not very responsive to fertilizer. Moreover the broadcast aman occupies the farmers' fields several months longer than aus or jute, thereby making it very difficult to plant more than one crop a year on the land. The main advantage of broadcast aman is its ability to grow rapidly so as to stay ahead of the flood. Most farmers would tend to grow broadcast aman only in those areas subject to flooding beyond the tolerance of jute and aus paddy. Consequently, competition between jute and broadcast aman is likely to be rather limited. Broadcast aman will tend to be planted in those areas of fairly deep flooding where its specialized architecture can be used to full advantage. In other areas, aus would be superior to broadcast aman and hence would be the paddy crop which competes with jute.

10. Jute versus Transplanted Aman Paddy: Transplanted aman is a considerably more profitable crop than aus, particularly with the introduction of IR-20, a transplanted aman variety capable of yielding about 28 maunds per acre on farmers' fields. Capsularis (or white) jute, the variety which covers about 70 percent of the jute area, does not normally compete with transplanted aman; in fact, a capsularis jute-transplanted aman cropping pattern is quite common. With olitorius (or Tossa) jute, the situation is different for, as Chart I indicates, there is considerable overlap of the harvest period of olitorius and the transplanting of transplanted aman. While it might be possible to double-crop these two crops, it would be difficult. The slightly higher yields (about one-quarter to one-half maund) and prices (about 2 Takas a maund) obtained by farmers for olitorius jute are not nearly sufficient to compensate for losing the opportunity for a transplanted aman crop. It seems unlikely that farmers who can grow a transplanted aman crop would cultivate olitorius jute. Instead they would grow

capsularis jute (or aus paddy) and then grow the transplanted aman. Consequently, olitorius jute is likely to be grown on those high lands which have insufficient moisture for transplanted aman later in the year. The competition between jute and transplanted aman is likely to have more of an effect on the olitorius-capsularis composition of the jute crop than on its size. The existence of higher lands suitable for olitorius but not for transplanted aman tend to dampen even this effect.

11. Jute versus Boro Paddy: As Chart I indicates, the harvesting of boro paddy conflicts with the planting of jute, particularly capsularis jute. Traditionally, however, boro is grown during the dry winter months in those low lying areas subject to very heavy flooding during the monsoon, and which have sufficient residual moisture to grow rice crop. These areas would not usually be suitable for jute cultivation and the areas suitable for jute cultivation would not usually have enough residual moisture to make a boro crop possible. There is not much land that has these characteristics and as a result boro covers only about 6 percent of the total cultivated acreage. Consequently, under traditional, rainfed conditions there would not be much competition between jute and boro paddy production.

12. Irrigation and Multiple Cropping Opportunities: Under conditions now prevailing in most of Bangladesh competition between jute and paddy is primarily competition between jute and aus paddy. The introduction of irrigation and drainage will sharply alter this picture. With irrigation and drainage farmers will have much greater flexibility in the use of their land. Boro could be grown in areas previously more suitable for jute. Aus could be planted earlier, making an aus-transplanted aman sequence easier. Transplanted aman could be planted in areas now more suitable for olitorius jute. While irrigation can increase the profitability of jute, its effect on rice is much greater. The impact of irrigation on boro has particularly serious implications for jute. The higher yielding variety IR-8 is suitable for cultivation as a boro crop under controlled water conditions. Its yields are about 50 maunds per acre - more than three times the current aus yields. To see roughly what this means for jute cultivation, one need only compare the figures in Table 5 for net returns to aus paddy production under the potential technology (which has cost and return assumptions similar to those relevant for boro IR-8 production) with those for jute production under the present technology. Even under the most favorable price, exchange rate and cost assumptions (US $244 per ton, 10 Takas per $, and Cost D) the returns to aus paddy at potential technology (Tk 761 per acre) are more than 200 Takas greater than the returns to jute production under traditional technology (Tk 539 per acre). Consequently, this seems little possibility for jute to remain competitive with rice under irrigated conditions.

Table 1: JUTE PER ACRE COST OF PRODUCTION DATA

| | Traditional Technology | | | | New Seed and Fertilizer Technology | | | | Potential Technology | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| 1. Labor - Man-days/acre | 110 | 110 | 110 | 110 | 120 | 120 | 120 | 120 | 125 | 125 | 125 | 125 |
| - price | 3.50 | 3.50 | 1.75 | 1.75 | 3.50 | 3.50 | 1.75 | 1.75 | 3.50 | 3.50 | 1.75 | 1.75 |
| - cost | 385.0 | 385.0 | 192.5 | 192.5 | 420 | 420 | 210 | 210 | 437.5 | 437.5 | 219 | 219 |
| 2. Bullock - Bullockdays/acre | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| - price | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 |
| - cost | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 | 172.5 |
| 3. FYM - QTY (md/acre) | 40 | 40 | 40 | 40 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| - price | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| - cost | 60 | 60 | 60 | 60 | 75 | 75 | 75 | 75 | 75 | 75 | 75 | 75 |
| 4. Fertilizer - QTY (mds of recom. mix/acre) | 0 | 0 | 0 | 0 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| - price | | | | | 16.90 | 33.70 | 33.70 | 42.63 | 16.90 | 33.70 | 33.70 | 42.63 |
| - cost | | | | | 21.12 | 42.10 | 42.10 | 53.30 | 21.12 | 42.10 | 42.10 | 53.30 |
| 5. Pesticide - QTY (spray/acre) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| - price (incl.labor) | | | | | | | | | 0 | 20 | 16 | 19 |
| - cost | | | | | | | | | 0 | 40 | 32 | 38 |
| 6. Water - QTY | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| - price | | | | | | | | | | | | |
| - cost | | | | | | | | | | | | |
| 7. Seed - QTY (srs.) | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| - price | 3.5 | 3.5 | 3.5 | 3.5 | 2.42 | 4.69 | 4.69 | 4.69 | 2.42 | 4.69 | 4.69 | 4.69 |
| - cost | 14.0 | 14.0 | 14.0 | 14.0 | 9.68 | 18.76 | 18.76 | 18.76 | 9.68 | 18.76 | 18.76 | 18.76 |
| Total Cost | 631.5 | 631.5 | 439.0 | 439.0 | 698.0 | 728 | 518 | 530 | 716 | 786 | 559 | 577 |

Table 2: AUS PADDY - PER ACRE COST OF PRODUCTION DATA

| | Traditional Technology | | | | New Seed and Fertilizer Technology | | | | Potential Technology | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | A | B | C | D | A | B | C | D |
| . Labor Man-days/acre | 65 | 65 | 65 | 65 | 70 | 70 | 70 | 70 | 105 | 105 | 105 | 105 |
| - price | 3.50 | 3.50 | 1.75 | 1.75 | 3.50 | 1.75 | 1.75 | 1.75 | 3.50 | 3.50 | 1.75 | 1.75 |
| - cost | 228 | 228 | 114 | 114 | 245 | 245 | 122 | 122 | 368 | 368 | 184 | 184 |
| . Bullock Bullockdays/acre | 25 | 25 | 25 | 25 | 27 | 27 | 27 | 27 | 30 | 30 | 30 | 30 |
| - price | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 |
| - cost | 188 | 188 | 188 | 188 | 202 | 202 | 202 | 202 | 225 | 225 | 225 | 225 |
| . FYM -QTY (mds/acre) | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| - price | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| - cost | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 |
| . Fertilizer - QTY (mds of recom mix) | 0 | 0 | 0 | 0 | 2.74 | 2.74 | 2.74 | 2.74 | 5.22 | 5.22 | 5.22 | 5.22 |
| - price (wtd.) | | | | | 16.7 | 38.3 | 38.3 | 48.5 | 16.5 | 34.3 | 34.3 | 43.5 |
| - cost | | | | | 46 | 105 | 105 | 133 | 86 | 179 | 179 | 227 |
| . Pesticide - QTY (spray acre) | 0 | 0 | 0 | 0 | | | | | | | | |
| - price | | | | | | | | | | | | |
| - cost | | | | | 0 | 70 | 70 | 88 | 0 | 54 | 54 | 68 |
| . Water - QTY acre in | | | | | | | | | 18 | 18 | 18 | 18 |
| - price | | | | | | | | | 0 | 15 | 15 | 19 |
| - cost | | | | | | | | | | 270 | 270 | 342 |
| . Seed - QTY | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .2 | .2 | .2 | .2 |
| - price | 40 | 40 | 40 | 40 | 75 | 75 | 75 | 82 | 75 | 75 | 75 | 82 |
| - cost | 32 | 32 | 32 | 32 | 60 | 60 | 60 | 66 | 15 | 15 | 15 | 16 |
| . Total Cost | 487 | 487 | 373 | 373 | 592 | 721 | 598 | 650 | 733 | 1150 | 966 | 1101 |

Table 3: JUTE: NET RETURNS PER ACRE AT ALTERNATIVE EXPORT PRICES, EXCHANGE RATES AND COSTING ASSUMPTIONS

| FOB Price (£/ton) | £112 | £112 | £95 | £95 | £80 | £80 |
|---|---|---|---|---|---|---|
| FOB Price ($) (less tax) | 244 | 244 | 226 | 226 | 190 | 190 |
| Exchange rate (Tk/$) | 7.9 | 10.0 | 7.9 | 10.0 | 7.9 | 10.0 |
| Taka export price | 1928 | 2440 | 1786 | 2260 | 1501 | 1900 |
| Less Marketing Margin (35%) | 1253 | 1586 | 1161 | 1469 | 975 | 1235 |
| Farmgate Price (Tk/Maund) | 47 | 59 | 43 | 55 | 36.4 | 46.1 |
| I. Traditional Technology | | | | | | |
| Yield (fiber, Md/ac) | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 | 15.0 |
| Gross Return (fiber, Tk/ac) | 701 | 888 | 645 | 822 | 546 | 691 |
| Yield (Stich, Md/ac) | 30 | 30 | 30 | 30 | 30 | 30 |
| Gross Return (Stich @3Tk/md) | 90 | 90 | 90 | 90 | 90 | 90 |
| Total Gross Return | 791 | 978 | 735 | 912 | 636 | 781 |
| a-b Less Total Cost A,B | 632 | 632 | 632 | 632 | 632 | 632 |
| = Net Return A,B | 159 | 346 | 103 | 280 | 4 | 149 |
| c-e Less Total Cost (C,D+E) | 439 | 439 | 439 | 439 | 439 | 439 |
| = Net Returns (C,D+E) | 352 | 539 | 296 | 473 | 197 | 342 |
| II. New Seed and Fertilizer Technology | | | | | | |
| Yield (fiber, Md/ac) | 18.5 | 18.5 | 18.5 | 18.5 | 18.5 | 18.5 |
| Gross Return (Fiber,Tk/ac) | 870 | 1092 | 796 | 1018 | 673 | 853 |
| Yield (Stich, Md/ac) | 37 | 37 | 37 | 37 | 37 | 37 |
| Gross Return (Stich @3Tk/md) | 111 | 111 | 111 | 111 | 111 | 111 |
| Total Gross Return | 981 | 1203 | 907 | 1129 | 784 | 964 |
| a) less Cost A | 698 | 698 | 698 | 698 | 698 | 698 |
| = Net Return A | +283 | +505 | +209 | +431 | +86 | +266 |
| b) less Cost B | 728 | 728 | 728 | 728 | 728 | 728 |
| = Net Return B | +253 | +475 | +179 | 401 | +56 | +236 |
| c) less Cost C | 518 | 518 | 518 | 518 | 518 | 518 |
| = Net Return C | +463 | +685 | +389 | +611 | +266 | +446 |
| d) less Cost D | 530 | 530 | 530 | 530 | 530 | 530 |
| = Net Return D | +451 | +673 | +377 | +599 | +254 | +434 |
| e) less Cost E | 488 | 488 | 488 | 488 | 488 | 488 |
| = Net Return E | +493 | +715 | +419 | +641 | +296 | +476 |
| III. Potential Technology | | | | | | |
| Yield (fiber, Md/ac) | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| Gross Return (Fiber,Tk/ac) | 1175 | 1475 | 1075 | 1375 | 910 | 1152 |
| Yield (Stich, Md/ac) | 50 | 50 | 50 | 50 | 50 | 50 |
| Gross Return (Stich @3Tk/md) | 150 | 150 | 150 | 150 | 150 | 150 |
| Total Gross Return | 1325 | 1625 | 1225 | 1525 | 1060 | 1302 |
| a) less Cost A | 716 | 716 | 716 | 716 | 716 | 716 |
| = Net Return A | 609 | 909 | 509 | 809 | 344 | 586 |
| b) less Cost B | 786 | 786 | 786 | 786 | 786 | 786 |
| = Net Return B | 539 | 839 | 439 | 739 | 274 | 516 |
| c) less Cost C | 559 | 559 | 559 | 559 | 559 | 559 |
| = Net Return C | 766 | 1066 | 666 | 966 | 501 | 743 |
| d) less Cost D | 577 | 577 | 577 | 577 | 577 | 577 |
| = Net Return D | 748 | 1048 | 648 | 948 | 483 | 725 |
| e) less Cost E | 489 | 489 | 489 | 489 | 489 | 489 |
| = Net Return E | 836 | 1136 | 736 | 1036 | 571 | 813 |

Table 4: AUS PADDY: NET RETURN PER ACRE

| | Traditional Technology | New Seed & Fertilizer | Potential Technology |
|---|---|---|---|
| Farmgate Price | 39 | 39 | 39 |
| Yield (md/acre) | 16 | 25 | 45 |
| Gross Return (Grain) | 624 | 975 | 1755 |
| Gross Return (Straw) | 54 | 59 | 107 |
| Total Gross Return | 678 | 1034 | 1862 |
| a) Less Cost A | 487 | 592 | 733 |
| = Net Return A | 191 | 442 | 1129 |
| b) Less Cost B | 487 | 721 | 1150 |
| = Net Return B | 191 | 313 | 712 |
| c) Less Cost C | 373 | 598 | 966 |
| = Net Return C | 305 | 436 | 896 |
| d) Less Cost D | 373 | 650 | 1101 |
| = Net Return D | 305 | 384 | 761 |
| e) Less Cost E | 373 | 469 | 549 |
| = Net Return E | 305 | 565 | 1313 |

Table 5: PER ACRE NET RETURN TO JUTE AND AUS PADDY PRODUCTION

| | (1) Jute for Export Price $/ton | (2) Exchange Rate Tk/$ | (3) Farmgate Jute Price Tk/md | I Traditional Technology (4) Net Return to Jute | (5) Net Return to Aus Paddy | (6) Col.4 - Col.5 | II New Seed & Fertilizer Technology (7) Net Return to Jute | (8) Net Return to Aus Paddy | (9) Col.7 - Col.8 | III Potential Technology (10) Net Return to Jute | (11) Net Return to Aus Paddy | (12) Col.10 - Col.11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **A. Inputs Priced at Financial Prices** | | | | | | | | | | | | |
| | 244 | 7.9 | 47 | 159 | 191 | -32 | 283 | 442 | -159 | 609 | 1129 | -520 |
| | 226 | 7.9 | 43 | 103 | 191 | -88 | 209 | 442 | -233 | 509 | 1129 | -620 |
| | 190 | 7.9 | 36.4 | 4 | 191 | -187 | 86 | 442 | -356 | 344 | 1129 | -785 |
| | 244 | 10.0 | 59 | 346 | 191 | +155 | 505 | 442 | +63 | 909 | 1129 | -220 |
| | 226 | 10.0 | 55 | 280 | 191 | + 89 | 431 | 442 | -11 | 809 | 1129 | -320 |
| | 190 | 10.0 | 46.1 | 149 | 191 | -42 | 266 | 442 | -176 | 586 | 1129 | -543 |
| **B. Inputs Priced at Unsubsidized Prices** | | | | | | | | | | | | |
| | 244 | 7.9 | 47 | 159 | 191 | -32 | 253 | 313 | -60 | 539 | 712 | -173 |
| | 226 | 7.9 | 43 | 103 | 191 | -88 | 179 | 313 | -134 | 439 | 712 | -273 |
| | 190 | 7.9 | 36.4 | 4 | 191 | -187 | 56 | 313 | -257 | 274 | 712 | -438 |
| | 244 | 10.0 | 59 | 346 | 191 | +155 | 475 | 313 | +162 | 839 | 712 | +127 |
| | 226 | 10.0 | 55 | 280 | 191 | +89 | 401 | 313 | +88 | 739 | 712 | +27 |
| | 190 | 10.0 | 46.1 | 149 | 191 | -42 | 236 | 313 | -77 | 516 | 712 | -196 |
| **C. Inputs Priced at Unsubsidized Prices, Labor Shadow-Priced** | | | | | | | | | | | | |
| | 244 | 7.9 | 47 | 352 | 305 | +47 | 463 | 436 | + 27 | 766 | 896 | -130 |
| | 226 | 7.9 | 43 | 296 | 305 | - 9 | 389 | 436 | - 47 | 666 | 896 | -230 |
| | 190 | 7.9 | 36.4 | 197 | 305 | -108 | 266 | 436 | -170 | 501 | 896 | -395 |
| | 244 | 10.0 | 59 | 539 | 305 | +234 | 685 | 436 | +249 | 1066 | 896 | +170 |
| | 226 | 10.0 | 55 | 473 | 305 | +168 | 611 | 436 | +175 | 966 | 896 | +70 |
| | 190 | 10.0 | 46.1 | 342 | 305 | +37 | 446 | 436 | +10 | 743 | 896 | -153 |
| **D. Inputs Priced at Unsubsidized Prices, Labor & Foreign Exchange Shadow-Priced** | | | | | | | | | | | | |
| | 244 | 7.9 | 47 | 352 | 305 | +47 | 451 | 384 | + 67 | 748 | 761 | -13 |
| | 226 | 7.9 | 43 | 296 | 305 | -9 | 377 | 384 | - 7 | 648 | 761 | -113 |
| | 190 | 7.9 | 36.4 | 197 | 305 | -108 | 254 | 384 | -130 | 483 | 761 | -278 |
| | 244 | 10.0 | 59 | 539 | 305 | +234 | 673 | 384 | +289 | 1048 | 761 | +287 |
| | 226 | 10.0 | 55 | 473 | 305 | +168 | 599 | 384 | +215 | 948 | 761 | +187 |
| | 190 | 10.0 | 46.1 | 342 | 305 | +37 | 434 | 384 | +50 | 725 | 761 | -25 |
| **E. Inputs Priced at Subsidized Prices, Labor Shadow-Priced** | | | | | | | | | | | | |
| | 244 | 7.9 | 47 | 352 | 305 | +47 | 493 | 565 | -72 | 836 | 1313 | -477 |
| | 226 | 7.9 | 43 | 296 | 305 | -9 | 419 | 565 | -146 | 736 | 1313 | -577 |
| | 190 | 7.9 | 36.4 | 197 | 305 | -108 | 296 | 565 | -269 | 571 | 1313 | -742 |
| | 244 | 10.0 | 59 | 539 | 305 | +234 | 715 | 565 | +150 | 1136 | 1313 | -177 |
| | 226 | 10.0 | 55 | 473 | 305 | +168 | 641 | 565 | +76 | 1036 | 1313 | -277 |
| | 190 | 10.0 | 46.1 | 342 | 305 | +37 | 476 | 565 | -89 | 813 | 1313 | -500 |

## ANALYSIS OF JUTE AND AUS PADDY PRODUCTION FUNCTIONS

1. The farm-level survey data collected by S.D. Chaudhuri and Md. Ashraf Ali in their 1958 and 1959 studies were used to estimate production functions for the production of aus paddy, olitorius jute and capsularis jute.[1/] Single equation ordinary least squares techniques were used to estimate production functions of a Cobb-Douglas form. The results are summarized below.

(a) Aus output = $.88(\text{Land})^{.64}(\text{Labor})^{.42}$ $R^2 = .98$

(b) Olitorius output = $.94(\text{Land})^{.67}(\text{Labor})^{.34}$ $R^2 = .94$

(c) Capsularis output = $1.17(\text{Land})^{.76}(\text{Labor})^{.33}$ $R^2 = .97$

The coefficients are all significant at the .1 level or better. The $R^2$ are all highly significant.

2. With certain qualifications[2/] the above results can be used to estimate the value of the marginal product of the inputs and the implicit price attached to the input. In a Cobb-Douglas production function the input coefficients are also the elasticities of output with respect to the input. Thus, if y = output and x = the labor input, equation (a) above implies that $\frac{\frac{\partial y}{\partial x}}{\frac{y}{x}} = .42$ that is a 1.0 percent charge in the labor input in aus production will yield a .42 percent increase in aus output. The marginal product of labor is $\frac{\partial y}{\partial x} = .42\frac{y}{x}$. When this is evaluated at the average values of y and x at the time of survey, $\frac{\partial y}{\partial x}$ becomes equal to .097. In other words, an increase in the labor input of one man/day would lead to an increase in output of aus paddy of .097 maunds. At the time of the survey the farmgate price of paddy was Tk 12 per maund implying a return to labor of about 1.16 Taka per man/day (12 x .097), somewhat less than the

---

1/ Chaudhuri, S.D. and Ashraf Ali, Md., Report on Survey of Cost of Production of Jute in East Pakistan (1958 and 1959), Pakistan Central Jute Committee, Government of Pakistan (Dacca, 1962).

2/ Caution must be used in interpreting these results as single equation estimates of what is probably a simultaneous system are possibly biased. There is, however, no satisfactory method available to avoid this problem.

market wage of 1.55. Similar calculations were carried out for the other crops and inputs and the results are summarized below.

| Crop | Input | Marginal Product | Input Price Implied | Input Price Market |
|---|---|---|---|---|
| Aus | Labor | .097 | 1.16 | 1.55 |
| | Land | 9.02 | 108 | n.a. |
| Olitorius | Labor | .041 | 1.00 | 1.57 |
| | Land | 8.80 | 214 | |
| Capsularis | Labor | .043 | .78 | 1.59 |
| | Land | 11.3 | 206 | |

3. The most important implication of these calculations is that market wage rates appear to be some 1/3 to 1/2 higher than the marginal product of labor, thereby suggesting the appropriateness of shadow-pricing labor as discussed in this Chapter. These results should be regarded only as indicative since several variables which would normally be included in the estimated production functions had to be excluded, thereby introducing a specification bias in the parameter estimates. In general, however, these excluded variables were positively correlated with the land and labor variables, and therefore the estimates obtained would tend to overestimate the implied input prices.

# THE PRICE RESPONSIVENESS OF JUTE PRODUCERS IN BANGLADESH

1. The first attempt to measure the supply elasticity of jute in terms of acreage adjustments made by producers in response to changes in the relative price of jute was made by R.M. Stern (1962).1/ It covered only a short period 1949/50-1959/60 following Partition and did not include a sufficient number of years to permit any generalization about the magnitude of the response of jute producers to changes in the relative price of jute. The elasticities obtained by R.M. Stern ranged from 0.57 to 0.76 and his simple correlation coefficients ranged from 0.51 to 0.56 (with 10 degrees of freedom).

## Adjustment Model Analysis

2. Rabbani used a Nerlovian adjustment model to estimate the response of jute acreage to changes in the jute/rice price ratio both in the short run and in the long run.2/ His data covered more years than the Stern study. Later Rabbani updated his study.3/ His results were:

| Area and Year | Price Elasticity of Acreage Short Run | Long Run | $R^2$ of estimating Equation |
|---|---|---|---|
| Bengal 1912/13-1938/39 | .52 | .90 | .72 |
| East Pakistan 1949/50-1962/63 | .40 | .65 | .69 |

The analysis suggests that the price elasticity of jute acreage has declined in recent years.

## District-wise Analysis

3. As a part of the Land and Water Resources Sector Study (Report No. PS-13), Mr. Bernard Oury carried out an analysis of the price responsiveness of jute area and jute production on a disaggregated district by district basis for the nine major jute producing districts in Bangladesh,

---

1/ Stern, Robert M., "The Price Responsiveness of Primary Producers", Review of Economics and Statistics, Vol XLIV, pp 202-207, 1962.

2/ Rabbani, A.K.M. Ghulam, "Economic Determinants of Jute Production in India and Pakistan", Pakistan Development Review, Summer 1965.

3/ Rabbani and Ahmed, Rais Uddin, Long Term Jute Policy, Planning Department, Government of East Pakistan, Dacca, November 1968.

using a sample of 17 years of data covering the period (1950/51-1966/67).[1] This analysis is reproduced here in full. The relationships considered are of the form:

for acreage $y_t = a_y + b_y \cdot x_{t-1}$

for production $z_t = a_z + b_z \cdot x_{t-1}$

where $y_t$ is the district acreage under jute

$z_t$ is the district production of jute

$x_t$ is the regional jute/rice price ratio relevant to the district, lagged one year.

4. The variables are expressed in logarithms. Hence the parameter estimate of $b_y$ is equal to the elasticity of acreage grown to jute with respect to the relative price of jute and $b_z$ is equal to the elasticity of total production of jute with respect to the relative price of jute.

5. Results are given in Table 1 for the jute acreage price response and in Table 2 for the jute production price response. Estimates for both would appear to be reasonably consistent. A pattern would appear to emerge from these calculations:

(a) Both jute acreage and jute production price elasticities in relation to rice would appear to be higher, namely about 0.7 to 0.8 on the coastal districts, Barisal and Khulna. That is a 1 percent increase in the jute/rice price ratio would appear to be associated with a 0.70 to 0.80 percent increase in jute acreage as well as in jute production in these districts.

(b) Moving away from the coast, Comilla and Jessore would have an 0.4 to 0.5 elasticity, or about. That is a 1 percent increase in the jute/rice price ratio would appear to be associated with a 0.40 to 0.50 increase in jute acreage and in jute production in these districts.

---

1/ Oury, B. "The Price Responsiveness of Jute Producers in Bangladesh", Appendix I, Bangladesh Land and Water Resources Sector Study, Vol.IV, Technical Report 8, IBRD Report No. PS-13, 1972.

(c) Dacca district would have elasticities of 0.4, or about. That is a 1 percent increase in the jute/rice price ratio would appear to be associated with a 0.40 percent increase in jute acreage and in jute production in the Dacca district.

(d) Moving further north, Mymensingh and Bogra would have these elasticities also around 0.4, or about. That is a 1 percent increase in the jute/rice price ratio would appear to be associated with a 0.40 percent increase in jute acreage and in jute production in these districts.

(e) Not fitting this pattern would be Rangpur further north and Rajshahi also in Northern Area 4, west of Bogra. Estimates would appear to be around 0.5, or about for Rangpur and 0.6 (acreage) and 0.5 (production) or about for Rajshahi.

6. Close inspection of Tables 1 and 2 reveals that for each district analyzed the jute acreage price response would, generally, appear to be equal or greater than the jute production price response. This would appear to indicate (a) that the price responsiveness of jute yield per acre would be negligible; (b) that in those districts where jute acreage price elasticities are greater than jute production price elasticities, jute would appear to move on marginal lands following a significant increase in the jute/rice price ratio the previous year, and away from marginal lands following a significant drop in the jute/rice price ratio the previous year.

7. In Jessore and Rajshahi there would appear to be other major substitutes for jute, than rice alone, notably sugarcane. In both cases, acreage and production responses, it is for Jessore that the equations are the least significant. There might be some explanation for this. On the one hand, variations in the jute/rice price ratio lagged one year would appear to explain from 20 percent (Jessore) to 44 percent (Rangpur), and more often from 31 percent to 38 percent, of year to year changes in jute acreage. On the other hand, variations in the jute/rice ratio lagged one year would appear to explain from 25 percent (Dacca) to 45 percent (Rangpur) and more often from 27 percent to 33 percent of year to year changes in district jute production (Jessore being excepted).

Combined Regional and Adjustment Model Analysis

8. The mission was provided by the Planning Commission with a more recent unpublished analysis of the price responsiveness of jute acreage. 1/

---

1/ Hossain, Mahabub, "Interregional Differences in Farmers', Response to Price in Jute in Bangladesh", Unpublished, typed Ms. June 13, 1972.

This analysis is carried out separately for each of the three major jute producing regions in Bangladesh (Jat, Northern and District), and covers the period 1952/53-1966/67. The effects of both the jute/rice price ratio and the absolute jute price on jute acreage were examined. The results are:

| Region | Jute Price | Elasticities | | $R^2$ of Estimating Equation |
|---|---|---|---|---|
| | | Short Run | Long Run | |
| Jat | Absolute | .44 | .51 | .66 |
| | Relative | .34 | .57 | .47 |
| Northern | Absolute | .45 | .75 | .67 |
| | Relative | .46 | 1.11 | .59 |
| District | Absolute | .29 | .43 | .38 |
| | Relative | .41 | .83 | .44 |

9. In general the results are within the range expected. They are lower than those presented in Rabbani's earlier studies (see para. 2 above) suggesting that the relationship between jute acreage and prices has continued to weaken. The one surprising factor is the very high long run relative price elasticity of jute acreage obtained for the Northern Region. There seems to be no obvious explanation for this finding. It could be that this region is heavily influenced by prices in India and this is preventing the normal relationship from emerging. It could also be that more jute land in this region is more easily substitutable for other crops than is the case in the other regions.

Conclusion

10. Jute farmers in Bangladesh like most farmers are responsive to prices. Their response to a price change is usually spread out over time with the long run response greater than the short run response. Over the years the elasticity of jute acreage with respect to the jute/rice price ratio appears to have declined somewhat. Almost all estimates indicate that jute acreage is relatively price inelastic so that a 1 percent change in the jute/rice price ratio yields a less than 1 percent change in jute acreage.

Table 1: JUTE ACREAGE RESPONSES TO JUTE/RICE PRICE RATIO LAGGED ONE YEAR FOR 9 DISTRICTS
(1950/51 - 1966/67; 17 Years)

$y_t$ is natural log of Jute Acreage; $x_{t-1}$ is natural log of Regional Jute/Rice Price Ratio of Previous Year

| Region | District | Equations (log - log) | Acreage Price Elasticity In Relation to Rice | $R^2$ |
|---|---|---|---|---|
| Jat Area (3) | Dacca | $y_t = 11.98600 + \underset{(2.742)**}{0.44045}\ x_{t-1}$ | 0.44 | 0.334 |
| " | Mymensingh | $y_t = 12.88317 + \underset{(2.618)**}{0.40567}\ x_{t-1}$ | 0.41 | 0.314 |
| " | Comilla | $y_t = 11.92367 + \underset{(2.478)***}{0.52823}\ x_{t-1}$ | 0.53 | 0.219 |
| District Area (4) | Jessore | $y_t = 11.08270 + \underset{(1.984)****}{0.57620}\ x_{t-1}$ | 0.57 | 0.208 |
| " | Khulna | $y_t = 9.80972 + \underset{(2.733)**}{0.88854}\ x_{t-1}$ | 0.88 | 0.333 |
| " | Barisal | $y_t = 10.24068 + \underset{(3.028)*}{0.71916}\ x_{t-1}$ | 0.72 | 0.379 |
| Northern Area (5) | Rangpur | $y_t = 12.26596 + \underset{(3.427)*}{0.50914}\ x_{t-1}$ | 0.51 | 0.440 |
| " | Bogra | $y_t = 11.02331 + \underset{(3.060)*}{0.39299}\ x_{t-1}$ | 0.39 | 0.384 |
| " | Rajshahi | $y_t = 11.26950 + \underset{(3.304)*}{0.61321}\ x_{t-1}$ | 0.61 | 0.421 |

N.B. The figures in parenthesis are the t-values indicating the levels of significance of the coefficient estimates. A *, indicates coefficient estimates significant at least at the 1% level; **, at the 2% level; ***, at the 3% level; ****, significant at the 10% level.
Both variables in the equation are expressed in logarithms. Hence, the parameter estimates of $x_{t-1}$ (the price variable) is equal by definition to the elasticity of jute acreage changes with respect to the relative price of jute in relation to rice.

Source: Raw Data from Planning Department, Dacca.

Table 2: JUTE PRODUCTION RESPONSE TO JUTE/RICE PRICE RATIO LAGGED ONE YEAR FOR 9 DISTRICTS
(1950/51 - 1966/67; 17 Years)

$z_t$ is natural log of Jute Production; $x_{t-1}$ is natural log of Regional Jute/Rice Price Ratio of Previous Year.

| Region | District | Equations (log - log) | Production Price Elasticity In Relation to Rice | $R^2$ |
|---|---|---|---|---|
| Jat Area (3) | Dacca | $z_t = 13.27661 + \underset{(2.267)***}{0.39665}\ x_{t-1}$ | 0.40 | 0.255 |
| " | Mymensingh | $z_t = 14.20706 + \underset{(2.534)***}{0.41633}\ x_{t-1}$ | 0.42 | 0.299 |
| " | Comilla | $z_t = 13.21946 + \underset{(2.458)***}{0.43640}\ x_{t-1}$ | 0.44 | 0.287 |
| District Area (4) | Jessore | $z_t = 12.31161 + \underset{(1.886)****}{0.55262}\ x_{t-1}$ | 0.55 | 0.192 |
| " | Khulna | $z_t = 10.96905 + \underset{(2.435)***}{0.86598}\ x_{t-1}$ | 0.86 | 0.283 |
| " | Barisal | $z_t = 11.39722 + \underset{(2.369)***}{0.67393}\ x_{t-1}$ | 0.67 | 0.272 |
| Northern Area (5) | Rangpur | $z_t = 13.51152 + \underset{(3.567)*}{0.52703}\ x_{t-1}$ | 0.53 | 0.458 |
| " | Bogra | $z_t = 12.19953 + \underset{(2.668)**}{0.38006}\ x_{t-1}$ | 0.38 | 0.321 |
| " | Rajshahi | $z_t = 12.40013 + \underset{(2.701)**}{0.49801}\ x_{t-1}$ | 0.50 | 0.327 |

N.B. The figures in parenthesis are the t-values indicating the levels of significance of the coefficient estimates. A *, indicates coefficient estimates significant at least at the 1% level; **, at the 2% level; ***, at the 5% level; ****, at the 10% level.
Both variables in the equations are expressed in logarithms. Hence, the parameter estimates of $x_{t-1}$ (the price variable) is equal by definition to the elasticity of jute production changes with respect to the relative price of jute in relation to rice.

Source: Raw Data from Planning Department, Dacca