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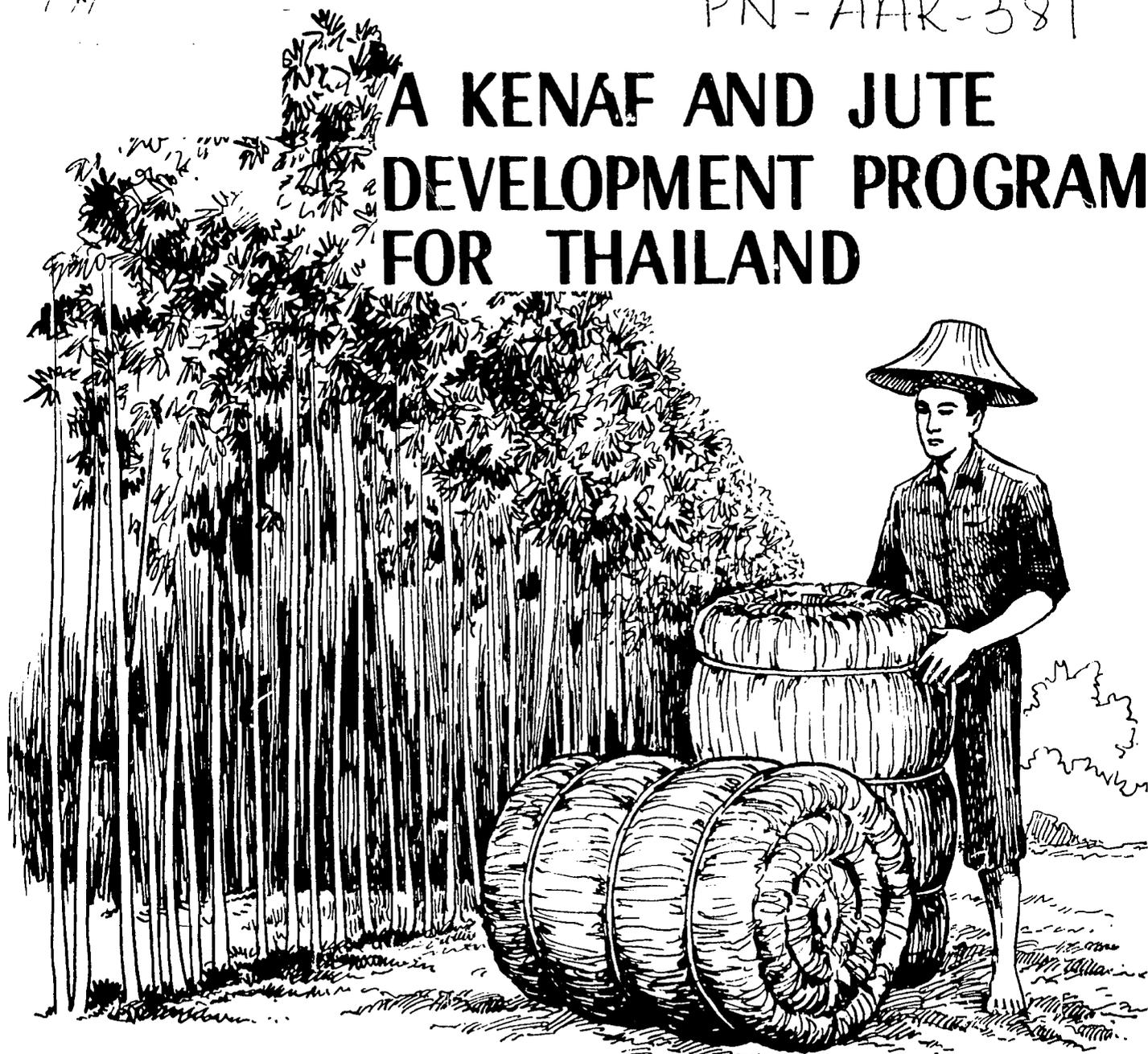
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A KENAF AND JUTE DEVELOPMENT PROGRAM FOR THAILAND



A Report Prepared for the
National Economic Development Board, Royal Thai Government
In Cooperation with the
United States Operations Mission to Thailand
Agency for International Development
Bangkok, Thailand
Under Contract No. AID493-052-T

By Erwin J. Sholton
Agri-Business Consultants
January, 1973

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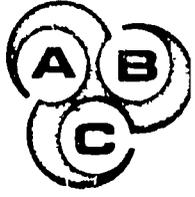
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FOR THAILAND

FINAL REPORT

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January, 1973

The Findings and Recommendations Contained in
this Report are Solely those of the Contractor
(Agri-Business Consultants, New York, N.Y., U.S.A.)

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Agri-Business Consultants

A DIVISION OF PLANTATION EQUIPMENT COMPANY, INC.

P.O. BOX 1104, GRAND CENTRAL STATION, NEW YORK, N.Y. 10017, U.S.A. CABLE ADDRESS PLANTEQUIP

Bangkok, January 17, 1973

Mr. Krit Sombatsiri
Deputy Secretary-General
National Economic Development Board
Bangkok, Thailand

Mr. Ray M. Hill, Director
U.S. Operations Mission to Thailand
Agency for International Development
Bangkok, Thailand

Gentlemen:

A Kenaf and Jute Development Program for Thailand

We have pleasure in submitting herewith our Final Report on the above subject under Contract No. AID 493-052-T, dated September 18, 1972, covering the writer's four months of consulting services to the Kenaf Development Committee of the National Economic Development Board in order to advise and assist the Committee in developing a program for the improvement of production, processing and marketing of kenaf and jute in Thailand.

For ease of perusal, the report is prefaced by a brief synopsis followed by a more detailed summary of the industry background and the overall development program; similarly, each of the four major program components is preceded by an individual summary.

We trust that this report will meet with your approval and that our services will have contributed in some small measure to the further development of the kenaf and jute industry in Thailand.

Thanking you for having given us the opportunity to furnish the subject consulting services, we remain,

Very truly yours,
AGRI-BUSINESS CONSULTANTS

BY: Erwin J. Sholton, Pres.

EJS/ut.

- ADDENDUM

The Kenaf Development Committee convened on January 8, 1973, under the chairmanship of H.E. the Minister of Finance, Dr. Serm Vinijchaikul, in order to consider the Advisor's report and resolved as follows:

- (i) Kenaf Master Development Program: The Committee agreed that the proposed program is to serve as the framework for overall kenaf development planning of the agencies concerned, including the determination of their actual manpower and budgetary requirements, whereafter the program is to be submitted to the Executive Committee of the NEDB for approval and inclusion in the Third National Economic and Social Development Plan.
- (ii) Kenaf Package Project: The Committee accepted the principle of a variable incentive price for Grade "A" kenaf fiber to replace the previously considered fixed guaranteed price system. The Committee will strongly urge the Thai Jute Company to involve itself in the marketing of Package Project (and, subsequently, Master Development Program) kenaf, to serve as the channel for incentive price financing and, ultimately, to act as the Executing Agency for the overall program.
- (iii) Pioneer Kenaf Development Program: The Committee instructed its Secretary to submit this program to the Ministry of Agriculture, in its capacity of potential implementing agency, for its consideration and further action.
- (iv) International Agency Project Assistance: The Committee took note of the World Bank's interest in potential IDA financing of various Kenaf and Jute Development Program aspects and requested the NEDB to proceed with further discussions with the Bank as it considered advisable.

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- SCOPE OF WORK AND ADVISORY SERVICES PROVIDED

The Kenaf and Jute Advisory Contract No. AID 493-052-T, dated September 17, 1972, calls for the Contractor to furnish the services of a qualified Advisor, on a full-time basis, for a period of about four months to advise and assist the Kenaf Development Committee (KDC) of the National Economic Development Board (NEDB) in developing a program for the improvement of production, processing and marketing of kenaf and jute in Thailand.

The specific work to be performed by the Advisor is listed as follows:

(i) Review the existing kenaf situation under the guidance and with the assistance of the KDC and help refine the KDC overall program for RTG support to Thai kenaf and jute development, including a more precise definition of technical assistance requirements and related time frames which can be considered for implementation by other possible donors.

(ii) Help establish the National Executive Council (NEC) approved "Package Project" to be carried out by the Bank for Agriculture and Agricultural Cooperatives (BAAC), the Northeast Jute Mill Co., Ltd., and the Agricultural Extension Department. This is a core kenaf and jute development project to achieve high yield, high quality production and price stabilization through integrated channels for production inputs, credit, extension services, and marketing of output.

(iii) Study the potential for introducing jute production in Thailand and recommend measures for the development of jute industries.

(iv) Recommend a price support program for the Northeast Jute Mill Co., Ltd.

The Contract requires the Advisor to perform his services under the general guidance of the Director of the United States Operations Mission to Thailand or his duly designated representative (Note: Mr. Donald C. Marsden, Chief, Private Enterprise Division). The Advisor's cooperating country Liaison Officials were Mr. Staporn Kavitanon, Secretary of the KDC, and Mr. Chinda Jimreivat, Head, Kenaf Package Project.

The Contract further stipulates that it is considered essential that the writer, in person, carries out the work specified thereunder.

In response to the above Contract terms, the Advisor first prepared a detailed Work Plan (Annex II) and obtained agreement thereto from both the NEDB and USOM with whom the plan was subsequently reviewed at periodic intervals; on such occasions, the schedule of work progress was checked and pending issues discussed.

After analysis and review of all available documentation and discussions with officials of the NEDB, the Ministry of Agriculture and the Ministry of Commerce, and with the Kenaf Package Program Sub-Committee and the Kenaf Master Development Program Group, the Advisor proceeded to the Northeast for field research and discussions with Government and bank officials, kenaf traders and jute mill management in order to establish a consensus on such basic questions as Kenaf Development Program targets and methods of implementation. He then undertook the actual report preparation whilst continuing to check facts and figures with the authorities concerned and submitting the individual report sections, as they were completed, for comment to his NEDB and USOM Liaison Officials. This refers particularly to the four specific Kenaf Development Program components, namely:

- The Kenaf Package Project which was also discussed with the Package Project Sub-Committee and modified as a result of

Sub-Committee resolutions;

- The Kenaf Master Development Program established in close consultation with the Program Group, although the Advisor continues to differ with several conclusions of the Group;
- The Kenaf Pioneer Development Project and International Agency Project assistance which were prepared at the specific request of the NEDB and discussed at length with the World Bank and the Mekong Committee.

Item (iv) of the Contract scope of work required modification in the sense that it was agreed upon early on that the "Price Support Program" specified in that item would be unworkable and should be substituted by a "Price Incentive Program" as had incidentally, been previously specified in the NEDB proposed and NEC approved Kenaf Development Program guidelines.

With regard to the required recommendation of "measures for the development of jute industries" in Thailand, detailed background information is furnished in this report and specific jute production problems are highlighted but no separate development program has been written up since, as emphasized under the heading "Jute in Thailand", its implementation requires identical measures to those discussed at length for kenaf development in Thailand and a detailed program description would simply have meant a duplication of the Kenaf Development Program.

- ADVISOR'S BIO-DATA

ERWIN J. SHOLTON

Agro-Engineer and Economist, Tropical Crops
President, Agri-Business Consultants

Summary of Qualifications

Tropical fiber engineer and economist.

Kenaf fiber production, processing and industrialization
specialist.

Consultant in the areas of agricultural production, farm economics,
agricultural marketing and agro-industries in the developing
countries.

Experience Record

Mr. Sholton has had more than 30 years of agricultural and agro-industrial experience in Latin America, Africa, the Middle East, South Asia and the Far East, with particular reference to crop production and marketing and the development of agriculture-based industries. He is a recognized authority in his special field of long vegetable fiber production and processing (kenaf, jute, ramie, sisal, abaca). He started his overseas career as engineer and manager of sisal and palmoil plantations in East Africa and subsequently acted as consultant to the then rapidly expanding Latin American sisal industry. He has been closely associated with the modern development of kenaf since its inception and has made important contributions to its progress, including the design of efficient ribboning equipment, the mechanization of field operations, and the introduction of centralized retting. He has acted as consultant on kenaf production and bag and hessian mill projects in some 20 developing countries

at the request of international agencies, local Governments and private industry. His consultancy covers all agronomical and technical aspects, including small farmer and commercial estate production, the complete range of economic and financial project considerations, and the preparation of loan applications, as well as project development and management.

In the general field of tropical agriculture, Mr. Sholton specializes in the development of crop production and agriculture-based industries, and in agricultural marketing. He has personally undertaken numerous agri-business surveys and follow-up implementation activities and directed several agricultural marketing studies, including a study which subsequently served as a sample for similar investigations in a number of developing countries. As President of Agri-Business Consultants, he concerns himself directly with the assignments carried out by the company's staff which cover a wide range of agricultural, agro-engineering and agro-economic activities in the developing world.

- ACKNOWLEDGEMENT

The Advisor wishes to take this opportunity to thank the numerous RTG, USOM and private sector officials he consulted in the performance of his services for their unfailing and wholehearted cooperation. Particular mention must be made of the following who extended their fullest support and guidance at all times and without whose assistance this report could not have been prepared:

Mr. Krit Sombatsiri, Deputy Secretary-General, NEDB;

Mr. Staporn Kavitanon, Chief, Private Sector Planning Unit, Economic and Social Planning Division, NEDB, and his staff;

Mr. Chinda Jimreivat, General Manager, Government Jute Mills;

Mr. Phote Inganinanda, Chief, Office of Commodity Standards, Ministry of Commerce;

Mr. Amnuay Kasipar, Chief, Kenaf Project, Ministry of Agriculture;

Mr. Harn Harnpatanapanich, Secretary, Thai Jute Association;

Mr. Donald C. Marsden, Chief, Private Enterprise Division, USOM/EDI.

To all of the above the Advisor tenders his sincere appreciation.

1. SYNOPSIS

The overall Kenaf and Jute Development Program presented in this report is aimed at improving fiber quality, raising farmer income in the Northeast, and assuring a steady demand for one of Thailand's principal export commodities. A survey of local and international market trends supports the assumption that an annual fiber crop of 400,000 to 450,000 tons, providing ฿1,000 to ฿1,500 million in revenues to the growers, will find ready acceptance on condition that the proportion of Grade "A" production is raised from the present 15 percent to some 40 percent of overall output and export quality control is strictly enforced.

The achievement of these aims requires the provision of a full range of inputs and services to the farmers, including improved seed, crop protection measures, retting facilities, and extension, credit and marketing services. The farmer is to pre-grade his fiber in the field and a ฿0.50 per kilogram incentive price is to be paid to him for his Grade "A" production.

The Kenaf Development Program submitted herein is comprised of four component parts as follows:

- The Kenaf Package Project, 1973;
- The Pioneer Kenaf Development Project;
- The Kenaf Master Development Program;
- International Agency Project Assistance.

The Kenaf Package Project, a pilot project designed to develop basic data, costs and operational procedures for subsequent large-scale development and providing all essential inputs and services, is to be implemented on 60,000 rai in Changwats Nakorn-rachsima and Chaiyaphoom in 1973. Overall project costs are estimated at ฿11.66 million of which ฿10 million are to be financed by Bank for Agriculture and Agricultural Cooperatives (BAAC)

farmer credits and ฿216,000 for six kenaf extension officers from budget funds; ฿1.44 million are represented by short-term incentive price financing credits. An additional ฿4.32 million expenditure, although rejected by the Kenaf Package Project Sub-Committee, is proposed for retting tank construction equipment and fiber transport truck purchases.

The implementation of the Pioneer Kenaf Development Project, if agreed upon between the RTG, the Mekong Committee and the World Bank, would be financed on a grant basis. It is a high-intensity 20,000 rai core type project including kenaf and jute seed production, supervised fiber production, processing and marketing, credit and other input provisions, and domestic and expatriate technical assistance and management services. The project is designed to provide major and essential support to the overall program.

The Kenaf Master Development Program is projected to cover some 2 million rai with an estimated annual crop of 400,000 tons of retted kenaf fiber, including 720,000 rai in the six principal kenaf producing Changwats under the 1974 to 1976 Phase I and 1.28 million rai in all sixteen Changwats under the 1977 to 1980 Phase II. Total staffing requirements are estimated at 200 extension workers and 60 export quality inspectors, and overall 1973 to 1980 costs (including the Kenaf Package Project) at ฿851 million of which ฿579 million are to be financed through BAAC credits and ฿179 million through short-term incentive price financing credits; the remaining ฿93 million are composed of ฿26.9 million in Department of Agricultural Extension and ฿8.6 million in Office of Commodity Standards budget funds and of ฿57.5 million in retting tank construction equipment costs.

Kenaf and jute development, which latter is to be promoted in suitable areas of the Northeast and is expected ultimately to

(3)

replace up to 25 percent of kenaf production, are to be coordinated by an Executing Agency and urgent priority must be given to an intensive research and improved seed production effort for both crops.

Potential International Agency Project Assistance, as tentatively discussed with the World Bank, concerns the provision of an expatriate consulting team, its desirability and composition to be decided upon by the RTG, and possible International Development Association (IDA) financial support to such Kenaf and Jute Development Program aspects as research, seed multiplication, retting facility construction (particularly in World Bank sponsored irrigation projects), the Pioneer Kenaf Development Project, fiber inspector training, multi-crop development associated with Kenaf and Jute Programs, and kenaf and jute mill modernization and management.

2. SUMMARY

THAI KENAF FIBER PRODUCTION AND CONSUMPTION TRENDS (Chapter I)

From its inception in 1950, Thai kenaf fiber production increased rapidly to its present level of some 400,000 tons annually of which between 250,000 and 300,000 tons are exported generating close to \$1,000 million in yearly foreign exchange income and placing kenaf amongst the six primary exports of the country, As the single most important cash crop and almost the only presently available economic upland crop in the Northeast, it provides, at the same time, an annual income of better than \$1,000 million to about 200,000 farm families and employment to approximately 50,000 other workers. Since Thai kenaf output normally represents less than 20 percent of jute production in India and Bangladesh, fiber demand and prices always have been and will continue to be largely governed by the jute crop size and marketing policies of these two countries. However, an improvement in average kenaf fiber quality and export grading should result in a steadier overseas demand and thus in a levelling out of both the crop size and prices. The Government's Kenaf Development Programs discussed in this report are, therefore, aimed at correcting these deficiencies as well as at increasing fiber yields and lowering production costs.

Domestic kenaf fiber demand by the local bag and hessian industry has risen steadily from year to year to its present level of some 130,000 tons annually, including an estimated 8,000 tons of village consumption, and is expected to expand further. Concurrently, it is anticipated that the export market will continue to absorb from 250,000 to 300,000 tons yearly, the reduction in demand in the developed countries, largely due to competition from man-made fibers, being offset by a rise in demand in the developing

world. Hence, a yearly output of 400,000 to 450,000 tons of Thai kenaf appears to be a reasonable target.

Northeast farm prices for kenaf have increased steeply from their "normal" level of $\text{฿}2.00/\text{kg.}$ for "Mixed Grade" into the $\text{฿}3.00/\text{kg.}$ to $\text{฿}4.00/\text{kg.}$ and higher range due to the pressure of demand as a result of the disruption of jute production and shipments in Bangladesh during the last two years; they are generally expected to fall back to about $\text{฿}2.50/\text{kg.}$ by 1973. Export prices for Thai Grade "A" kenaf and "Bangladesh White D" (BWD) jute, which are usually considered equivalent in spinning quality in a jute mill, consistently differ by $\text{¥}1\text{st.}40$ per ton or more in favor of BWD. It is anticipated that the aimed for improvement in export quality control will somewhat reduce this differential for properly assorted "Super" and Grade "A" kenaf and that the quality improvement program will increase the availability of these grades.

PRESENT THAI KENAF PRODUCTION AND MARKETING METHODS AND BASIC IMPROVEMENT REQUIREMENTS (Chapter II)

An overall review of prevailing kenaf production, processing and marketing methods indicates the necessity of improving almost all aspects of present practices, including the following:

Planting and Cultivation

- Location of kenaf plots in relation to soil quality and availability of retting facilities;
- Land preparation;
- Use of high-yielding and disease resistant seed varieties;
- Introduction of row planting;
- Intensive weeding and thinning;
- Selective fertilizer application;

- Pest and disease control.

Harvesting and Processing

- Time of harvest;
- Cutting the stalks at ground level;
- Stalk bundling according to size;
- Provision of improved retting facilities;
- Stalk submersion by logs, stones or bamboo sticks;
- Farmer education with respect to exact determination of the completion of the retting process;
- Intensification of fiber washing operations;
- Introduction of farm level fiber grading.

Research and Extension

- Greatly increased research activities aimed at the selection of higher yielding and disease resistant varieties;
- Expansion of kenaf seed multiplication, demonstration farms and extension services.

Fiber Marketing

- Improvement of fiber quality;
- Exact application of grading standards;
- Supervision of farmer to merchant fiber sales;
- Baling plant control;
- Strict exercise of quality inspection.

PRINCIPAL RESTRAINTS ON EFFECTIVE DEVELOPMENT PROGRAM IMPLEMENTATION
AND PROPOSED REMEDIAL MEASURES (Chapter III)

Research and Extension

Past kenaf research and extension efforts have been limited in scope and achievement and the results so far obtained are quite inadequate to properly support an overall Kenaf Development Program.

The research station should be relocated, preferably to a site in the Khon Kaen - Kalasin - Mahasarakam area, and combined with a demonstration and kenaf extension officer training center. The primary task of an enlarged research effort must be the selection, from both local and introduced strains, of higher yielding and disease resistant varieties, particularly varieties resistant to stem rot disease which seriously threatens the economic survival of the kenaf fiber industry in the Northeast. More intensified research must also be conducted into seed multiplication and storage, land preparation and stalk production, fertilization, time of harvesting, retting facilities, methods and periods, and pest and disease control. The immediate implementation of a greatly enlarged kenaf research program is an absolute necessity to assure the improvement and, in fact, the survival of the industry.

Similarly, kenaf extension work must be substantially strengthened. It is estimated that at least one extension officer is required to supervise each 1,000 kenaf growers and that under the condition that he concerns himself exclusively with such growers. On the basis of an aimed at 2 million rai overall kenaf planting area in the Northeast, 200 specialized extension officers will be required. They should work under the supervision of and be based on the proposed kenaf extension and demonstration centers.

Improved Seed Production

The essential requirement of supplying improved seed to all kenaf growers under fiber production development programs has been almost completely neglected in the past. Whereas some 4,000 tons of seed will be required for a 2 million rai planting area by 1980, only 8 tons were available in 1972 and 30 tons are to be produced in 1973. The improved seed should be grown by the Department of Agriculture and/or the Department of Agricultural Extension, possibly in combination with supervised peasant farmer production, although the inclusion of the latter will increase seed costs quite appreciably.

Retting Facilities

The improvement of existing and the construction of additional retting facilities is an absolute necessity if large scale fiber quality upgrading is to be achieved. On the generally accepted assumption that adequate retting water is already available in the Northeast for the good quality production of 200,000 tons of kenaf fiber annually and that one standard size retting tank (25 m. x 4 m. x 1 m.) is required for every 10 rai of kenaf planting area, 100,000 new tanks will have to be provided for the projected 2 million rai kenaf improvement program. Although a number of these tanks can be excavated by paid manual labor or under farmer group self-help arrangements, the large majority will have to be constructed with the bulldozers and bucket excavators of a greatly expanded "Kenaf Retting Pond Improvement Pilot Project" of the Department of Agriculture.

Consideration should also be given to the establishment of centralized retting facilities with permanent water supplies permitting the extension of the regular retting season and the increased production of superior quality fiber.

Credit Facilities

Farm credit at reasonable interest rates being one of the essential inputs under any crop development program, credit facilities to the kenaf growers must be expanded. The Bank for Agriculture and Agricultural Cooperatives already renders most effective services in that regard and its activities in support of the Kenaf Development Program must be increased as must those of private banks and other lenders which are already active in this field to a limited extent.

Fiber Quality, Grading and Marketing

The increased production of high quality fiber at the expense of the lower grades is indispensable if Thailand is to maintain and possibly raise its share of the world packaging fiber market and this is, in fact, the principal aim of the various Kenaf Development Programs discussed in this report which are designed to improve the present ratio of some 15-50-35 percent of Grade "A", "B" and "C" fiber production respectively to a 40-50-10 ratio through the provision of the required inputs and price incentives and the enforcement of strict quality control measures.

Preliminary fiber assortment into the basic grades at the farm level is to be encouraged and will be combined with the purchase of such graded fiber at suitable price differentials presently set at $\text{฿}0.50/\text{kg.}$ above the prevailing "Mixed Grade" price level for Grade "A", at that level for Grade "B", and at $\text{฿}0.80$ below that level for Grade "C". This will provide an incentive of $\text{฿}120$ per ton or $\text{฿}24$ per rai to the grower at all "Mixed Grade" price levels at the 40-50-10 percent grade ratio. It is anticipated that the additional outlay of $\text{฿}0.50/\text{kg.}$ for Grade "A" fiber, which corresponds to approximately $\text{¥}1.10$, will be recovered through the re-establishment of a price differential

in that amount on the international market once the buyer is assured, through the implementation of an effective quality control program, that he will indeed receive Grade "A" fiber under that label rather than a mixture of the three grades as is presently often the case.

In order to assure that the grower actually receives the prescribed grade price differentials, buying units are to be established under the Kenaf Development Program. The existing kenaf baling plants will be persuaded to act as such units under program management supervision.

No modifications are required to the prevailing export marketing system which is a well organized and smoothly running operation except for the stricter enforcement of quality control measures to be exercised more directly by the Office of Commodity Standards of the Ministry of Commerce in the exporters' Bangkok godowns where quality inspection is already being carried out but that largely by private companies which are sometimes subject to undue influence by both sellers and buyers and over which the Office of Commodity Standards is empowered to exercise only a limited control. Training of the official inspectors and of baling plant supervisors constitutes an important aspect of the development program.

Reference is also made in Chapter III to stalk ribboning prior to retting and the potential benefits of that method are discussed with respect to reduction in stalk transportation costs, reduction in retting facility requirements, and fiber quality improvement.

THE KENAF DEVELOPMENT COMMITTEE (Chapter IV)

The Kenaf Development Committee was established early in 1970 in recognition of the fact that kenaf is one of Thailand's major exports as well as being the most important cash crop in the

Northeast. It is headed by the Chairman of the Executive Committee of the National Economic Development Board and its membership includes high level representatives of the Ministries, Government agencies and private organizations concerned with the kenaf industry. It was assigned the task of establishing promotional policies for the production of high quality fiber, coordinating the activities of its member agencies and organizations directed towards that aim, examining progress achieved, identifying existing restraints on successful promotional policy implementation, submitting proposals for corrective measures to the Government, and evaluating kenaf development projects submitted for its consideration. In the course of its periodic meetings during the last two years, the Committee developed the Kenaf Package Project, a pilot kenaf operation in Changwats Nakornrachsima and Chaiyaphoom implementation of which was started in 1972 and which is discussed in detail in Chapter V; discussed and rejected Thailand's participation in an international jute and kenaf buffer stock organization; gave its support to a jute promotion project; and considered Thailand's potential role in a United Nations Development Program proposed International Jute Research and Promotion Center about the advantages to Thailand of which it expressed substantial reservations. The Committee continues to play an active part in developing all kenaf and jute projects in Thailand and in coordinating their implementation.

THE KENAF PACKAGE PROJECT (Chapter V)

The report presented in Chapter V covers the results of the specific investigations carried out by the Advisor into the operation of the 1972/1973 phase of the Kenaf Package Project, his recommendations for project refinement and for its implementation during the 1973/1974 season, the discussions of the Kenaf Package Project Sub-Committee on the Advisor's report, and his modified

recommendations for 1973/1974 project implementation as a result of these discussions.

The project provides for all inputs and services included in the Kenaf Master Development Program for which, in fact, it is intended to develop detailed basic data, costs and operational procedures. Due to the delayed start of the 1972/1973 program, such inputs and services could be furnished only to a limited extent except for Bank for Agriculture and Agricultural Cooperatives farmer group credits; in fact, kenaf producing farmer groups financed by the Bank were selected as Package Project members. Improved seed, fertilizer, insecticides, pesticides and retting tanks were not provided, and extension and technical assistance services only to a small degree. The fiber marketing and price incentive phases could not be implemented satisfactorily due to the lack of funds and of sufficient time to organize them adequately. The purchasing center of the Northeast Jute Mill Co., Ltd., a Government owned bag factory, acted as buying unit for the project.

The original intention having been to expand the Package Project area from some 60,000 rai in the first year to 100,000 rai in 1973/1974, the further project refinement and implementation recommendations were worked out on that basis. It was suggested that, for ease of supervision, the project should be concentrated in Chaiyaphoom only. As a first step, assurances had to be obtained from the Bank for Agriculture and Agricultural Cooperatives as to its ability to qualify the estimated 675 farmer groups required and to provide the necessary \$12.5 million in farm credits. Only a small percentage of the improved seed needs will be available from the Department of Agriculture so that these essential inputs can not be provided. The retting tank construction equipment presently operated by the Department of Agriculture is sufficient for the

excavation of only 1,000 units per season; it was recommended that another two sets of equipment should be procured so as to increase mechanical excavation capabilities to 3,000 tanks by August 1973, the remaining 2,000 tanks required to be dug by paid manual labor and under farmer self-help programs. It was further proposed to secure the cooperation of a Chaiyaphoom baling plant to act as project buying unit and to provide free fiber transportation services from village collection centers to the baling plant.

As a result of extensive discussions with fiber dealers and consumers in the Northeast, it was proposed to establish a grade price differential of $\text{฿}0.50/\text{kg}$. above the prevailing "Mixed Grade" price for Grade "A" fiber, to pay that price for Grade "B" fiber and to offer $\text{฿}0.80/\text{kg}$. less than that price for Grade "C" fiber; this would result in a $\text{฿}120/\text{ton}$ or $\text{฿}24/\text{rai}$ revenue incentive to the Package Project members if the percentage of Grade "A" fiber production could indeed be raised from 15 percent, as at present, to 40 percent as is anticipated. It was argued that the $\text{฿}2.4$ million subsidy apparently required to finance the estimated 20,000 tons of fiber purchases could be recovered from the sale of the fiber to those local kenaf mills and exporters who normally regrade their fiber and expressed their willingness to pay the extra price for properly assorted kenaf, at least for the 8,000 tons of Grade "A" fiber expected to be produced during 1973/1974.

The Kenaf Package Project Sub-Committee met to discuss the Advisor's memorandum and decided that, in view of the fact that the 1972/1973 project has not demonstrated the desired results due to its late start and because of various organizational problems, it should be repeated on the same scale in 1973/1974. It was agreed that the Bank for Agriculture and Agricultural Cooperatives' credit service was most satisfactory and could be expected to be equally so next season. The required 120 tons of improved

seed could not be supplied, since only 8 tons could be made available by the Department of Agriculture; steps would be taken by that Department in cooperation with the Department of Agricultural Extension and the Bank to organize peasant farmer seed multiplication in the project area where, however, the question of seed prices to be paid to such farmers might create a problem.

A survey of new retting tank requirements will be carried out promptly and mechanical excavation of 1,000 such tanks will be started by the Department of Agriculture in January 1973, the estimated remaining 2,000 tanks to be constructed by paid labor, since it was felt that the required B3,720,000 for the purchase of even one additional set of mechanical equipment could not be secured. It is submitted that it is doubtful that such an ambitious construction program can be completed in time with manual labor.

The Department of Agricultural Extension expressed its willingness to furnish one or two additional officers to the Package Project and an intensive kenaf training program for extension officers and Bank supervisors is to be instituted.

The Kenaf Buying Center of the Northeast Jute Mill Co., Ltd., at Nakornrachsima is to continue to function as the sole buying unit. It is emphasized that it still seems advisable to establish an additional buying unit at Chaiyaphoom where most of the project fiber will be produced. The proposal to furnish free kenaf transportation services between village collection centers and the buying unit(s) was rejected; again, it is submitted that the lack of such services will curtail the amount of fiber delivered to the designated buying unit(s).

The meeting decided to re-establish the guaranteed Grade "A" fiber price at B2.50/kg. for the 1973/1974 season, since it was considered that the proposed variable incentive price system would

be difficult to implement. It is argued against this decision that the guaranteed price at that low level will be ineffective, since even "Mixed Grade" prices are anticipated to remain at a higher level next season, that the principle of a fixed price guarantee program might prove very costly if and when upcountry kenaf prices decrease substantially, and that an incentive or "floating guaranteed price" program would avoid these pitfalls. It is understood that, on condition that the Executing Agency provides the necessary short-term funds to finance an incentive price program as proposed, the Northeast Jute Mill Co., Ltd., subsequently agreed to implement such a program.

The overall 1973 Kenaf Package Project costs are estimated at a total of \$16.3 million. However, this estimate includes \$10 million to be financed by Bank for Agriculture and Agricultural Cooperatives loans, \$200,000 for extension officer salaries to be paid from Department of Agricultural Extension budget funds, and \$3.7 million for mechanical retting tank construction equipment and \$0.6 million for fiber transport truck purchases which have not been approved by the Sub-Committee, so that only \$1.5 million for incentive price financing has to be furnished by the Package Project management.

THE PIONEER KENAF DEVELOPMENT PROJECT (Chapter VI)

This self-contained project has been prepared specifically for Mekong Committee/World Bank consideration and possible grant financing under their "Pioneer Project" plan and is designed to furnish, through its high intensity and concentrated approach, essential techno-economic data and other support services to the Kenaf Package Project and the Kenaf Master Development Plan. It proposes the operation of one to four Nucleus Farm units, each servicing some 500 farmers with a kenaf planting area of some

5,000 rai and an annual retted fiber production of 1,000 to 1,250 tons. A complete range of inputs will be furnished to the growers, including Pioneer Project produced selected seed, fertilizer, pest and disease control, stalk transportation and supervised central retting facilities, as well as technical assistance services from land preparation through final processing. Graded fiber will be purchased at an incentive price differential and baled and marketed under project management supervision. The techno-economic feasibility of manual and machine ribboning will be investigated. The project will employ two extension officers and two retting and grading supervisors for each Nucleus Farm and the Nucleus Farm Group is to be placed under the direction of a qualified manager assisted by two expatriate kenaf specialists.

Preliminary project costs are estimated as follows:

	<u>Capital Costs</u>	<u>Annual Operating Costs</u>
Per Nucleus Farm Unit	¥ 6,800,000	¥ 4,600,000
Per Nucleus Farm Group	22,000,000	11,200,000

Annual operating costs would be reduced by ¥3.3 million and ¥6.6 million respectively, if the credit assistance to be furnished by the Bank for Agriculture and Agricultural Cooperatives is taken into account.

THE KENAF MASTER DEVELOPMENT PROGRAM (Chapter VII)

Program Goals and Time Frames

The Kenaf Master Development Program, including the 1973 Kenaf Package Project, is designed to increase the proportion of Grade "A" fiber production in a 400,000 overall annual crop planted on 2 million rai from the present estimated level of 60,000 tons (15%) to 160,000 tons (40%) so as to raise farm income in the

Northeast, increase foreign exchange revenue from fiber exports, and assure a steady export demand for Thai kenaf. The program is to be implemented in two phases with the Phase I (1973 to 1976) efforts concentrated on 720,000 rai in the six Changwats with the greatest average kenaf production areas; Phase II will cover the remaining 1.28 million rai in all 16 Changwats between 1977 and 1980.

The achievement of the Master Program goals require a complete range of inputs and marketing services as follows:

- Improved seed supplies;
- Retting tank construction;
- Pest and disease control;
- Extension services;
- Farm credit;
- Fiber purchases by grade at incentive prices;
- Fiber quality control.

The program must also be supported by an intensive research effort and it must be co-ordinated by an Executing Agency.

Improved Seed Supplies

The supply of improved kenaf seed to the farmers is considered one of the most important Master Program aspects. This will require the production of 4,000 tons of such seed annually, if 100 percent of improved seed requirements are to be met, as is deemed essential to the success of the program by the Advisor. It is emphasized, however, that the RTG officials participating in the Master Program preparation reject this assumption and consider the supply of 10 percent of such seed as adequate. The required seed could be produced either on specific seed farms operated by the Ministry of Agriculture or on supervised peasant farms; as an interim measure the Executing Agency might arrange for the purchase of high quality

kenaf stalks, prior to harvest, from selected farmers for subsequent seed production.

Retting Tank Construction

Additional retting facility requirements to enable the growers to increase Grade "A" production to the desired level are estimated at 100,000 tanks by 1980. Tank construction costs have been established at \$1,000 per unit utilizing the mechanical equipment of the "Kenaf Retting Pond Improvement Pilot Project" of the Department of Agriculture and it has been assumed that sufficient additional equipment will be made available to that project for the excavation of all tanks required.

Credit

The Bank for Agriculture and Agricultural Cooperatives (BAAC), which already renders most efficient credit services in the Northeast, is expected to furnish all production and retting tank construction credit requirements. However, the BAAC assumes that only 50 percent of the farmers under the Master Program, associated in farmer groups, will qualify for its credit services. Further consideration should be given to this problem, as it implies the exclusion of the non-qualifying farmers from what is considered an essential Master Program service.

Extension Services

Extension worker requirements have been calculated on the basis of one such worker for every 1,000 farm families so that 200 kenaf extension officers will have to be placed in the field by 1980.

Incentive Price Financing

In order to persuade the grower to assume the additional

responsibilities and exert the necessary increased efforts to raise his high quality fiber output, he is to pre-grade the fiber in the field and a B0.50/kg. incentive price is to be paid to him for his Grade "A" production by the Master Program buying units which will amount to a B120 per metric ton incentive at all "Mixed Grade" price levels. The necessary funds are to be secured by the Executing Agency through short-term loans and placed at the disposal of the buying units.

Quality Inspection

Quality inspection is to be exercised exclusively by the Office of Commodity Standards. For the inspection of 270,000 tons of export fiber at the Bangkok godowns, 20 three-man teams of inspectors will be required and that from the very start of the Master Program.

The Executing Agency

The appointment of an Executing Agency is indispensable for the effective supervision, co-ordination and implementation of the Master Program and is also a pre-condition if international agency assistance is to be sought for the program. The Ministry of Agriculture (kenaf production and processing) or the Ministry of Commerce (marketing and quality control) are most closely concerned with the program efforts and goals. In the past, the Thai Jute Company, a dependency of the Ministry of Commerce, has been considered as a potentially suitable Executing Agency.

Financial Requirements and Sources of Financing

Reference is made to Table 26 (Summary of Cumulative Annual Expenditures) and Table 27 (Sources of Financing).

Total cumulative Kenaf Master Development Program costs over the 1973 to 1980 time span are estimated at B851 million with a maximum annual expenditure of B200 million in 1980. The total program costs are broken down as follows:

BAAC credits	B580,000,000
Department of Agricultural Extension budget	26,900,000
Office of Commodity Standards budget	8,600,000
Executing Agency:	
Short-term incentive price financing credits	179,000,000
Equipment purchases	57,500,000

Of the total, B778 million are either self-financing or recoverable items, so that actual "investment" costs are reduced to B93 million.

On the other hand, the anticipated increase in Grade "A" production will provide an additional yearly revenue of B48 million to the Northeast farmers and an equal amount in additional foreign exchange revenue to Thailand.

JUTE IN THAILAND (Chapter VIII)

Certain areas of the Northeast offer suitable climatic and soil conditions for the production of true jute fiber which commands a higher price than kenaf and there is a definite place for this crop in the economy of the region, although complete or even large-scale substitution of kenaf by jute is neither feasible nor desirable from the point of view of world market acceptance. Jute production areas must be carefully selected, the jute promotion program must be supported by an intensive research and extension effort, and proper assortment, quality control and marketing practices must be instituted from the start.

Jute has been grown on a limited scale in the Central Plain since 1940. Its production started to be strongly encouraged in

1969 and 1970 by the Thai Jute Association which supplied seed to farmers in the Northeast and, by 1972, an annual output of some 9,000 tons was achieved, mainly in Changwats Udorn Thani and Nong Khai where the rains usually start earlier and are more plentiful. An incentive price of ฿1.00/kg. above the current kenaf price and higher yields per rai encouraged farmers to grow the crop. In 1972, the Kenaf Development Committee joined the Thai Jute Association and the Siam Gunny Company in further promoting jute production, several Resettlement Areas of the Department of Public Welfare were involved and a jute seed production scheme was implemented near Nakornrachsima. A limited amount of jute research has been carried out by the Department of Agriculture.

Further jute development should be promoted on the approximately 400,000 rai in the Northeast which it is estimated will be found suitable for its production and which can be expected to yield some 120,000 tons of retted fiber annually, a quantity which it should be possible to dispose of readily in the local and overseas markets. The principal restraints on the effective implementation of such a program and the measures required to overcome these restraints are very similar to those for kenaf and refer specifically to the requirements for an intensive research and extension program, selected seed production and distribution, the provision of retting facilities, the availability of farm credit, and effective grading and quality control. The production of jute under irrigated conditions is recommended.

THE THAI KENAF MILL INDUSTRY (Chapter IX)

A brief review of the present situation of the Thai Kenaf Mill Industry shows that, on the assumption of an average operating efficiency of 75 percent, total estimated sacking and hessian cloth production in the 10 mills would amount to some 130,000 tons

annually to which must be added an estimated 8,000 tons of yarn and twine. Based on the number of sacking and hessian looms installed in the mills and assuming that all sacking is converted into Heavy-Cee bags, this would be equivalent to an annual production of some 100 million such bags plus close to 70 million yards of 10 ozs. 40" hessian, requiring approximately 152,000 tons of kenaf fiber. On the other hand, total domestic kenaf fiber consumption in 1972 is estimated at 130,000 tons including, say, 2,000 tons of village consumption, which would make it appear that the average operating efficiency of the Thai mills is only in the 62½ percent range.

Hence, there seems to be ample scope for improvement in mill operation; also, the assumption of an annual kenaf fiber consumption of 130,000 tons by the local industry must be considered a conservative estimate.

INTERNATIONAL AGENCY PROJECT ASSISTANCE (Chapter X)

Under this heading, the Advisor was required to define overall technical assistance needs and to explore the possibilities of securing financial support from international agencies for the implementation of the various Kenaf and Jute Development Programs discussed in this report. Accordingly, a full range of desirable advisory assistance is listed requiring the services of an eight-member consulting team so as to enable the authorities concerned to decide which, if any, of such assistance is indeed required and/or desired and to discuss its procurement with potential donor organizations. The individual team members' terms of reference are indicated in detail and cover all aspects of kenaf and jute research, agronomy, processing, quality inspection, marketing, and mill engineering and management, as well as advisory services to the Kenaf Development Committee.

Preliminary discussions between the National Economic Development Board, the Advisor and the World Bank indicate the latter's interest in further exploring potential Bank assistance, possibly utilizing International Development Association interest-free loan funds, with respect to such Kenaf and Jute Development Program aspects as research, seed multiplication, retting facility construction (particularly within Bank supported irrigation projects), the Kenaf and Jute Pioneer Project, fiber inspector training, kenaf and jute mill modernization, and multi-crop development associated with kenaf and jute improvement programs.

KENAF AND JUTE RESEARCH STATION (ANNEX I)

Due to delays in securing the required information, the budgetary requirement estimates for the Kenaf and Jute Research Station under the Kenaf (and Jute) Development Program had to be included in annex form. Such requirements are estimated at \$13.6 million in capital costs and \$2.5 million in annual operating costs. It is essential that the respective budgetary allocations be promptly made available since a greatly increased research effort is a basic condition for successful Kenaf and Jute Development Program implementation.

CHAPTER I - THAI KENAF FIBER PRODUCTION AND CONSUMPTION TRENDS

1. History of the Thai Kenaf Fiber Industry

Commercial kenaf fiber production in Thailand was started in 1950 when 31,000 rai (6.25 rai = 1 hectare) were planted to this crop. Production increased rapidly from 1956 onwards and reached its maximum in 1966 with a planting area of 3.3 million rai and an output of 622,000 tons. Since then, it has fluctuated widely, from a low of 184,000 tons in 1968 to a high of 414,000 tons in 1971; it is estimated at 430,000 tons for 1972. For the last 15 years, kenaf has consistently maintained its position amongst the seven most important exports of Thailand (Table 1) and, since 1965, has contributed from 6.1 to 14.4 percent of the country's annual foreign exchange earnings from these principal exports (Table 2).

Kenaf is the single most important - and often the only - cash crop of the farmers in the Northeast. Although the value of the rice crop is greater than that of kenaf, rice is produced mainly for family consumption and thus does not contribute to cash income. Also, kenaf is grown on generally poor upland soils unsuitable for rice cultivation and on which few crops can be produced profitably but which, nevertheless, return an economically attractive yield of kenaf fiber. On the assumption of an average annual crop of 400,000 tons, a $\text{฿}2.50/\text{kg}$. farm price for "Mixed Grade" fiber, and a planting area of 10 rai per farm family, the cash income to the growers amounts to some $\text{฿}1,000$ million per year shared by approximately 200,000 farm families. Kenaf production also generates work and income for numerous shopkeepers, kenaf traders and transport workers and creates employment for some 30,000 workers in about 200 baling plants for seven months of the year and for over 11,000 workers in the ten local bag mills on a year-round basis and that largely in rural areas where few other industrial employment opportunities exist.

Table 1

Total Quantity and Value of the Principal Thai Exports
1957 to 1971

Year	Rice		Rubber		Tin		Maize		Teak		Tapioca Products		Kenaf & Jute	
	Metric Tons	Million ฿	Cubic Meters	Million ฿	Metric Tons	Million ฿	Metric Tons	Million ฿						
1957	1,570,237	3,622	134,833	1,406	18,396	531	64,337	74	75,747	262	98,775	138	14,580	46
1958	1,132,930	2,968	135,508	1,326	9,096	255	162,914	183	72,554	239	151,626	192	25,587	69
1959	1,091,671	2,576	174,404	2,336	13,737	434	236,781	250	73,253	244	194,648	224	37,317	88
1960	1,202,772	2,570	169,655	2,579	17,114	537	514,745	551	100,938	356	269,733	288	61,796	230
1961	1,575,998	3,598	184,598	2,130	18,104	617	567,236	597	64,528	252	443,376	446	143,477	626
1962	1,271,623	3,240	194,180	2,111	19,841	685	472,405	502	39,753	170	400,788	423	237,898	579
1963	1,417,673	3,424	186,887	1,903	22,003	741	744,046	828	32,215	137	427,443	439	125,753	358
1964	1,896,258	4,389	216,993	2,060	22,339	962	1,115,041	1,346	40,490	179	738,859	653	162,095	495
1965	1,895,223	4,334	210,854	1,999	20,503	1,166	804,380	969	45,233	201	719,442	676	316,989	1,102
1966	1,507,550	4,001	202,535	1,861	18,898	1,316	1,218,537	1,520	49,459	243	688,603	644	473,269	1,614
1967	1,482,272	4,653	211,118	1,574	27,107	1,822	1,090,762	1,355	35,716	194	781,357	726	317,112	866
1968	1,068,185	3,775	252,220	1,816	24,017	1,510	1,480,841	1,556	29,446	169	888,854	772	289,478	674
1969	1,023,064	2,945	276,381	2,664	23,431	1,631	1,476,106	1,674	29,003	166	957,091	876	255,978	760
1970	1,063,064	2,516	275,610	2,232	22,246	1,618	1,371,474	1,857	28,763	156	1,326,865	1,223	257,663	719
1971	1,661,840	2,901	307,873	1,901	21,703	1,561	1,829,878	2,251	37,491	181	1,112,466	1,229	270,977	933

Source: Department of Customs

Table 2

Export Value of Kenaf & Jute in Relation to the
Principal Thai Exports, 1957 to 1971

Year	Export Value Rating, Kenaf No.	Total Export Value 7 Principal Exports (.)	Export Value Kenaf Million Baht	%age of Total Export Value, Kenaf (.)
1957	7	6,079	46	0.76
1958	7	5,232	69	1.32
1959	7	6,152	88	1.43
1960	7	7,111	230	3.23
1961	3	8,266	626	7.57
1962	4	7,710	579	7.51
1963	6	7,830	358	4.57
1964	6	10,084	495	4.91
1965	4	10,447	1,102	10.55
1966	3	11,199	1,614	14.41
1967	5	11,190	866	7.74
1968	6	10,272	674	6.56
1969	6	10,736	780	7.27
1970	6	10,321	719	6.97
1971	6	10,957	933	8.52

The principal problems of the Thai kenaf fiber industry are comparatively low yields per unit area, low average fiber quality, and unreliability of fiber grading. Whereas the first must be the concern of improved agricultural research and extension efforts, the latter two have resulted in excessively low prices for Thai kenaf compared to those of jute, the other principal natural packaging fiber. Good quality kenaf, due to its inherent greater coarseness, is considered equivalent to "Bangladesh White D" (BWD), a fairly low quality of jute but one used to a very large extent in packaging material manufacture; nevertheless, Thai "Grade A" kenaf is sold at a 20 to 35 percent lower price on the international market than "BWD", mainly due to its reputation for undependable quality. Although it is recognized that one of the main attractions to the overseas buyer is the comparatively low price of Thai kenaf as is the fact that such consumers will continue to use jute as their principal raw material in packaging goods manufacture, an increase in the ratio of high quality Thai kenaf fiber production would raise its overall export demand which emphasizes quality. Such demand would further increase by the consistent application of international grading standards which could also reduce the above price differential to the advantage of Thai kenaf as a result of the greater confidence of the consumer that he will receive the desired fiber quality.

The successful implementation of a yield, quality improvement and quality control program would, thus, materially contribute to a stabilization of kenaf prices and production and profoundly affect the entire economy of the Northeast. Such stabilization is of particular importance to the area since there is as yet no alternative enterprise in sight which promises a comparative source of income from upland areas.

2. Domestic Kenaf Fiber Production Areas and Trends

Practically all of the kenaf in Thailand is grown in the fifteen - now sixteen - Changwats (provinces) of the Northeast. The annual record of the areas planted, the areas harvested, the average fiber yield per rai, and total fiber production for recent years are shown in Tables 3, 4 and 5. It should be noted that it is somewhat difficult to secure exact statistics and that different sources do not always agree with each other as to such statistics so that these tables, necessarily, had to include some compromise and adjusted figures based upon reasonable approximations.

As will be seen, there have been wide fluctuations in the size of the annual kenaf crop ranging, for the last decade only, from a low of 134,000 tons in 1962 to a high of 622,000 tons in 1966. Such fluctuations in crop production inevitably result in similar fluctuations in the price of the fiber. The area of land which the Northeast farmer devotes to kenaf planting depends largely on the price he received for his fiber during the previous season; this, in turn, depended on both the previous year's local crop size as well as on the size of that year's jute crop in India and Bangladesh which, due to its preponderant position, greatly influences the world market prices of natural packaging material fibers. Thus, a good price in one season will lead to a large Thai kenaf crop in the following season which, if coincidental with a large jute crop in India and Bangladesh, will result in lower prices and, thus, a smaller crop the next following year, a procedure which perpetuates annual crop size and price fluctuations.

Although Thailand, with its relatively small share in the world jute, kenaf and allied fiber market, can not exert any effective influence on world market prices, the level of which will continue to be governed by the jute crop size and marketing policies of India and Bangladesh, an improvement in average fiber quality and the conscientious grading of export fiber would lead to a steadier overseas

Table 3

Area Planted, Area Harvested, Yield Per Rai
and Kenaf Fiber Production
1961 to 1971

Year	Area Planted (1,000 Rai)	Area Harvested (1,000 Rai)	Average Yield (Kg. Per Rai)	Production (1,000 Tons)
1961	1,190	1,180	202.5	239.3
1962	691	690	194.8	134.4
1963	924	920	230.1	211.7
1964	1,387	1,380	219.6	303.1
1965	2,139	2,130	248.4	529.1
1966	3,337	3,330	198.9	622.4
1967	2,548	2,540	192.0	487.8
1968	1,068	1,060	173.2	183.6
1969	1,943	1,940	177.7	344.8
1970	2,056	2,050	191.8	393.1
1971	2,847	2,800	147.6	414.1

Table 4
Kenaf Growing Areas of Thailand by Province
1962 to 1971

Province	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Buriram	94,026	48,000	63,466	89,000	164,103	57,213	18,800	93,552	145,772	221,868
Chaiyaphoom	110,039	158,622	178,348	313,693	396,859	491,328	160,825	247,603	303,878	386,417
Kalasin	106,200	71,490	63,430	86,000	196,691	140,085	54,838	102,892	75,203	94,046
Khon Kaen	96,769	126,192	299,398	450,235	666,941	408,147	124,313	318,156	380,710	437,046
Loei	774	700	6,392	5,000	29,655	14,321	2,740	17,191	38,125	19,518
Mahasarakam	121,859	211,738	266,359	398,754	467,682	349,819	186,938	378,431	313,588	202,910
Nakornrachsima	58,160	120,375	169,551	183,780	398,985	325,046	78,321	162,522	227,446	389,642
Nakorn Phanom	12,032	11,298	10,107	16,576	33,144	58,068	38,434	40,545	24,461	7,313
Nong Khai	2,300	5,000	2,500	4,000	20,000	21,429	1,652	3,475	2,577	5,121
Roi-Et	12,053	27,384	38,602	92,570	180,157	168,168	76,484	91,621	140,719	127,693
Sakon Nakorn	3,283	1,342	1,066	16,596	9,722	17,100	4,223	4,980	5,991	29,736
Srisaket	34,504	31,233	58,184	89,754	134,631	56,524	211,280	74,134	94,881	96,634
Surin	11,919	6,679	26,382	65,807	191,370	62,347	12,515	47,865	90,126	214,494
Ubon Ratchani	6,525	81,492	165,406	248,068	299,141	261,229	78,378	266,000	151,942	394,264
Udon Thani	21,269	23,259	38,154	79,646	147,620	116,918	18,595	93,670	61,223	220,740
Total	691,712	924,660	1,387,309	2,139,462	3,336,681	2,547,742	1,068,336	1,942,637	2,056,642	2,847,442

Sources: (1962 - 1967 Figures) Department of Agriculture
(1967 - 1970 Figures) Department of Agricultural Extension
(1971 Figures) Division of Agricultural Economics

Table 5

Kenaf Areas and Production by Province
1967 to 1971

	1967 (1)		1968 (2)		1969		1970		1971 (3)	
	Area (Rai)	Production (Tons)								
Buriram	57,213	11,433	18,800	3,670	93,552	20,144	145,772	20,605	221,868	28,189
Chaiyaphoom	491,328	89,072	160,825	27,841	247,603	18,506	303,878	71,878	386,417	61,147
Kalasin	140,085	27,852	54,838	8,579	102,892	20,888	75,203	17,906	94,046	14,640
Khon Kaen	408,147	81,629	124,313	27,224	318,156	70,585	380,710	56,613	437,046	53,698
Loei	14,321	3,857	2,740	675	17,191	4,509	38,125	11,926	19,518	5,084
Maharakam	349,819	68,424	186,938	31,523	378,431	73,686	313,588	60,916	202,910	26,889
Nakornrachsima	325,046	63,380	78,321	23,673	162,522	26,458	227,446	39,975	389,642	62,265
Nakorn Phanom	58,068	12,555	38,434	6,572	40,545	10,470	24,461	4,647	7,313	1,031
Nongkhai	21,429	2,486	1,652	204	3,475	672	2,577	411	5,121	512
Roi-Et	168,168	33,401	76,484	11,030	91,621	17,154	140,719	28,144	127,693	16,915
Sakon Nakorn	17,100	2,534	4,223	952	4,980	1,008	5,991	1,145	29,736	3,119
Srisaket	56,524	10,006	211,280	21,128	74,134	12,653	94,881	19,485	96,634	13,335
Surin	62,347	11,612	12,515	2,110	47,865	11,227	90,126	18,025	214,494	36,271
Ubon Ratchani	261,229	46,400	78,378	14,116	266,000	45,486	151,942	30,179	394,264	66,179
Udon Thani	116,918	23,153	18,595	4,296	93,670	11,227	61,223	11,221	220,740	24,860
Total	2,547,742	487,794	1,068,336	183,593	1,942,637	344,673	2,056,642	393,076	2,847,442	414,234

Sources: (1) Department of Agriculture
(2) Department of Agricultural Extension (from 1968 - 1970)
(3) Division of Agricultural Economics

demand and a higher average price for good quality Thai kenaf thus contributing to a levelling out of both the crop size and prices.

The indicated substantial reduction in fiber yield per rai in 1968, 1969 and particularly in 1971 as shown in Table 3 is considered to be due to an over-estimation of the planting area rather than to an actual drop in yield and the generally accepted average retted fiber yield figure of 200 kg. per rai will be used for purposes of future production area requirement estimates in this report.

The average annual planting area per Changwat for the 1962 to 1971 period is listed below in the order of magnitude:

1. Khon Kaen	330,800 rai
2. Mahasarakam	289,900 "
3. Chaiyaphoom	274,800 "
4. Nakornrachsima	211,400 "
5. Ubon Ratchtani	194,700 "
6. Buriram	99,600 "
7. Kalasin	99,100 "
8. Roi-Et	95,500 "
9. Srisaket	82,200 "
10. Udorn Thani	81,100 "
11. Surin	73,000 "
12. Nakorn Phanom	25,200 "
13. Loei	13,400 "
14. Sakorn Nakorn	9,400 "
15. Nong Khai	6,800 "

The above listing shows that the five Changwats of Khon Kaen, Mahasarakam, Chaiyaphoom, Nakornrachsima and Ubon Ratchtani between them account, on the average, for 69 percent of the annual kenaf planting area in the Northeast. Four of these five major kenaf production Changwats showed a steady increase in planting area over the

last three years, Mahasarakam, being the only exception. In addition, three of the lesser average producers - Buriram, Udorn Thani and Surin - drastically expanded their kenaf plantings to more than 200,000 rai each in 1971.

3. Domestic Kenaf Fiber Demand

Domestic kenaf fiber consumption in Thailand is made up of the fiber requirements of the Thai bag and hessian mills and of village consumption, including any small twine, rope or other cottage industry. Whereas the mill consumption is known or can be closely estimated based upon finished goods production figures, no information is available for village and cottage industry consumption and it can only be estimated based on similar consumption estimates in India and Bangladesh and taking the population disparity into account.

Table 6 shows the estimated annual domestic consumption of kenaf in Thailand based upon the above information and estimates. Although finished goods production, specially in more recent years, is composed of Heavy-C bags, B-Twill bags, hessian and other constructions as well as of yarn, such production has been assumed to be exclusively Heavy-C bags in Table 6 and an average raw material requirement of 1.25 kg. per bag has been used as a basis of calculation, composed of 1.13 kg. actual finished bag weight plus 10 percent mill wastage.

It will be seen that, with the exception of 1969, annual domestic kenaf fiber demand has increased steadily from year to year and that particularly during the last three years when it rose from 83,000 tons to 130,000 tons or an increase of close to 57 percent. Future expansion of domestic kenaf consumption is, however, expected to be more gradual.

Table 6

Local Consumption of Kenaf Fiber in Thailand
1952 to 1972

Year	Finished Goods Production (Million Bags) (1)	Mill Consumption (2) (Metric Tons)	Village etc. Consumption (3) (Metric Tons)	Total Local Consumption (Metric Tons)
1952	1.0	1,250	4,000	5,250
1953	1.1	1,400	4,200	5,600
1954	1.2	1,500	4,400	5,900
1955	1.3	1,600	4,600	6,200
1956	3.5	4,400	4,800	9,200
1957	4.0	5,000	5,000	10,000
1958	4.6	5,750	5,200	10,950
1959	5.1	6,400	5,400	11,800
1960	6.9	8,600	5,600	14,200
1961	8.8	11,000	5,800	16,800
1962	10.9	13,600	6,000	19,600
1963	23.1	28,900	6,200	35,100
1964	33.5	41,900	6,400	48,300
1965	40.4	50,500	6,600	57,100
1966	46.8	58,500	6,800	65,300
1967	54.7	68,400	7,000	75,400
1968	55.3	69,100	7,200	76,300
1969	48.0	60,000	7,400	67,400
1970	60.3	75,400	7,600	83,000
1971	73.7	92,100	7,800	99,100
1972 (3)	97.6	122,000	8,000	130,000

(1) Converted into No. of Heavy-C Bag Equivalent

(2) Assuming 1.25 kg./Heavy-C Bag (weight = 1.13 kg. + 10% fiber wastage in mill)

(3) Estimated

Sources: Bank of Thailand

Department of Customs

National Economic Development Board

4. The Thai Kenaf Fiber Export Market

4.1. The World-Wide Trend in Jute, Kenaf and Allied Fiber Production and Consumption

In view of the fact that Thailand's kenaf fiber production normally represents only some 10 percent of the total world production of jute, kenaf and allied fibers and less than 20 percent of the production of the two principal producers, India and Bangladesh, it is indispensable to examine the world-wide production and consumption trends of these fibers in order to establish the position of the Thai kenaf fiber industry within the overall framework of the world fiber market and to project its future potentials.

The discussion in the present section is based on the publications submitted by its Secretariat to the Fifth Session of the Intergovernmental Group on Jute, Kenaf and Allied Fibers, held at the FAO, Rome, on October 4 to 6, 1972. Tables 7 thru' 11 are reproductions or condensations of some of the statistical information presented to the Session; those portions of the draft report issued at the conclusion of the Session which affect the Thai kenaf industry are summarized and commented upon.

Table 7 indicates the relative size of the Thai kenaf fiber industry compared to the jute and kenaf fiber industries in India and Bangladesh for the three most recent years as follows:

Year	Production (000 M/T)		
	India & Bangladesh	Thailand	Thai Production %age of Total
1970/1971	2,279	300	13
1971/1972	2,003	350	17
1972/1973	2,236	440	20

Table 7

Estimated Jute and Kenaf Planting Areas, Yields and Production in the Three Main Producing Countries, 1970/1971 to 1972/1973

	Bangladesh			India			Thailand
	Jute	Kenaf	Total	Jute	Kenaf	Total	Jute/Kenaf
<u>Area (000 ha.)</u>							
1970/71	918	19	937	749	330	1,079	-
1971/72	688	20	708	819	295	1,114	405
1972/73	941	20	961	-	-	-	470
<u>Area (000 acres)</u>							
1970/71	2,268	48	2,316	1,851	815	2,666	-
1971/72	1,700	50	1,750	2,024	729	2,753	1,000
1972/73	2,324	50	2,374	-	-	-	1,160
<u>Yield (bales/acre)</u>							
1970/71	2.8	2.7	2.8	2.7	1.5	2.3	-
1971/72	2.9	2.0	2.9	2.8	1.5	2.5	1.9
1972/73	3.0	3.0	3.0	-	-	-	-
<u>Production (000 M/T)</u>							
1970/71	1,140	23	1,163	889	227	1,116	300
1971/72	755	17	772	1,028	203	1,231	350
1972/73	1,255	27	1,282	774	180	954	440

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers, FAO, October 1972

Similarly, Table 8 indicates the relationship between Thailand's production and the overall world total for the years 1961/1962 to 1971/1972:

Year	Production (000 M/T)		
	World Total	Thailand	Thai Production %age of Total
1961/62 to 1963/64	3,317	204	6
1964/65 to 1966/67	3,443	507	15
1967/68 to 1969/70	3,318	260	8
1970/71	3,388	300	9
1971/72	3,222	350	11

The above two listings emphasize the fact that Thailand's annual kenaf fiber production represents only a small fraction of the overall world production of packaging fibers and only 1/7th to 1/5th of the combined production of India and Bangladesh and that, therefore, its fortunes will continue to be influenced largely by the size of the annual jute (and kenaf) crop in these two latter countries. It should be noted, nevertheless, that Thailand's share of overall world packaging fiber production has increased steadily over the last decade and may well continue to increase at the rate of between 0.5 and 1 percent annually to 13 or 14 percent which would require a yearly production of some 500,000 tons of Thai kenaf. Equally, Thailand's share of the combined India/Bangladesh/Thailand jute and kenaf fiber output has been rising apace; it appears reasonable to assume that Thailand will be able to at least maintain its 17 to 20 percent share since, although the 1971/1972 figures are distorted due to the hostilities in Bangladesh which caused a fall in production by almost one-third in that country,

Table 8
Estimated World Production of Jute and Allied Fibers
1961/1962 to 1971/1972

Country	Fiber	1961/62	1964/65	1967/68	1970/71	1971/72
		to 1963/64	to 1966/67	to 1969/70	(est.)	(est.)
		(. thousand metric tons.)				
Bangladesh	Jute	1,165	1,049	1,188	1,140	755
	Kenaf	35	44	39	23	17
India	Jute	1,082	951	895	889	1,028
	Kenaf	317	245	198	227	203
Thailand	Jute	9	9	10	10	10
	Kenaf	195	498	250	290	340
Nepal	Jute	25	25	25	25	25
Burma	Jute	10	13	20	27	40
	Kenaf	-	1	1	1	1
Indonesia	Kenaf	5	7	15	8	14
Iran	Kenaf	4	5	3	3	3
Khmer	Jute/Kenaf	2	2	6	6	3
South Vietnam	Jute	2	1	1	0	0
	Kenaf	5	3	0	0	0
Japan	Jute	1	1	-	-	-
Other Asia	Jute	13	12	12	9	3
	Kenaf	0	4	4	5	-
<u>Total Asia</u>		<u>2,870</u>	<u>2,870</u>	<u>2,666</u>	<u>2,663</u>	<u>2,442</u>
Brazil	Jute	43	48	34	30	22
	Malva/Guaxima	12	16	22	27	40
Peru	Jute	1	2	3	3	3
Guatemala	Kenaf	4	4	4	4	4
Cuba	Kenaf	1	4	4	5	5
Other Latin America	Kenaf	2	4	4	4	4
<u>Total Latin America</u>		<u>63</u>	<u>78</u>	<u>71</u>	<u>73</u>	<u>78</u>
Zaire, Rep. of	Urena/Punga	9	5	6	8	8
Mozambique	Kenaf	1	2	5	7	7
Angola	Kenaf/Urena/Punga	1	2	2	2	2
Nigeria	Kenaf	0	1	3	3	3
Dahomey	Kenaf	-	-	3	4	4
Madagascar	Urena	2	2	2	2	2
Other Africa	Kenaf	1	1	3	12	12
<u>Total Africa</u>		<u>14</u>	<u>13</u>	<u>24</u>	<u>38</u>	<u>38</u>
China	Jute	105	142	170	200	225
	Abutilon/Kenaf	210	285	322	350	375
USSR	Kenaf	42	39	48	46	46
North Vietnam	Kenaf	13	16	17	18	18
<u>Total, Centrally Planned Countries</u>		<u>370</u>	<u>482</u>	<u>557</u>	<u>614</u>	<u>664</u>
<u>World Total</u>		<u>3,317</u>	<u>3,443</u>	<u>3,318</u>	<u>3,388</u>	<u>3,222</u>
of which	Jute	2,458	2,255	2,363	2,339	2,114
	Allied Fibers	859	1,188	955	1,049	1,108

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers, FAO, October 1972

production in India is expected to continue to remain close to its present level and Bangladesh production resumed its normal rate for the 1972/1973 season.

Tables 9 and 10 estimate the jute and allied fiber supply and demand situation for 1971/1972 and 1972/1973. It will be seen that the forecast for 1972/1973 is an overall world import requirement of 836,000 tons versus export availabilities of 934,000 tons or an export availability surplus of some 100,000 tons. However, the actual export supply from Bangladesh - which is projected to contribute some 67 percent to world exports - will depend heavily on the rapid improvement of facilities for inland water transportation to enable the jute to reach the ports. It should also be noted that the increase in world import demand for 1972/1973 over that for the previous year is almost entirely the result of anticipated larger Indian purchases and that the combined Western European and United States demand is likely to continue to decrease (Table 11).

4.2. Thai Kenaf Export Trends and Prices

The export quantities and values of Thai kenaf for the 1958 to 1971 period are shown in Table 12. 1972 exports are projected at 275,000 tons or more. The table indicates that, for the last eight years, Thailand has been able to export regularly from 250,000 to 300,000 tons annually and that in spite of the fact that, during that period, total world production of jute, kenaf and allied fibers remained practically constant (Table 8) and consumption in the developed countries (Western Europe, United States, Japan) progressively decreased. This supports the argument that the reduction in demand for Thai kenaf in the developed countries is offset by a rise in demand in the developing world and it is submitted that this trend will continue for the foreseeable future. Recent developments as far as potential Thai kenaf exports to the People's Republic of China are concerned further support this forecast and that in spite

Table 9
**Estimated Supplies, Domestic Requirements, Exports
 and Imports, 1971/1972**

	Bangladesh (. thousand metric tons.)	Thailand	India	Other Countries	World
Opening Stocks	385	20	297		
Production	772	350	1,231	869	3,220
Imports	-	-	108(1)	<u>698</u>	806
<u>Total Supply</u>	<u>1,157</u>	<u>370</u>	<u>1,636</u>		
Mill Consumption	315	120(2)	1,339		
Village Consumption	45	-	18		
Closing Carryover	227	-	225		
<u>Total Domestic Reqts.</u>	<u>587</u>	<u>120</u>	<u>1,582</u>		
<u>Exports</u>	<u>570(3)</u>	<u>250</u>	<u>54</u>	<u>18</u>	<u>892</u>

Notes: (1) Unrecorded Trade

(2) Including Village Consumption

(3) Of which: Recorded Exports = 354,000 tons
 Unrecorded Exports = 216,000 tons

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers, FAO, October 1972

Table 10

Forecast of Supplies, Domestic Requirements, Export Availabilities
and Import Requirements, 1972/1973

	Bangladesh (. thousand metric tons)	Thailand	India	Other Countries	World
Opening Stocks	227	-	225		
Production	1,281	430	1,026	900	3,647
Import Requirements Forecast	-	-	144	692	836
<u>Total Forecast Supply</u>	<u>1,508</u>	<u>430</u>	<u>1,395</u>		
Mill Consumption	630	130(1)	1,260		
Village Consumption	45	-	18		
Closing Carryover	203	50	99		
<u>Forecast Domestic Reqts.</u>	<u>878</u>	<u>180</u>	<u>1,377</u>		
<u>Forecast Export Availab.</u>	<u>630</u>	<u>250</u>	<u>18</u>	<u>36</u>	<u>934</u>

Note: (1) Including Village Consumption

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers, FAO, October 1972.

Table 11

Estimated Net Imports of Jute and Allied Fibers in 1970/1971
and 1971/1972 and Forecast Import Requirements in 1972/1973

	1970/71	1971/72 (Partly Estimated)	1972/73 (Forecast)			
			Jute		Kenaf	Total
			Long Fibers	Cuttings		
(. thousand metric tons.)						
Belgium (1)	59	76	-	-	-	80
France (1)	48	49	19	4	20	43
Germany, Fed. Rep. (1)	62	71	-	-	-	60*
Italy	19	19	-	-	-	19
Netherlands	10	7	-	-	-	9
<u>Total, EEC</u>	<u>198</u>	<u>222</u>				<u>111</u>
Australia	4	4	-	-	-	4*
Portugal	30	24	-	-	-	25
Scandinavia	8	4	-	-	-	5*
Spain	24	33	-	-	-	15
United Kingdom/Ireland	76	81	77	-	9	86
<u>Total, Western Europe</u>	<u>340</u>	<u>368</u>				<u>346</u>
Angola-Mozambique	4	5	-	-	-	7
Australia	10	21	-	-	-	5*
Hungary	7	7	-	-	-	7*
India	-	108(2)				144
Japan	93	59	25	-	40	65
Poland	25	26	19	1	5	25
United States	22	15				13*
Rest of the World	220	197				224*
Of which:						
Centrally Planned						
Country:	90	66				60*
Africa	70	65				70*
Asia	30	35				50*
Latin America	10	11				27*
Other Developed Countries	20	20				17*
<u>World Total</u>	<u>721</u>	<u>806</u>				<u>836*</u>

Notes: (1) Including an estimate of the needs of the felting industry
(2) Unrecorded imports (estimated)
* Secretariat Estimate

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers, FAO, October 1972

Table 12
Export Quantities and Values of Thai Kenaf
1958 to 1971

Year	Metric Tons	Million Baht
1958	27,548	69
1959	36,504	86
1960	60,783	227
1961	142,440	623
1962	236,695	575
1963	124,934	356
1964	161,802	494
1965	316,759	1,102
1966	473,011	1,631
1967	316,759	865
1968	289,255	674
1969	254,629	776
1970	253,906	709
1971	266,686	900

Source: Thai Jute Association

of the fact that a number of developing countries are attempting to establish their own kenaf industries, attempts which, however, are achieving only very gradual results. Although it is, obviously, very difficult to make accurate long-range demand estimates, it seems reasonable to assume that the Thai kenaf industry will be able to maintain its rate of fiber exports around the 300,000-ton per year level, particularly if the quality and quality control improvements are achieved which are the subject of this present report.

On this basis and in view of the actual estimated local demand of 130,000 tons annually - which may be expected to increase to 150,000 tons in the near future - a total yearly production of Thai kenaf fiber of 400,000 to 450,000 tons would appear to be a reasonable target.

Table 13 lists the internal fiber prices in Bangladesh, India and Thailand from 1969/1970 to 1971/1972. Whereas the Calcutta prices for Assam Bottoms in India increased only by 8 and 4 index points in 1970/1971 and 1971/1972 respectively over the 1969/1970 seasonal average of 117.7 (taking the July 1967 Index at 100), the same index change amounted to 15 and 26 index points for 1970/1971 and 1971/1972 for loose jute at growers' level in Bangladesh and to 60 points for 1971/1972 for Grade "A" Thai kenaf ex godown, Bangkok. This very substantial increase in the price index for Thailand can not be expected to be maintained once the jute supply situation in Bangladesh returns to normal, probably not later than the 1973/1974 season. However, since the 60 index point increase reflects a Thai farmers' level price of $\text{฿}3.00$ to $\text{฿}4.00$ per kilogram compared to a "normal" price of $\text{฿}2.00$ per kilogram of "Mixed Grade", even a reduction to an index figure of, say, 20 points higher than the 1969/1970 seasonal average index of 104 points, would still signify a farmer's level price for "Mixed Grade" in the $\text{฿}2.30$ to $\text{฿}2.50$ per kilogram range which represents an attractive incentive for the Northeast grower.

Table 13

**Internal Prices in Producing Countries
1969/1970 to 1971/1972**

		Bangladesh (1) (Prices in national currency)	India (2)	Thailand (3)	Bangladesh (1) (Index: July 1967 = 100)	India (2)	Thailand (3)
1969/70	<u>Seasonal Average</u>	<u>30.91</u>	<u>52.98</u>	<u>2.81</u>	<u>108.4</u>	<u>117.7</u>	<u>104.1</u>
1970/71	<u>Seasonal Average</u>	<u>35.15</u>	<u>56.51</u>	-	<u>123.2</u>	<u>125.6</u>	-
1971	July	-	57.25	3.93	-	127.2	145.6
	August	-	56.20	3.62	-	124.9	134.1
	September	-	54.25	3.47	-	120.6	128.5
	October	-	51.38	3.53	-	114.2	130.7
	November	-	48.50	3.69	-	107.8	136.7
	December	-	52.75	4.36	-	117.2	161.5
1972	January	38.55	55.60	4.14	135.1	123.6	153.3
	February	43.18	55.75	4.35	151.4	123.9	161.1
	March	45.84	56.00	4.84	160.7	124.4	179.3
	April	49.50	53.50	5.56	173.6	118.9	205.9
	May	51.62	56.20	5.85	181.0	124.9	216.7
	June	51.47	59.50	5.85	180.5	132.2	216.7
1971/72	<u>Seasonal Average</u>	<u>38.80</u>	<u>54.74</u>	<u>4.44</u>	<u>136.0</u>	<u>121.6</u>	<u>164.3</u>
1972	July	-	-	5.85	-	-	216.7

- Notes:** (1) Loose jute at growers' level: White and Tossa combined prices, Rs./maund;
Taka/maund as of January 1972
(2) Assam Bottoms at Calcutta, Rs./maund
(3) Grade "A" ex godown, Baht/kg.

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers, FAO, October 1972

Representative export prices of jute and kenaf from 1968/1969 to August 1972 for Bangladesh BWD, FOB Chittagong/Chalna, and Thai Grade "A", FOB Bangkok, are shown in Table 14. A comparison of the average seasonal prices emphasizes the substantial price differences between these two fiber qualities which, on the other hand, are usually considered equivalent as far as their spinning qualities in a jute mill is concerned:

	BWD (.)	Thai "A" ₹st. per long ton.)	Differential
1968/1969	124.5	76.5	48.0
1969/1970	115.5	64.5	51.0
1970/1971	116.0	78.0	38.0
1971/1972	139.0	98.5	40.5

Furthermore, the Fifth Session of the Intergovernmental Group on Jute, Kenaf and Allied Fibers held from October 4 to 6, 1972, at the FAO in Rome, reiterated its recommended indicative price range of ₹st.109 + ₹st.6 per long ton, FOB Chittagong/Chalna, for Bangladesh Grades BWD/BTD and of ₹st.69 + ₹st.5 per long ton, FOB Bangkok, for Thai Grade "A", i.e. a differential of ₹st.40.

It is obvious that the ₹st.40 per ton lower price for Thai Grade "A" for a theoretically "equivalent" fiber quality is the principal attraction to the overseas buyer in favor of Thai kenaf. In view of the basic greater coarseness of that fiber, some price differential is admittedly justified, but a ₹st.40 per ton spread seems exaggerated on the face of it. The overseas consumers claim, on the other hand, that a large part of the price differential is due to the negligent and unconscientious grading of Thai kenaf which results in their actually receiving a substantial percentage of lower quality fiber in a Grade "A" marked bale. This argument seems

Table 14
 Representative Export Prices of Jute and Kenaf,
 1968/1969 to August 1972

	<u>Bangladesh BWD, FOB Chittagong-Chalna (1)</u>				
	1968/69	1969/70	1970/71	1971/72	1972/73
	(. Lst. per long ton)				
July	109	113	115	120	115
August	114	113	116	119	127
September	114	113	113	120	
October	127	113	113	120	
November	130	115	113	122	
December	130	115	113	220	
January	130	115	113	220	
February	130	115	113	140	
March	130	116	-	128	
April	130	118	-	123	
May	127	118	120	119	
June	122	120	125	115	
<u>Seasonal Average</u>	<u>124.5</u>	<u>115.5</u>	<u>116</u>	<u>139</u>	
	<u>Thai Grade "A" FOB Bangkok (2)</u>				
July	63	62	70	89	114
August	68	60	67	85	
September	68	59	66	79	
October	76	53	71	77	
November	83	59	79	84	
December	85	65	77	105	
January	91	73	77	97	
February	88	72	75	98	
March	83	65	74	107	
April	76	65	93	120	
May	71	67	91	121	
June	65	72	91	118	
<u>Seasonal Average</u>	<u>76.5</u>	<u>64.5</u>	<u>78</u>	<u>98.5</u>	

Notes: (1) End-month price
 (2) Average monthly price

Source: Intergovernmental Group on Jute, Kenaf and Allied Fibers,
 FAO, October 1972

to be borne out by the fact that a number of experienced and well reputed Thai kenaf exporters who pay special attention to grading are able to dispose of "Super" and "Selected Super" grade fiber at mark-ups of £st.10 and even £st.20 above prevailing Grade "A" prices. It is, therefore, argued and has, in fact, been agreed to on several occasions in the past by such specialist traders as representatives of the London Jute Association that, if Thai kenaf is properly and reliably graded, better prices would be offered for the superior grades, and that the price differential between BWD and true Thai "A" could be reduced to £st.30 per ton or even less.

The following three points should be made in connection with the above:

If the assumed increase in price of £st.10 per ton for reliably assorted Grade "A" kenaf is indeed achieved, the overall percentage of production of true Grade "A" fiber in the Northeast must be increased since, otherwise, the revenue from overseas sales would actually fall as a percentage of lower grade fiber is presently being sold - and paid for - at the prevailing Grade "A" price. This quality increase is, of course, the aim of the Kenaf Package Project and the Kenaf Master Development Program discussed in this report.

A price differential will continue to prevail between BWD and Thai "A" fiber and it should not be the aim to reduce this differential beyond at most, say, £st.20 per ton for true "Super" and £st.30 per ton for true Grade "A" Thai kenaf, since otherwise Thailand might lose some of its overseas market to Bangladesh and other producers in view of the strong price consciousness of the foreign kenaf market.

In absolute terms, the price of Thai kenaf will continue to fluctuate in accordance with Bangladesh jute price fluctuations and Thailand will not be able to establish a minimum price level of its

own. It is, however, considered unlikely that world market prices for Thai kenaf will fall below the indicative price range of $\text{₹}109.69 + \text{₹}109.5$ per long ton, FOB Bangkok, for Thai Grade "A" kenaf set by the Intergovernmental Group at the FAO in the foreseeable future, since Bangladesh will neither be able nor willing to reduce its own export prices below the $\text{₹}109.109 + \text{₹}109.6$ level set by the Group and since the overseas consumers are resigned to the maintenance of that price range.

In order to provide a basis for comparing C&F European Port Thai kenaf export prices with the corresponding upcountry farm level prices, an attempt has been made to estimate fiber marketing costs from the Northeast kenaf farm to European Port from basic data supplied by the Thai Jute Association, as follows:

	<u>₹/Metric Ton</u>
A. <u>Fixed Costs</u>	
a. Grading and Baling	325
b. Inland Transportation	100
c. Warehousing, Bangkok, per Month	15
d. Loading Lighters	12
e. Lighterage, incl. Tugboat Charges and Insurance	25
f. Quality and Weight Inspection Fees	15
g. Miscellaneous Expenditures (Stamp Duties, Customs Formalities, Clearance Fees, Shipping Clerk Charges, Overtime, etc.)	22
h. Ocean Freight ($\text{₹}15$ at $\text{₹}48$)	720
i. Profit, Middleman	50
j. Profit, Baler	100
k. Profit, Exporter	<u>100</u>
l. Total Fixed Costs	<u>1,484</u> =====

B. Variable Costs

m. Farm Price	2,000	2,500	3,000	3,500	4,000
n. Insurance, Bangkok Per Month (4% on Items a, b, c, i, j, m)	104	124	144	164	184
o. Bank Interest Per Month (12%/Year on Shipper's Cost = Items a, b, c, i, j, m, n)	27	32	37	42	48
p. Local Broker's Commission (1% on Baling Plant Sales Price)	<u>25</u>	<u>30</u>	<u>35</u>	<u>40</u>	<u>45</u>
Total Variable Costs	<u>2,156</u>	<u>2,686</u>	<u>3,216</u>	<u>3,746</u>	<u>4,277</u>

C. Export Sales Costs

q. C&F Costs (Items a thru' p)	3,640	4,170	4,700	5,230	5,761
r. Business and Municipal Tax (2.2% on q)	80	92	103	115	127
s. Overseas Broker's Commission (2% on q)	73	83	94	105	115
t. Weight Loss at Destination (0.75% on q)	<u>27</u>	<u>31</u>	<u>35</u>	<u>39</u>	<u>43</u>
u. C&F Selling Price	<u>3,820</u>	<u>4,376</u>	<u>4,932</u>	<u>5,489</u>	<u>6,046</u>
Inst. (at \$48)	79	91	103	114	126

It is pointed out that the above C&F pound sterling prices reflect various "Mixed Grade" upcountry farm level prices so that they represent the average for all grades (Super, A, B, C, D, Cuttings, Tangles and Caddies).

CHAPTER II - A SUMMARY OF PRESENT THAI KENAF FIBER PRODUCTION,
PROCESSING AND MARKETING METHODS AND OF BASIC RE-
QUIREMENTS FOR THE IMPROVEMENT OF THE INDUSTRY

1. Introduction

Numerous studies and reports on the production, processing and marketing of Thai kenaf fiber have been prepared in the past to which the reader is referred for information on these aspects of the industry, including a report entitled "Kenaf in Thailand", dated October 1968, by the advisor which goes into considerable detail as to the overall methods employed and their suitability or lack thereof. Since no major changes have occurred in these procedures during the last four years, only a summary of the prevailing practices will be given in this chapter and the existing problems will be highlighted to the extent required so as to provide the reader with an overall view of the subject matter and to form the basis of recommendations for future action.

2. Planting and Cultivation

Thai kenaf (Hibiscus sabdariffa var. altissima) is a tropical crop which resists drought reasonably well and can be grown economically where rainfall conditions are poor or under unfavorable rainfall distribution patterns such as prevail in the Northeast. The soils of the region are predominantly of low fertility, particularly those of the "upland" areas, but will nevertheless produce adequate yields of kenaf fiber where most other crops will fail. This is, of course, the principal reason for the rapid expansion of kenaf production in the Northeast. Until alternate dryland crops are introduced, the local farmer will continue to depend to a large extent on kenaf for his cash income.

Although the major consideration affecting the selection of the plot to be planted to kenaf should be the quality of the soil and the availability of retting facilities, these criteria as well as considerations of potential soil erosion and unsuitability of the plot for proper land preparation and cultivation practices are often disregarded and the farmer will, either by choice or by necessity, plant his kenaf on land not suitable for the purpose. Extension assistance to the farmers in proper land selection for kenaf growing must be expanded in order to achieve higher fiber yields, improve the present wasteful methods and reduce progressive soil depletion and erosion. Land selection should be based on soil quality, availability of retting facilities and accessibility to the farmer's home. The site selected must not be subject to flooding during the rainy season and it should be reasonably flat so as to facilitate land preparation. Kenaf should not be planted on gravelly soils or where there is less than 60 cms. of soil above a laterite layer.

Since the seeds of Thai kenaf are very small, the soil must be thoroughly broken up before planting in order to assure proper germination and uniform growth, a practice often neglected by the growers.

Plowing and raking is usually started during the first half of April, after the initial brief rain showers. For optimum results, three plowing and cross-plowing and three raking and cross-raking operations should be carried out at two to three-week intervals prior to seeding. Almost all farmers still use animal-drawn wooden implements. The plow usually will not penetrate more than six inches below the surface, but this is generally considered sufficient in the sandy to very sandy upland soils used for growing kenaf in the Northeast. Harrowing is done with a wooden rake which again is not designed for deep working of the soil but which does an adequate job provided it is conscientiously employed. Mechanization of agricultural operations in the region is still in its initial stages but steady progress is being made. Wherever possible, the introduction of tractor-drawn plows and harrows should be expanded and these should be used particularly for the initial plowing and harrowing operations.

The spreading of manure and compost on the land is as yet practically unknown on Thai kenaf farms although it is an excellent means of improving the land and increasing fiber yields. Pamphlets describing the collection and preparation of compost have been issued by the Department of Agriculture and should be of help in promoting these practices. The use of retting pond silt as manure should also be encouraged since it has been enriched by decomposing vegetable matter and debris from the kenaf stalks being retted.

Thai kenaf is a photo-sensitive plant which means that it develops vegetatively during periods of long daylight and will start to flower when the length of daylight falls below a certain minimum in the autumn. Since the yield of kenaf fiber increases in direct proportion to the vegetative development of the plant, seeding should be done as early as possible in the season in order to permit maximum time for growth before flowering. In view of the limitations

imposed by the start of the rainy season in the Northeast in mid-May and by the lack of irrigation water, planting should take place about that time, unless a reasonable amount of rain falls in late April, and should then be completed as soon as possible and certainly not later than June 15.

Most of the kenaf is still sown broadcast resulting in uneven stands, reduction in fiber yield and lack of uniformity of fiber quality. Farmers also plant their seed in holes or "hills" made either with a hoe or a stick. Although this method is superior to broadcast seeding, it leads to a too close stand of seedlings and an inefficient use of the land. By far the best method of planting and one already adopted by some Thai kenaf farmers is row planting; it has been found that the fiber yield per rai increases by 25 percent or more with this planting system and that the uniformity of retted fiber quality is greatly improved. At the same time, weeding and thinning become very much easier and cheaper thus reducing cultivation labor requirements and costs. The expanded application of row planting should be encouraged and locally built multi-row seed drills and similar implements should be introduced. Every effort should be made to persuade the farmers to abandon the inefficient practices of broadcast seeding and hill planting with their resulting low fiber yields and increased weeding and thinning costs.

Spacing experiments have shown that distances of 30 cms. between the rows and 5 to 7 cms. between the plants in the row result in optimum yields while still permitting easy access for manual weeding and thinning. These planting distances should be universally adopted.

Proper weeding at the correct time is essential for yields of good quality fiber. The first weeding should be done about one month after germination and the second weeding one month later. Normally, no further weeding will be required, since the plants will

then be tall and leafy enough to shade out the weeds. Weeding is greatly facilitated when the kenaf is planted in rows; consideration should be given to the introduction of hand-pushed wheel-hoes such as are used in the jute plantings in India and Bangladesh.

In view of the small size of Thai kenaf seed, a fairly heavy seeding rate is required to assure adequate germination and a uniform stand, but this results in crowding of the young seedlings. In order to obtain tall and healthy plants of adequate stalk diameter, each plant must have sufficient room to grow and the superfluous plants must be removed by thinning. Most farmers still neglect this operation, particularly those who have broadcast or hill planted their kenaf, partly because it is a labor-intensive task but also because they are difficult to convince that they will obtain a higher yield of fiber from the lesser number of thinned plants than from the much greater number of spontaneously growing stalks. If the kenaf has been planted in rows, thinning becomes an easy operation. Enough young plants should be pulled out so that the distance between the remaining seedlings in the rows becomes 5 to 7 cms. Care must be taken to remove weak seedlings rather than strong and healthy ones. The thinning operations should be carried out immediately after the first weeding so that the superfluous seedlings do not compete too long for soil nutrients.

3. Seed

So far, only very limited efforts have been made to assure the farmer of a reliable supply of good quality seed and that in spite of the fact that improved seed is one of the most important contributory factors towards increased fiber yields and improved fiber quality. Most farmers still collect the seed for the following year's crop from their own plantings, without any attempt at selection and frequently from stalks too inferior in development to warrant harvesting and retting. The inevitable result is a progressive deterioration of seed quality.

A reasonable amount of work has already been done by the Department of Agriculture, the Applied Scientific Research Corporation of Thailand and the Northeast Agricultural Research Center at Tha Pra on kenaf variety selection and improvement but it has, so far, not resulted in the development of a superior variety specially adapted to the soil and climatic conditions in the Northeast. It is most urgent that more intensive work is carried out on the improvement of the existing local varieties and the introduction of new varieties of both H. sabdariffa and H. cannabinus; with regard to the latter, the experimental efforts should concentrate on the selection of nematode resistant varieties with the aim of developing selections suitable for the particular conditions of the Northeast.

For a projected annual fiber production target of 400,000 tons, some 130,000 rai of specific seed plantings would be required producing approximately 4,000 tons of improved seed; these estimates are based on the presently stated very low production rate of 30 kg. of seed per rai of Thai kenaf planted for seed. With improved seed varieties, a yield of twice that amount or more per rai should be obtainable thus reducing annual seed planting area requirements to approximately 65,000 rai. The above 4,000-ton yearly improved seed requirement estimate compares with a stated selected seed production program of 8 tons in 1972 and 28.5 tons in 1973.

As in other major fiber producing countries, well organized and supported plant breeding research, selection and multiplication programs must be instituted promptly in Thailand, combined with proper distribution and extension efforts. At the same time, the research work in relation to the introduction of new varieties should be continued and intensified. In the meantime, extension efforts should be directed towards persuading the farmers to collect their seed from the strongest and tallest of their kenaf plants rather than from the least developed stalks as is their present practice.

4. Fertilization and Pest and Disease Control

The application of chemical fertilizers is not yet widespread on the kenaf farms in Northeast Thailand, largely because of financial restraints. Furthermore, the cash return from the use of fertilizer depends on the farm level price for kenaf fiber. Since it has been found that fertilizer application on the presently used varieties of Thai kenaf increases fiber yields by 25 percent at best - or from a "normal" 200 kg. to only 250 kg. per rai - the cost of the fertilizer plus an additional profit must be covered by the revenue realized from the additional 50 kg. of fiber production. At a recommended fertilizer application rate of 40 kg. per rai, the cost of the fertilizer amounts to about ฿100 so that the farmer must receive at least ฿2.00 per kilogram to break even, not taking labor costs for fertilizer application into account.

Chemical fertilizer is applied in two equal doses, 30 and 60 days after germination respectively. No fertilization is done prior to or at the time of planting as is practiced in several other countries. Additional research on the timing, method, composition and amount of fertilizer application is urgently required.

For many years, pests and diseases have caused no serious problems to kenaf production in the Northeast and, as a result, no intensive efforts were made to introduce adequate control measures. The situation has changed drastically during the last two or three years when a substantial spread of stem rot disease caused by Phytophthora sp. occurred which has assumed alarming proportions and is presently estimated to effect as much as 30 percent of the planting areas in certain Changwats. In addition, the existence of such pests as stem borers, leaf hoppers, aphids, black flea beetles and others has already been identified as has that of a number of additional diseases including anthracnose and powdery mildew. Suggestions for the control of these pests and diseases are described

in Chapter III, Section 3 below.

Many varieties of kenaf are highly sensitive to root knot nematodes but, fortunately, Thai kenaf appears to be resistant to that disease which, otherwise, might well cause considerable damage in the light upland soils of the Northeast, although the local authorities claim that nematodes are not widespread in the region.

5. Harvesting

Basically, kenaf should be harvested when it starts flowering at which time the stalks contain the maximum amount of fiber of good quality. However, many farmers start cutting their stalks earlier since adequate amounts of retting water are then available, the land can be used for a second crop such as water melons, the kenaf harvest can be completed before the start of the rice harvest, fiber prices are frequently higher at that time than during the principal harvesting season, or because the farmer is in urgent need of cash. Although it is generally assumed that this practice results in substantial yield losses, sporadic experiments have shown that, in fact, such losses are quite small. Further intensive experiments are required to verify these preliminary results in order to establish whether the stalks can be harvested earlier without significant yield reduction thus allowing the farmer to profit from a timelier start of the harvesting operations. In the meantime, the farmers must be advised that, if they are short of labor, it is better to start cutting early than late. It is much to be preferred to begin harvesting in September or even August than leave part of the stalks for retting after the end of the rice harvest, when yields will have fallen drastically, the fiber will be coarse and of inferior quality, and very little retting water will be available.

The kenaf stalks are either cut with a bushknife or pulled out of the ground, the latter particularly in sandy soils. Many farmers cut their stalks too high thus losing much of the butt-end fiber. Cutting at ground level is essential to maximize fiber yield. Similarly, the roots are not cut off from pulled kenaf stalks before transport to the retting facility; since they contain no usable fiber, this unnecessarily increases transportation costs and reduces retting efficiency. Expanded extension work is required to make the

farmer aware of the disadvantages of cutting his kenaf stalks well above rather than at ground level. The objections voiced by some Thai kenaf specialists against this cutting method should be submitted to thorough practical tests, since they are not borne out by experience in other kenaf growing areas.

No stalk selection according to size before bundling is practiced and many bundles are too large in diameter; the result is lack of uniformity in retting. The kenaf stalks should be graded for size before bundling and the individual bundle diameter should not exceed 25 cms. Care should be taken that the bundles are shocked in the field long enough for the leaves to dry out and fall or can be shaken off; on the one hand, the leaves provide fertilizer value to the soil and, on the other, stalks without leaves are cheaper to transport to the retting place.

6. Retting

6.1. Retting Facilities

In Northeast Thailand, kenaf is retted wherever water is available for the purpose, such as in swamps, ponds, roadside ditches, rivers, streams, canals, and paddy seedbeds. The lack of adequate retting facilities and of water at the time it is required constitutes the single most serious problem as far as the improvement of Thai kenaf fiber quality is concerned. Retting water is often at a considerable distance from the kenaf fields and most retting locations become badly polluted soon after the onset of the season since their water is stagnant. The retting water problem assumes serious proportions almost everywhere in the region by the end of November and certainly in the January to April period when the "second wash" takes place after the completion of the rice harvest.

Essential improvements to existing facilities could be carried out at little cost, including the removal of old stalks and debris, the deepening of the pond or ditch to the optimum 75 cms. to 1 m. water level, building up the height of the retaining walls, subdividing roadside ditches into individual sections, constructing small dams across streams and locating additional sources of water supply such as streams, large ponds, wells or the distribution canals from irrigation dams. In addition, improved retting tanks should be constructed whenever and wherever possible; in this connection, full advantage should be taken of the Department of Agriculture's mechanical excavating equipment and the amount of that equipment should be increased as is already being planned. Such other agencies as the Office of Accelerated Rural Development, the Royal Irrigation Department, the Army's Mobile Development Units, the Department of Land Development and the Department of Public Welfare through its resettlement area projects should be involved

to the fullest extent possible.

It is estimated that adequate retting facilities are available in the Northeast to enable the farmers to produce some 200,000 tons of good quality kenaf annually. At the presently set overall improved fiber production target of 400,000 tons per year, this means a requirement of additional retting facilities for the processing of 200,000 tons. On the accepted basis of a retted fiber production of 3.5 to 4 tons per "standard" size retting tank (25 m. long by 4 m. wide by 1 m. deep) per season, such additional requirements will amount to 50,000 to 60,000 tanks. The Department of Agriculture's "Improved Retting Tank Construction Pilot Project" estimates that construction costs per tank, using the project's mechanical equipment, amount to close to \$1,000 so that the approximate cost of an eventual overall tank construction program would be some \$50 to 60 million.

The introduction of stalk ribboning prior to retting should also be further investigated and promoted, since it reduces retting water requirements very substantially.

6.2. Steeping, Stripping, Washing, Drying and Baling

Steeping is the operation of placing the kenaf stalks into the retting water. Due to the considerable buoyancy of the stalks, some type of weight must be placed on top of the bundles or they must be held below the water surface by some other means.

Depending upon the size and depth of the retting facility, the stalk bundles are arranged either in single or multiple layers. The bundles must be completely submerged and should not touch the muddy bottom of the retting facility since, otherwise, inferior fiber quality is obtained both through lack of uniformity in retting and the discoloration of the fiber.

The most common practice of stalk submersion - and the most unsatisfactory one - is still by means of earth clods placed on top of the bundles. The dissolving earth dirties the retting water, darkens the fiber and gradually chokes up the facility. However, a number of farmers who are already better aware of the importance of fiber quality submerge the stalks with stones or logs or by means of wooden stakes and either wooden or bamboo cross-poles; these latter can be found almost anywhere in the region, are easy to install and are re-usable and permit an exact adjustment of the depth of the stalk bundles below the water surface. Community retting in retting centers, where proper supervision and instruction can be made available, should be encouraged wherever possible.

After completion of the retting process, that is the decomposition of the vegetable matter in the fiber bearing layer surrounding the central woody stalk, the retted fiber is removed by "stripping". It is most important to remove the stalks from the water at the correct time in order to assure optimum fiber quality: too early removal will leave barky runners and an excessive proportion of unretted butt-ends on the fiber; too late removal will cause over-retting and weakening of the fiber. In the Northeast, the importance of stripping at the correct time is often either not recognized or disregarded and too little attention is paid to this most important factor which has a decisive influence on fiber quality.

After stripping, the fiber must be washed. All too often, the grower will carry out this operation inadequately, either through neglect but often intentionally so as to increase the weight of the finished product. The fiber should be slashed on the water surface and swished backwards and forwards until it is thoroughly clean if a good quality is to be obtained. If a large stone or log is available, the butt-end should be beaten over it so as to open up

the fiber. If clean water can be used for washing, this should always be preferred over the polluted and usually dirty water in which the stalks have been retted.

After washing, the fiber is hung up for drying, usually on bamboo poles placed across wooden supporting poles. The drying process may take anywhere from one to three or four days, depending on the climatic conditions. Careful spreading and alignment of the fiber on the drying lines facilitates subsequent selection and baling. It is imperative that the fiber is not removed from the drying lines before it is properly dry.

The final operation carried out by the kenaf farmer is to pack his fiber into field bales or "drums" for transport to the village merchant, the baling plant or some other buyer. It is only natural that the buyer will be influenced by the appearance of the bale when making his price offer for the fiber; it is, therefore, unfortunate that many farmers are careless in the preparation of their field bales after having spent much time and effort on the growing and processing of their fiber. The Northeast farmers are well aware of the required procedures and should be encouraged, in their own interest, to follow them closely.

7. Research and Extension Activities

Kenaf research activities in Thailand are carried out by the Department of Agriculture, principally at its Nong Soong Experiment Station near Nakornratchasima, by the Applied Scientific Research Corporation of Thailand and by the Northeast Agricultural Research Center at Tha Pra near Khon Kaen, in the case of the latter two organizations only to a limited extent. All three organizations publish regular reports to which the reader is referred. Extension services are operated by the Department of Agricultural Extension through its upcountry Changwat and Amphur agricultural officers. There is an urgent need for an expansion of these activities, particularly with reference to the selection of improved local H. sabdariffa varieties and the introduction and selection of new varieties of both H. sabdariffa and H. cannabinus from abroad, to more detailed fertilization studies and to experimental work to be carried out at a number of stations in the Northeast under different soil and climatic conditions.

The work already being done by the Department of Agricultural Extension and its Changwat and Amphur agricultural officers should be strengthened so as to pass on promptly to the individual farmers the results obtained by the experimental work as well as to instruct them in improved procedures which the grower can apply without having to introduce any drastic changes into his traditional methods.

Priority should be given to a substantial expansion of the Department of Agricultural Extension itself and the close cooperation of all other Royal Thai Government agencies concerned should be secured, such as the Office of Accelerated Rural Development and its Amphur Farmer Groups, the Royal Irrigation Department and its Irrigation Associations, the Community Development and its Changwat, Amphur and Tambol workers, the Department of Land Development, the Department of Land Cooperatives, the Department of Public Welfare

and its Resettlement Areas, the Army and its Mobile Development Units, etc. Cooperation between the above agencies already exists but such joint efforts must be further strengthened.

The number of practical demonstrations must be greatly increased. Instructional movies and illustrated pamphlets are available and must be distributed to the farmers. Such extension efforts in the production areas themselves are considered to be one of the most effective means of creating a prompt and practical impact at the farm level and they should be implemented both at certain of the already existing demonstration centers as well as on farmers' lands.

8. Economics of Kenaf Fiber Production

It is difficult to establish the exact fiber production costs per rai, mainly because the Northeast farmer - like his counterpart in India and Bangladesh - does not count his and his family's labor as an expense item and since the number of paid labor days of outside workers fluctuates widely. It must be realized that kenaf fiber production, like the production of so many peasant farmer produced tropical crops, is profitable only if labor costs are largely disregarded. On the other hand, since the family members work in the kenaf fields mostly at times when no other agricultural activities are required of them and since paid employment opportunities are still very scarce in the Northeast, their labor does produce a cash return to the family which would otherwise not be available.

Within these limitations, the estimated financial return per rai, at a "standard" farm level sales price of \$2.00 per kg. for "Mixed Grade" fiber, is estimated as follows:

Average fiber production	200 kg.
Average sales price	\$2.00 per kg.
Gross revenue	\$400
"Profit":	
Including labor costs	\$250
Excluding labor costs	\$350

9. Fiber Grading and Standards

In practice, the Northeast kenaf farmer does not grade his fiber, and it is sold as "Mixed Grade", that is all fiber qualities placed together in a single field bale. This procedure removes almost any incentive for the farmer to exert an extra effort to produce superior quality fiber, particularly since the price differential paid by the middlemen for good and low quality "Mixed Grade" is usually very small or non-existent. On the contrary, since badly retted and insufficiently washed fiber weighs more and requires less effort to produce, the farmer is tempted to try to sell to the middleman the lowest quality fiber the latter is willing to buy or, occasionally, can be tricked into accepting.

The majority of the village and district dealers pre-grade the "Mixed Grade" fiber they have purchased from the farmers before selling it to the baling houses or other buyers. The final grading is done at the baling plants except for those instances where a local bag factory purchases its fiber directly from the merchants and carries out its own grading.

The quality standards of "Thai Jute" (kenaf) have long been established and are well known to all concerned. So far, however, they have not been adequately enforced. The principal complaint of domestic and overseas buyers is inadequate, improper or even misleading grading which creates serious problems for the ultimate consumer who must be able to rely on receiving exactly the quality of fiber which he has ordered.

Thai kenaf is sorted into "Super A", "A", "B", "C" and "D" grades of line fiber and into "Cuttings" and "Tangles". At present, there is too large a proportion of low grade fiber production in Thailand at the expense of the higher grades which are in predominant demand in the export market. It is the consensus of opinion of the

specialists concerned with the kenaf industry that a substantial improvement in fiber quality could be achieved by offering the farmer an attractive price incentive for "Grade A" kenaf and encourage him to pre-grade his fiber while, at the same time, providing him with the necessary inputs and technical assistance to enable him to improve his fiber quality. Programs are presently under way in that direction and reference is made to the "Kenaf Package Project" and the "Kenaf Master Development Plan" described in subsequent chapters of this report. It must be emphasized that these programs can only be effective in the long term if they are combined with improvements in grading practices and strict enforcement of quality standards.

Except where a direct attempt is being made by the merchant to take unfair advantage of the farmer by unreasonably down-grading his fiber, the middlemen at the village level should not be blamed too harshly for not bothering to differentiate carefully between the various fiber grades; instead responsibility for this unsatisfactory situation should be assumed equally by the subsequent marketing levels, namely the balers, the exporters and the foreign brokers. In the final analysis, if all exporters and consumers would strictly insist on superior fiber quality and reliable grading at all times, the pressure on the balers would be such that, apart from having to improve their grading practices, they in turn would have to exert pressure on the village merchants to supply a higher percentage of good quality fiber. This would immediately place a premium on high grade fiber and automatically create the desired incentive for the farmer.

It is estimated that this change of attitude alone could well double the production of "A" grade fiber at the farm level without having to add substantially to the available knowledge and facilities at the disposal of the farmer. At the same time, the desire

on the part of the farmers for technical assistance and additional facilities would obviously rise the satisfaction of which, in turn, would lead to a further increase in high quality fiber production at the expense of the lower grades. In view of the fact that Thailand's most reliable fiber export market in Europe - and to a somewhat lesser extent in Japan - is interested almost exclusively in high quality kenaf, such a development is most desirable and, in fact, indispensable.

10. Baling Plant Operations

The function of the baling plants is to grade the kenaf fiber received from the farmers and middlemen and to compress it into export bales. The baling houses are organized in the Jute Balers Association of Thailand (JBOT); an average size plant handles some 4,000 to 6,000 tons of fiber per year.

Upon arrival at the baling plant, the field bale is weighed and inspected. The fiber is then graded according to quality, the under-retted butt-ends are removed in the form of "cuttings" and the fiber is pre-boxed according to grade. It is then transferred to the baling shed where it is compressed into 180 kg. export bales by high-density presses. If these operations are carried out efficiently and conscientiously, no problem exists in producing bales entirely acceptable to the overseas market. Unfortunately, this is not always the case, either due to lack of experience or through negligence or even by intent. A major share of the effort to increase the acceptability of Thai kenaf on the world market must be concentrated on improving baling plant operation.

11. Internal Marketing

Generally speaking, four principal types of intermediaries are involved in the internal marketing of Thai kenaf fiber: the local or village merchant, the provincial dealer, the baling plant and the wholesaler. The proportion of the crop handled by the various intermediaries fluctuates from year to year but, on the average, the farmers sell about half of their production directly to local baling plants, some 30 percent to village merchants and 20 percent to district and provincial dealers. The village merchants sell most of their fiber to nearby baling plants and the remainder to large dealers. From the baling plants, the fiber is distributed to the local bag mills and to export houses in Bangkok.

In the absence of effective control and supervision at the time the farmer disposes of his fiber, the advantage usually lies with the middleman who often profits excessively from his favored position. In his defence, however, it must be pointed out that he also assumes considerable risks. Not only must he depend upon the fairness of the next higher level merchant, but he also often furnishes credit to the grower under conditions which other credit channels refuse to accept. In fact, he frequently constitutes the only credit source available to the farmer as well as being his only fiber customer. Thus, he furnishes two essential services to the kenaf producer and it seems unrealistic to criticize his practices without providing the farmer with a properly organized alternate channel of both credit and marketing. Once this is established, the private merchant would have no alternative but to fall into line if he wishes to stay in business. It is praiseworthy that successful efforts are already being made, both by private financial institutions and Government agencies, to provide credit at reasonable interest rates to the farm population; reference is once again made to the Government sponsored Kenaf Development Plans discussed later on in this report.

An alternate first step in the marketing process would be the elimination of one or more middlemen by the organization of cooperative marketing procedures. Ultimately, a cooperative or a group of cooperatives might undertake its own exporting by becoming a member of the Thai Jute Association, but caution is in order before putting such a plan into practice, since international fiber marketing is a very specialized and often speculative business. Nevertheless, the establishment of cooperative fiber marketing organizations should be encouraged, including technical assistance, the provision of improved retting facilities, instruction in proper grading procedures, credit, etc. Careful guidance and supervision will be required for some time before the cooperative membership will be able to provide its own efficient management.

Kenaf is planted in late April, May and early June. The principal harvest starts in September and continues into November; it is resumed after the completion of the rice harvest at the end of January. The greatest volume of fiber comes into the market in October, November and December, usually resulting in lowest prices during that period. In normal years, the highest prices are paid for kenaf in June and July when stocks are lowest. They then decline steadily until December only to increase again in January and February. Most stocks are in the hands of the kenaf balers by that time and there is little buying in the production areas thereafter which causes price to decline steadily through May. Although the above is the general pattern of price movements, substantial fluctuations occur from time to time caused principally by the size of the jute crops in India and Bangladesh and the availability of local kenaf supplies.

12. Export Marketing

After grading and baling, the kenaf fiber is ready for overseas shipment. These shipments are handled by exporters all of whom are located in Bangkok. They sell the fiber either to a local agent of a foreign firm, through London brokers, or directly to middlemen and consumers in other countries. Most of the exporters purchase their fiber supplies from middlemen in Bangkok who may also be exporters themselves. Some 20 percent deal with provincial traders and another 20 percent purchase kenaf directly from the farmers, often through their subsidiary upcountry baling plants but also through their own agents.

Almost from the date of its inception, the Thai kenaf export trade has suffered from quality and grading problems giving rise to complaints from overseas purchasers and reducing the price of Thai kenaf on the international market and thus limiting the income of the Northeast growers and the expansion of the industry. Although there is no question that kenaf is basically coarser than true jute and that its applications are, therefore, restricted to the production of the heavier fabrics and to a limited percentage admixture to true jute for the manufacture of the lighter weight finished goods, the usual price differentials between Thai kenaf and Bangladesh jute of similar spinning properties are far greater than justified by the difference in basic fiber characteristics.

CHAPTER III - PRINCIPAL RESTRAINTS ON EFFECTIVE DEVELOPMENT PROGRAM
IMPLEMENTATION AND PROPOSED REMEDIAL MEASURES

1. Research and Extension

Due to budgetary and personnel restrictions, past kenaf research and extension efforts have been limited in scope and achievement. This statement does not imply any criticism of the officers in charge of both programs who are seriously hampered by the lack of staff, facilities, equipment and funds, but the fact remains that the results so far obtained are quite inadequate to properly support an overall Kenaf Fiber Development Program.

1.1. Research

The kenaf research program has been centered on the None Soong Agricultural Research Station near Nakornrachsima for many years. It is felt that the Station has not been located at the best possible site to enable it to efficiently carry out its functions. It is far from the center of the major kenaf producing areas and somewhat inaccessible at a distance of about 12 km. from the Friendship Highway, and the soil and climatic conditions at the Station are by no means representative of those under which most of the kenaf in the Northeast is grown. As already indicated, its work is also handicapped by the lack of qualified technicians to assist the Chief, Kenaf Project, and of sufficient land, buildings and agricultural equipment, by the almost complete absence of scientific equipment, and by budgetary restrictions.

The Chief, Kenaf Project, of the Department of Agriculture suggests that the research activities be transferred to a new location on the Nakornrachsima - Chokchai highway at a site some 10 km. from Nakornrachsima where an adequate land area is available which consists of soils of the Yasoothorn series which are representative of the upland kenaf soils of the

Northeast. The location is easily accessible and provides convenient communications with both Bangkok and the kenaf production areas. On the other hand, he agrees that a demonstration station should be established close to the center of the principal kenaf producing areas and with good road connections to all parts of the Northeast. These conditions would be met by a location near the junction of the Khon Kaen - Kalasin - Mahasarakam highways. It is submitted that a site in that area could be selected which offers both convenient access and representative upland soils so that the research and demonstration centers could be combined in one location which would reduce financial and personnel requirements and administrative problems and provide superior service to the kenaf growers.

It is stated that the kenaf research program presently covers three principal areas as follows:

- Variety Improvement
- Agronomic Practice Improvement
- Fiber Quality Improvement.

Information on these programs is contained in the Annual Report of the Ministry of Agriculture for the year 1970 which, together with information supplied verbally by the Chief, Kenaf Project, on more recent work, is summarized below.

Trials on the three standard Thai H. sabdariffa varieties (Green Stem, Green and Red Stem, Red Stem) have been discontinued since it is felt that final results have been obtained and that the "Green Stem" variety has been found superior to the other two. This variety is presently being bulked under the (limited size) seed multiplication program. It is felt that the discontinuation of this particular program may have been premature, since it does not appear to have resulted in a significantly superior selection.

A considerable number of variety tests are also said to have been done on introduced H. sabdariffa varieties, particularly from Indonesia, but no detailed information regarding the results of these tests could be obtained. The Indonesian "THS" varieties (presumed to stand for "Thai Hibiscus sabdariffa") were probably originally introduced from Thailand into Indonesia and selected at the Bogor Fiber Research Station. However, a series of well documented variety trials, including a number of THS, local Thai kenaf and H. cannabinus varieties, were carried out at the Northeast Agricultural Center at Tha Pra between 1967 and 1971 (and are being continued) which show a consistent superiority of "THS-30" over all other varieties, both as far as fiber yield and pest and disease resistance are concerned. The Center recommends the general introduction of this variety in the Northeast, but the Chief, Kenaf Project, disagrees since trials at the Nong Soong Station did not confirm the above results.

Tests are also being carried out on introduced H. cannabinus varieties with Thai "Green Stem" as control. Unfortunately, the exact parentage of these varieties is unknown and the results obtained at the four test locations are so disparate and inconsistent that no conclusions can be drawn from the trials.

The last series of trials concentrates on varietal selection for resistance to stem rot disease (Phytophthora sp.) which is making serious inroads in the Northeast kenaf plantings (see Section 3 below). The trials were started only in 1971 and are stated to have covered all available local and introduced varieties of both H. sabdariffa and H. cannabinus. Only THS-2, THS-12 and THS-22 showed good resistance and further tests on these varieties are being undertaken in 1972. It is stated that, once these are completed, yield tests will be carried out and only then will a seed multiplication program be started. It should be noted that, at

Tha Pra, THS-22 showed greater resistance to stem rot disease than THS-30 and THS-12 about the same degree of resistance as Thai Red Stem (THS-2 was not included in the Tha Pra trial).

In excess of 100 introduced H. cannabinus varieties are said to be available at None Soong but no time has so far been found to test these varieties. Some cross-breeding work has been done in the past, including work by the Applied Scientific Research Corporation of Thailand, but is being continued only on a very limited scale.

As far as the "Agronomic Practice Improvement Program" is concerned, this has been discontinued since optimum practices are said to have been established with regard to time of planting, depth of planting, spacing, time of harvesting, etc., a conclusion with which some disagreement seems justified, particularly with respect to fertilization and time of harvesting.

The "Fiber Quality Improvement Program", apparently limited to the 1970 season, tested the fiber quality obtained in different types of retting tanks including both traditional earth tanks and cement-lined tanks, where the earth tanks are stated to have proven superior. It is submitted that, based upon kenaf retting experience in other countries, this conclusion is, to say the least, premature.

Most recently, the Chief, Kenaf Project, has submitted a budget request for \$3.5 million - of which \$2.3 million was approved by the Budget Bureau - for a kenaf research program during the 1973 fiscal year which comprises the following work:

- Variety Improvement:

Selection and cross-breeding of local and introduced varieties aimed at the establishment of the varieties most suitable for varying soil conditions; development of early maturing and high-yielding varieties; selection of spineless introduced varieties.

- Seed Multiplication and Storage:

Multiplication of existing seed varieties, with emphasis on "Thai Green Stem"; seed quality research including investigations into optimum seed production and seed processing methods; distribution of improved seed to growers; seed storage and protection against pests and diseases; methods of maintaining seed germination; seed grading; investigations into the quality of farmer produced seed.

- Land Preparation and Stalk Production:

Research into land preparation methods and seeding rates aimed at increasing fiber yields and reducing production costs.

- Fertilization.

Rates, methods and timing of fertilizer application on different soil types; soil fertility research (Note: 30 farmer plots to be included in the study).

- Harvesting:

Harvesting methods and time of harvest in relation to fiber yield and quality.

- Fiber Quality:

Retting methods and periods; types of retting facility; maintenance and construction of farmers' facilities.

- Pest and Disease Control:

General preventive measures; causes of stem rot disease; chemical control of the disease; selection of stem rot resistant kenaf varieties.

Upon evaluating the information summarized in this section, the impression is gained that, in spite of the ambitiousness of the programs, kenaf research activities in Thailand have neither been adequate nor coordinated or conclusive and that a greatly increased

research effort is imperative if the Kenaf Development Program is to be properly supported, fiber yields and quality are to be substantially improved and if, indeed, the Thai kenaf fiber industry is to survive on its present scale of magnitude in view of the increasing problems posed by stem rot disease (see Section 3 below). It is submitted, however, that with adequate funds, equipment and qualified personnel, preferably supported by advisory consultants, the existing kenaf research organization under the able and dedicated leadership of the Chief, Kenaf Project, will be able to implement such efforts successfully and expeditiously.

1.2. Extension

At present, the Department of Agricultural Extension (DAE) of the Ministry of Agriculture has not assigned any specific kenaf extension officers to the Northeast nor are its Changwat and Amphur extension offices sufficiently staffed to assure an adequate extension effort under the Kenaf Master Development Plan. It is considered essential that the necessary extension personnel is made available.

On the average, the extension officer should be in contact with each farmer at least once a month. Assuming 15 days of actual field work per month and that the officer can contact 2 to 3 farmer groups of, say, 30 farmers each per day, one officer would be required for each 900 to 1,350 farmers or, say, 1,000 farmers. Hence, at an average kenaf planting area of 10 rai per farmer, one extension officer will be required for each 10,000 rai.

If special kenaf officers are provided, one such officer need not necessarily be stationed in each Amphur; rather, there should be the required number of officers per Changwat based on the kenaf area in that Changwat. Also, these officers should work out of one

or more Kenaf Extension and Demonstration Centers to which they would be directly responsible and where they would receive their training and support.

The cost of placing one kenaf extension officer in the field is estimated as follows:

Salary and subsistence allowance	₱ 2,000/month
Travel per diem at ₱40 x 15 days	600 "
Motorcycle operating allowance (fuel and maintenance)	<u>200 "</u>
	₱ 2,800/month
	or ₱33,600/year
Motorcycle depreciation (4 years)	<u>2,500 "</u>
Total annual cost	<u>₱36,100/year</u> =====

(Capital cost, 1 motorcycle = ₱10,000).

The DAE states that its present low density coverage is due to the lack of funds and that there would be no problem in recruiting (and supervising) up to 72 new kenaf extension officers as required by 1976 under the Kenaf Master Development Plan, particularly since the DAE offers an attractive incentive and upgrading system. Although sometimes insufficiently trained - a problem to be remedied through instruction by the DoA - the extension officers now in the field are, for the most part, hard working, motivated and responsible men.

Instructional movies and pamphlets on improved traditional kenaf production and processing prepared under DoA/USOM auspices are available and can be used for both extension officer training and farmer instruction and should be supported by farmer group visits to the preferably combined DAE/DoA Kenaf Demonstration Center(s) as well as by demonstration on farmers' land.

2. Improved Seed Production

It is generally agreed that one of the essential requirements of assistance to the Thai kenaf farmer is research into and the production and distribution of improved, high-yielding and disease resistant seed to assist the grower in increasing his fiber production per rai. Nevertheless, this most important aspect of any effective Kenaf Development Program has been neglected almost completely in the past.

The inadequacy of the basic research effort has been discussed in the previous Section 1.1. of this chapter; the first step in any seed multiplication plan must, obviously, be a drastically increased research program. However, pending the result of such a program, a greatly expanded seed multiplication project must be implemented promptly using the optimum presently available local variety, namely "Thai Green Stem".

It is submitted that, for the subsequently discussed Kenaf Package Project and the Kenaf Master Development Program to be fully successful, the farmers under these programs must be supplied with 100 percent of their requirements of improved seed, but disagreement has been expressed with this view and it has been suggested that as little as 10 percent of total requirements need be covered with such seed. Nevertheless, the original contention is maintained and is, indeed, supported by similar crop program inputs, in Thailand and elsewhere, including jute and kenaf.

The Kenaf Master Development Plan (1st. Phase) envisages the following planting areas and will, on the basis of 30 kg. seed yield per rai and 2 kg. seed requirements per rai of fiber plantings, require the improved seed quantities listed:

<u>Year</u>	<u>Promoted Area (Rai)</u>	<u>Seed Requirements (Tons)</u>
1973	60,000	120
1974	180,000	360
1975	420,000	840
1976	720,000	1,440
1977	1,040,000	2,080
1978	1,360,000	2,720
1979	1,680,000	3,360
1980	2,000,000	4,000

This compares with a 1972 seed multiplication program of 8 tons and a 1973 program of 30 tons.

It is obvious from the above that, at least during the first two years of the Master Plan, the goal of the supply of 100 percent improved seed to the farmers can not be achieved and that it will require a concentrated effort to reach the desired target in subsequent years.

At the presently stated rate of 30 kg. of kenaf seed production per rai, 133,000 rai would be required for the production of 4,000 tons. It is suggested that, with improved variety selection and improved agronomic practices, this yield can be doubled, thus reducing the required annual seed planting area to some 65,000 rai. In fact, seed production experiments carried out by the DoA at five locations in 1970 resulted in seed yields close to or above 100 kg. per rai for ten individual tests and an overall average of 75 kg. per rai for the 30 tests completed.

It is not clear at this stage which department of the Ministry of Agriculture, the Department of Agriculture (DoA) or the Department of Agricultural Extension (DAE), would be in charge of a large-scale seed multiplication program. The DoA states that it is the

task of the DAE and that, in any case, it has only a very limited potential planting area at its disposal. The DAE contends that it could only produce the seed on farmers' land, as is already being done in the case of rice and since it operates no stations of its own. Even if the system of producing "improved" seed on farmers' land is adopted, this still leaves the problem of "certified" seed production, the next step after the production of "foundation" seed by the DoA. For 65,000 rai of "improved" seed production at 2 kg. per rai seed requirements, a planting area of 2,170 rai of "certified" seed (at 60 kg. per rai seed yield) will be required. It appears that the DoA presently disposes of a maximum total area of 1,000 rai which it can set aside for this purpose at seven of its stations.

Under the improved rice seed production program, the DAE secures "stock" (certified) seed from the rice stations of the DoA and passes this on to selected farmers to whom it furnishes technical assistance. The farmer is expected to sell his resulting "improved" seed to other farmers, but does not always do so and the DAE thus does not effectively control the seed sale. However, it is authorized to buy back the "improved" seed, as it also does in the case of cotton.

If the improved seed is produced on peasant farms, the gross revenue to the grower from seed sales must be at least equal to the one he can obtain from retted fiber sales (200 kg. fiber at $\text{฿}2.00 = \text{฿}400$; 200 kg. at $\text{฿}3.00 = \text{฿}600$) and, on the assumption of a 30 kg. per rai seed yield, the price to be paid per kilogram would have to vary from $\text{฿}13.35$ to $\text{฿}20.00/\text{kg.}$; at the anticipated 60 kg./rai seed yield, the corresponding figures are $\text{฿}6.70$ to $\text{฿}10.00/\text{kg.}$ The DoA, on the other hand, estimates its seed production costs at $\text{฿}120/\text{rai}$ at the 30 kg./rai seed yield level; costs are estimated to increase to $\text{฿}180/\text{rai}$ at the 60 kg./rai level due

to the additional labor involved in harvesting and cleaning the greater seed quantity. Thus, DoA produced seed would cost ₪4.00/kg. at 30 kg./rai seed yields and ₪3.00/kg. at 60 kg./rai seed yields. In view of this price differential between DoA (or DAE) and peasant farmer produced improved seed and in the interest of furnishing the growers with low cost seed, it appears preferable to have the entire improved seed requirements produced under DoA and/or DAE auspices, although it should not be forgotten that the peasant farmer will, most likely, realize additional revenue from the sale of the retted fiber produced from the stalks remaining over after the removal of the seed capsule bearing tips, although this fiber will not be of first quality. Alternatively, specific seed farms could be operated by the Kenaf Program Executing Agency which might even be able to realize a reasonable profit from seed sales while still supplying such seed to the growers at reasonable cost.

As an interim measure prior to the selection and large scale multiplication of truly improved seed and in order to arrest further seed deterioration caused by the prevailing farmer practice to collect seed from mostly inferior quality stalks, the following procedures could be adopted.

Shortly before the start of the harvest season, say in July/August, fiber plantings should be surveyed by DoA/DAE teams and the required area of well developed stalks selected, either entire farmer fields or parts of such fields. The selected stalk areas would then be purchased from the grower at that time against his undertaking not to harvest them for fiber. At seed maturity, the same teams would return and either supervise the farmers' seed harvest from the selected areas or arrange for such harvest by DoA/DAE employed labor. The resulting seed would then be distributed to the farmers under the Kenaf Development Programs. Whilst such seed would by no means be equivalent to truly improved seed, it

would be greatly superior to the kind of seed presently being used for fiber plantings; furthermore, its large scale supply could be organized very promptly and would bridge the time gap until truly improved seed becomes available in significant quantity.

It is pointed out, furthermore, that the overall seed requirements indicated above (4,000 tons/year) are based on the assumption that the rainy season starts on time and is not interrupted by early season droughts so that the growers only have to plant once. This is by no means always the case and two, three or even four replantings are sometimes required. It should, therefore, be the ultimate aim of the authorities to build up and maintain a sizeable seed reserve stock and to hold it available for distribution in case of necessity.

3. Pest and Disease Control

The most serious control problem facing the Thai kenaf fiber industry is the rapidly increasing infestation of stem rot disease caused by Phytophthora sp. which has assumed alarming proportions during the last two or three years and is estimated to presently affect up to 30 percent of the planting areas in some Changwats. As it is both a seed and soil borne disease, attempts were made to control it by both treating the seed with fungicide and spraying and dusting the infected plants. As already established in other kenaf producing countries, no protection was achieved and it was correctly concluded that the only defense is the development of disease resistant varieties. A limited scale program to that end is presently under way. It is felt to be imperative that that this program is promptly and drastically expanded since there exists a very real danger that the kenaf fiber industry might be drastically curtailed within four or five years, unless stem rot disease resistant varieties are developed, multiplied and distributed in time.

Although it is argued that pests and other disease are posing no serious problem to kenaf production in the Northeast, the existence of such pests as stem borers, leaf hoppers, mealy bugs, aphids, black flea beetles and others has already been confirmed as has that of a number of diseases including anthracnose and powdery mildew. In fact, numerous instances have been recorded where pests and diseases have caused serious damage, although so far only on a limited scale, and where spraying and/or dusting was required - and carried out - for their control.

Estimated costs of spraying or dusting per rai are as follows:

Fungicide or Pesticide	฿10.00
Sprayer, incl. fuel and depreciation	5.00
Labor (1 man. = 12 rai/day @ ฿18 per man-day)	1.50
Total	฿16.50 =====

The Chief of the Pest and Disease Control Division of the Ministry of Agriculture states that an estimated 20 percent of the annual kenaf planting areas are infested and should be treated. The Advisor considers this estimate on the low side and has used higher percentage figures for his estimates in later sections of this report.

4. Retting Facilities

It is the consensus of opinion that the improvement of existing and the establishment of additional retting facilities is one of the most important requirements to achieve a substantial increase in the quality of Thai kenaf fiber. Suggested improvements to already available facilities have already been listed in Chapter II, Section 6.1. above, where mention has also been made of the fact that it is estimated that adequate facilities are in existence in the Northeast to enable the farmers to produce some 200,000 tons of good quality fiber annually, always provided the required technical assistance, inputs and price incentives are furnished to the grower. Hence, new facilities must be provided for the production of an additional 200,000 tons of improved quality fiber.

The Applied Scientific Research Corporation of Thailand (ASRCT) has calculated that, assuming four retting cycles per season, the surface area of the retting facility must amount to 1 percent of the area planted to kenaf. Since 200,000 tons of kenaf fiber will be produced on some 1,000,000 rai (200 kg./rai or 5 rai/ton), 10,000 rai of retting facilities would be required. Each "standard" improved retting tank (25 m. long by 4 m. wide by 1 m. deep) provides an effective surface area of $25 \times 4 = 100$ sq.m.; one rai comprises 1,600 sq.m. Hence, 10,000 rai of retting facility area are equivalent to $10,000 \times 1,600/100 = 160,000$ standard size improved retting tanks.

The DoA assumes a ratio of one retting tank for every 10 rai or 2 tons of retted fiber production. On that basis, new tank requirements amount to $1,000,000/10 = 100,000$ standard-size improved tanks. The DoA's estimate is based on the premise that the stagnant water in the tanks will become too polluted after the production of 2 tons of retted fiber to permit the production of high quality fiber. It is submitted that this is a reasonable assumption and the DoA's tank requirement figure will be used as a basis for future calculations.

The number of required facilities can be reduced in two ways:

(a) By the provision of permanent water supplies:

If the improved facilities are equipped with a permanent water supply permitting the "topping up" of the facility or, preferably, periodic water exchange, the retting period can be extended to about six months or some 12 retting cycles. This would lead to a two-thirds reduction in facility requirements or a total of 33,500 units.

(b) Through the retting of kenaf ribbons:

"Ribboning" means the stripping of the bast (the fiber bearing layer of vegetable matter encasing the central woody stem) from the stalks prior to retting. Approximately six times as much kenaf fiber can be retted in the same size facility when kenaf ribbons are immersed as compared to the retting of whole stalks. Facility requirements would then be reduced as follows:

- Without permanent water supply
= 4 cycles per season = $100,000/6$ = 16,000 units
- With permanent water supply
= 12 cycles per season = $100,000/3 \times 6$ = 5,400 units

Furthermore, dry kenaf ribbon can be stored almost indefinitely and retted when convenient and/or when retting facility space becomes available without any reduction in fiber quality thus permitting the extension of the retting season, theoretically, over the entire year. However, assuming only a 50 percent extension - due to other work obligations of the growers - or a nine-month retting season, facility requirements would then be further reduced to $5,400 \times 2/3 = 3,600$ units.

A more "realistic" estimation of new retting facility requirements should probably be based on the following assumptions for the coming, say, five-year period:

- 50 percent of the required new facilities can not be provided with a permanent water supply due to lack of surface or ground water supplies. The required number of such facilities will then be $100,000/2 = 50,000$ units.
- 35 percent of the required new facilities can be provided with a permanent water supply (from rivers, streams, irrigation schemes or tube wells), but the farmers will continue to ret in the stalk. The required number of such facilities will then be $100,000 \times 0.35 = 35,000/3$ (12 retting cycles/season) = 12,000 units.
- 10 percent of the required facilities can be provided with a permanent water supply and the farmers utilizing these facilities will strip the kenaf stalks and ret the ribbons during 6 months each season. The required number of such facilities will then be $100,000 \times 0.10 = 10,000/3 \times 6 = 600$ units.
- 5 percent of the required facilities can be provided with a permanent water supply and the farmers will ret ribbons during 9 months each year. The required number of such facilities will then be $100,000 \times 0.05 = 5,000/3 \times 6 \times 1.5 = 200$ units.

- Summary of New Retting Facility Requirements

Without permanent water supply, stalk retting	50,000 units
With permanent water supply, stalk retting	12,000 units
With permanent water supply, ribbon retting	600 units
With permanent water supply, extended period ribbon retting	<u>200</u> units
Total	62,800 units =====

A DoA program for the construction of new retting facilities - without permanent water supply - is already under way. This "Kenaf Retting Pond Improvement Pilot Project" has the following equipment,

donated in 1969 by the Government of Japan under the Colombo Plan, at its disposal:

- 3 Bulldozers, Komatsu D50A (equivalent to D-4)
- 3 Bucket Excavators, Kubota, 1/3 cu.m. capacity
- 1 Transport Trailer (Low-Boy)
- 3 Pickup Trucks

Under the above project, a survey team from the DAE first carries out an investigation as to where new retting tanks are required. After concurrence by the DoA to the site selections, the equipment is dispatched. Each unit can excavate one tank daily; on the basis of 20 actual working days per month and nine working months per year (December to August), the presently available equipment pool can excavate 1,080 or, say, 1,000 tanks annually. The actual work program carried out by the project is summarized in Table 15.

The construction costs per standard-size tank are estimated as follows:

- Komatsu Bulldozer

Wages & per diem, 2 drivers, 7-hour shift	¥110
Fuel	100
Oil	28
Grease	5
Hydraulic fluid	15
Maintenance (¥60/hour x 7 hours)	420
Transport (see below)	<u>185</u>
	¥863
	say ¥900
	=====

Table 15

Retting Pond Excavation Project Implementation
1970 to 1972

Changwat	1970			1971			1972		
	Volume Excavated (m ³)	Working Days	Average Daily Excavated (m ³)	Volume Excavated (m ³)	Working Days	Average Daily Excavated (m ³)	Volume Excavated (m ³)	Working Days	Average Daily Excavated (m ³)
Khon Kaen	123,900	95	1,304	16,700	66	253	184,933	154	1,200
Maharakam	113,603	155	733	70,519	66	1,068	239,075	61	3,919
Chaiyaphoom	53,862	159	339	94,635	76	1,245	364,396	134	2,719
Nakornrachsima	-	-	-	-	-	-	44,800	41	1,093
Total	291,365	409	712	181,854	208	874	833,204	390	2,136

- Kubota Bucket Excavator

Wages & per diem, 2 drivers, 7-hour shift	Ø110
Fuel	40
Oil	14
Grease	5
Hydraulic fluid	30
Maintenance (Ø65/hour x 7 hours)	455
Transport	<u>185</u>
	Ø839
	say
	<u>Ø900</u>
	=====

- Transportation Costs

Equipment transportation by Low-Boy = Ø3.00/km.
Average transportation distance/tank = 15 km.
Equipment transportation costs/tank = Ø3.00 x 15

	Ø 45
Wages & per diem, 1 driver	55
Fuel transport, etc., by pickup @ Ø2.00/km.	30
Wages & per diem, 1 driver	<u>55</u>
	Ø185
	=====

The estimated capital cost of one equipment set as above, capable of excavating 1,000 tanks per year, is estimated as follows:

6 Bulldozers, D-4 or Komatsu D 50 A, @ Ø500,000	Ø3,000,000
1 Transport Truck Trailer (Low-Boy), 15 tons	480,000
3 Pickup Trucks, 2 tons, diesel, @ Ø80,000	<u>240,000</u>
Total Estimated Cost	Ø3,720,000
	=====

In addition to the improvement of existing and the construction of additional retting facilities as well as instruction in the application of more effective retting, washing and drying methods, con-

sideration should be given to the establishment of centralized retting facilities, preferably to be owned and operated by farmer groups of various types, where improved retting tanks with permanent water supplies and proper water control can be constructed and the operation can be carried out under expert supervision. Centralized, group-managed retting centers have proved highly successful in such countries as Taiwan. Basic designs and layouts for various types of retting centers have been developed in Thailand and the Royal Irrigation Department has already constructed several such installations near some of its Northeast irrigation dams or reservoirs.

An attempt is made below at estimating the potential financial returns from improved retting tanks as described in the foregoing. The estimate is based on the assumption that:

- The overall grade improvement as a result of Kenaf Development Program implementation, including the provision of additional retting facilities and price incentives, will result in a grade production ratio of 40-50-10 percent for "A", "B" and "C" quality fiber respectively, compared to a present ratio of 15-50-35; in other words, one ton of finished fiber will contain 250 kg. more "A" grade and 250 kg. less "C" grade, the amount of "B" grade remaining constant (Section 6.1.);

- The price incentive program will result in a grade price differential of $\text{฿}1.30/\text{kg.}$ between "A" and "C" Grade (Section 6.3.);

- The construction costs per retting tank will amount to $\text{฿}1,000$ per unit plus $\text{฿}500$ per unit for the provision of water supply and control facilities;

- Interest on investment charged at 12 percent (BAAC); depreciation charged at 20 percent;

- Output per tank = 4 tons per season.

Then: Added value per tank per season		
= 4 x 250 kg. x ₱1.30 =		₱1,300
Less added costs:		
Interest = ₱1,500 x 15%	₱180	
Depreciation = ₱1,500 x 20%	300	
Labor costs (donated labor with zero opportunity costs)	-	
Operating costs (water supply costs assumed to be negligible)	-	<u>480</u>
Net return		<u>₱ 820</u> =====

The above annual net return on an investment of ₱1,500 is equivalent to close to 55 percent.

5. Credit Facilities

The lack of adequate credit facilities is a major obstacle impeding increases in farmer income, not only in the Northeast but everywhere in Thailand and in the developing countries in general, and not only of the kenaf growers but of all farmers. Too often, the farmer's only credit source is the village merchant whose interest charges are usually high and who then obliges the farmer to sell him his crop, frequently at less than optimum prices; nor can the merchant be blamed too harshly, since he generally extends credit without adequate security and his risks are high. It should be noted that, since kenaf production is more profitable than the production of other crops in the Northeast, the kenaf growers are, in fact, in a better position to obtain credit than other farmers.

A number of farm credit programs are already in operation in Thailand through private banks, certain private commodity traders, Government cooperative organizations and others. An outstanding program is operated by the Bank for Agriculture and Agricultural Cooperatives (BAAC) which is willing to support the Kenaf Development Program to the maximum extent feasible; it has already participated in the 1972 Kenaf Package Project (see Chapter V, Section 2.3.). The BAAC extends loans to members of farmer groups which it pre-qualifies: one-year production loans in the amount of about \$100 per rai and three-year capital loans, both at the rate of 12 percent interest per year. Loans are extended either in a lump sum or as needed as the season progresses; BAAC credit supervisors check on compliance with loan utilization conditions and crop progress.

The BAAC operates in all 16 Changwats in the Northeast and is represented in every Amphur of these Changwats. It has a capitalization of some \$1,250 million and operates at a small but consistent profit. It would require additional capital to further expand its

operations. Reference is made to Chapters V, VI, and VII regarding the BAAC's present and potential future involvement in the Kenaf Package Project and the Kenaf Master Development Program.

6. Fiber Quality, Grading, and Marketing

6.1. Fiber Quality

The quality standards of "Thai Jute" (kenaf) have long been established and agreed upon and are well known to the higher levels of the marketing channel, from the large-scale dealer upwards through the baler and exporter to the local and overseas consumer; the farmers as well as most of the village merchants are unfamiliar with the details of these standards - but are well aware of the fact that they can realize a better price for the higher grades. Nevertheless, the growers frequently do not expend the additional time and effort required to produce top grade fiber, either because they are unable to do so due to lack of adequate retting water, because the additional revenue incentive is insufficient, or when they are in urgent need of cash and are, therefore, unwilling to wait even the few days longer it requires for the fiber to ret properly.

In order to maintain and increase Thailand's share of the world packaging fiber market as well as to enable the local kenaf mills to raise their production of the lighter and more profitable finished goods, it is essential to encourage the increased production of top quality fiber at the expense of the lower grades. To achieve this end, the farmer must be provided with the necessary inputs and facilities, including credit, improved seed, fertilizer, pest and disease control measures, retting facilities, technical assistance and an assured market offering an attractive price incentive; the merchants, balers and exporters must be allowed a reasonable profit but they must also be subjected to strict and relentlessly enforced quality inspection and control which has, so far, not been the case.

Opinions as to the present percentages of Grade "A", "B" and

"C" kenaf fiber production vary within quite narrow limits - but differ substantially from the grade distribution figures shown in the official export statistics. The following assessments were made by five experienced kenaf specialists concerned with up-country fiber trading, mill management and agro-economic advisory services:

<u>Source</u>	<u>"A" (%)</u>	<u>"B" (%)</u>	<u>"C" (%)</u>
Trader	20	50	30
Trader	20	50	30
Mill Manager	20	50	30
Mill Manager	15	50	35
Advisor	15	50	35

Whereas the majority opinion leant towards a 20-50-30 percent present grade distribution ratio, estimates in this report will be based on the more conservative 15-50-35 percent ratio which, it is felt, is closer to actual facts taking all Northeast production areas into account including those suffering from frequent retting water shortages and water quality problems.

The assessments of the same five specialists as to the potential Grade "A", "B" and "C" percentage distribution as the result of the successful Kenaf Development Program implementation, including price incentives, are listed below:

<u>Source</u>	<u>"A" (%)</u>	<u>"B" (%)</u>	<u>"C" (%)</u>
Trader	40	50	10
Trader	45	45	10
Mill Manager	35	45	20
Mill Manager	40	50	10
Advisor	40	50	10

It is felt that the 40-50-10 percent grade distribution estimate as assumed by the majority of the specialists approaches most closely the quality improvement potential and this ratio will be used as a basis for program targeting purposes.

6.2. Fiber Grading

The Thai kenaf farmer presently does not grade his fiber but packs all fiber qualities in a single bale which he then sells as "Mixed Grade" to the village merchant or other buyers. He has, thus, little or no incentive to invest additional time and effort into improving fiber quality especially in view of the fact that the buyer pays only a small price differential, if any, for better quality "Mixed Grade"; in fact, since under-retted and insufficiently washed fiber weighs more and takes less time and requires less effort to produce, he is actually inclined to offer as low a fiber quality as possible which the buyer is willing to accept.

If the overall fiber quality improvement program, including its price incentive component, is to be maximally effective, the farmer must be better informed as to the basic grading standards so as to place him into a stronger bargaining position vis-a-vis the buyer. At present, the only source of information regarding such standards is the printed description of grades mainly circularized among dealers by Government agencies, when and if it is displayed. This description is difficult for the farmer to interpret (if he can read). A much more useful source of information would be samples illustrative of the three basic grades accompanied by some simple explanation of permissible tolerances. The display of such samples in each buying establishment should be made compulsory.

The majority of the village and higher level merchants pre-select the "Mixed Grade" fiber they have purchased from the farmer, as do the local kenaf mills. The final grading is done at the

baling plants, both for re-sale to the local mills and for export. As a result of the rapid expansion of Thai kenaf fiber production, a large number of baling plants have been established many of which operate neither very efficiently nor conscientiously. A substantial proportion of the plants are small and work on a scale which would be considered uneconomic in India or Bangladesh. Some of the balers appear to have little knowledge of fiber quality and grading requirements; others engage in fraudulent practices such as intentionally adding lower quality fiber, baling fiber with an excessive moisture content or mis-labelling bales. Thus, they offer irresponsible competition to the old established balers and force them to lower their standards in order to stay in business. Inconsistent grading and misrepresentation of grades is the most serious and frequent cause of complaint, particularly from overseas buyers.

As in the case of the farmer, the prevailing small grade price differentials offer no incentive to the baling plants to carefully assort the fiber even where the responsible personnel is thoroughly familiar with the grading standards. This aspect of the baling plant grading problems will be remedied through the introduction of the proposed price incentive program which, however, will not be able to influence the baler's decision as to the degree of conscientiousness he wishes to apply to his assorting practices. In this respect, improved control over the operations of the kenaf baling houses is clearly required. At the same time, technical assistance to the less experienced balers should be provided; it might also be decided to close down the obviously non-viable plants and to strike their names from the roster of licensed balers in the overall interest of the industry. The Thai Jute Association and the Jute Balers Association are already cooperating toward the improvement of baling practices and they and the most ably directed Office of Commodity Standards, which acts in a supervisory capacity, should be fully supported in their efforts.

The problem of quality control at the baling plant level is discussed in greater detail in Section 6.5. of this chapter.

6.3. Price Incentive

In order to encourage the farmer to increase the percentage of high quality fiber production - once he has been enabled to do so through the provision of the necessary inputs and facilities - a program is presently being developed and its first stages are being implemented by the Thai authorities concerned under which the grower will pre-grade his fiber before field baling or the fiber in his field bales will be graded for him at specially organized buying units which will then purchase the fiber at price differentials corresponding to the various grades.

At this time, there still exist differences of opinion as to the anticipated response of the kenaf farmers to a price incentive program. Thus, doubts as to the success of the program are expressed by some traders and consumers (kenaf mills) who predict a negative farmer attitude for such reasons as the lack of adequate retting facilities, the problem of fiber transportation facilities to the buying unit, the lesser amount of work involved in the production of low quality fiber, the additional retting time required for high quality fiber production which delays sale, and the lack of knowledge of and time required for fiber grading. The majority opinion is, however, that once the inputs, facilities and services provided for under the overall development program are furnished and the required educational efforts emphasizing the potential financial advantages accruing to the farmer and the solution of his logistic and financial problems are expanded, there will indeed be a positive response on the part of the growers.

The determination of an attractive, realistic and workable price differential between the three standard grades to be sold by the

farmer is, obviously, a difficult problem and will have to be subject to adjustment based upon the experience gained during the initial phases of program implementation. On the one hand, the grower must be offered an adequate financial attraction for his increased expenditure in time and effort and, on the other hand, high quality fiber must not be priced out of the market. These two conditions appear to be met by establishing the price for Grade "A" fiber at ₱0.50/kg. above that for Grade "B", the Grade "B" price at the prevailing "Mixed Grade" price, and the Grade "C" price at ₱0.80 below that for Grade "B", the latter to provide a dis-incentive to the production of that low quality. At different "Mixed Grade" price levels and on the assumption of a 40-50-10 percent (improved) grade distribution, the farmer's income for ungraded and graded fiber respectively will then be as follows:

<u>Mixed</u> <u>Grade</u>	<u>"A"</u>	<u>"B"</u>	<u>"C"</u>	<u>Farmer Revenue/Ton</u>	
				<u>Ungraded</u>	<u>Graded</u>
₱4.00	₱4.50	₱4.00	₱3.20	₱4,000	₱4,120
3.50	4.00	3.50	2.70	3,500	3,620
3.00	3.50	3.00	2.20	3,000	3,120
2.50	3.00	2.50	1.70	2,500	2,620
2.00	2.50	2.00	1.20	2,000	2,120

At an average retted fiber production of 200 kg./rai, the additional revenue of ₱120 per metric ton is equivalent to ₱24 per rai. Although this limited increase in income may appear to provide an insufficient incentive for the farmer, it is the consensus of opinion that it is indeed adequate, particularly since it is argued that many buyers presently downgrade the farmer's fiber unfairly and pay him, on the average, some ₱0.20/kg. less than the prevailing official "Mixed Grade" price, so that the proposed price incentive will actually result in increased revenues of ₱320 per ton or ₱64 per rai.

As far as the domestic marketing of the kenaf purchased under the price incentive program is concerned, it is anticipated that the Grade "A" fiber - or the 40-50-10 Grade "A", "B" and "C" assortment, for that matter - can be sold without difficulty to those kenaf mills which presently have to re-sort even baling plant graded and pressed fiber due to their exacting batching standards and their requirements for a substantial percentage of high quality kenaf for the manufacture of finer and lighter weight yarns and finished goods, since this would actually result in an economy for them from both the financial and labor saving points of view. However, the number of such Thai mills is still limited and the majority of local production consists of Heavy-C bags for which only the medium and lower qualities of fiber are needed. The producers of such types of goods do, in fact, often find it advantageous to purchase "Mixed Grade" kenaf which contains a certain percentage of Grade "A" fiber for which they do not have to pay a higher price. Thus, increased mill efficiency and the then possible diversification into the production of the lighter finished goods which offer greater profits and export potentials would result in an increased domestic demand for improved fiber.

The principal market for high quality fiber is overseas. The normal price differential between Grades "A" and "B" Thai kenaf is of the order of $\text{¥}1.5$ per ton delivered European port, equivalent to approximately $\text{฿}0.25/\text{kg}$. or only 50 percent of the proposed price incentive for Grade "A" fiber. In addition, some attenuation of the overseas price differential is inevitably by the time it is passed on to the farmer through the various marketing steps. It is submitted that the small overseas grade price spread is largely due to the prevailing deficient grading practices of Thai kenaf as a result of which the buyer expects to find only a limited percentage of true Grade "A" fiber in the bale he has purchased under that

grade designation and that, to the consumer, the overall difference in quality between Grade "A" and "B" labelled bales does not warrant a greater price differential. This argument is supported by the fact that the best reputed Thai exporters more carefully grade or re-grade their fiber and are then able to sell "Super" and even "Selected Super" qualities at premium prices of as much as $\text{£st.}15$ to 20 per ton above the ruling Grade "A" price. It then appears reasonable to assume that properly assorted and labelled high quality fiber produced and marketed under the incentive scheme will command, on the average, a price at least $\text{£st.}10$ per ton (or $\text{฿}0.50/\text{kg.}$) above that of Grade "B" kenaf. In the meantime, the above reputable exporters are obvious clients for such fiber.

From the foregoing discussion of the domestic and export market and the price potentials of properly graded high quality fiber, it appears that a well organized and administered price incentive program could be self-supporting.

6.4. Fiber Marketing

Both the internal and export marketing system is well established in Thailand and comprises the local or village merchants, the provincial dealers, the baling plants and the exporters. Like in any other organized trade anywhere, the integrity of the various component individuals and firms of the marketing channel varies where, in the case of the kenaf industry, the practices of the unscrupulous members unfortunately exert a strong negative effect on the reputable ones whom they are often able to force, through over-bidding for middle and low grade fiber in the anticipation of selling such fiber under a higher grade label, to reluctantly modify their own practices in order to be able to fulfil their contracts and remain in business. On the other hand and in the absence of effective control and supervision at the farm and village level, they are equally able to take advantage of the kenaf grower at the

time they purchase his fiber. Whereas the first of these problems must be solved through strict enforcement of quality control, a solution to the second is offered through the provision of alternate marketing channels to the farmer.

In order to complement the input, technical assistance, credit and price incentive programs described in the foregoing and to assure that the farmer will indeed be rewarded for the additional responsibility and effort he has invested in the production of higher quality fiber, the Kenaf Development Programs under discussion in this report provide for such alternate channels. As detailed in Chapter V hereunder, the kenaf marketing services are to comprise the following:

- The establishment of buying units which will be supervised by the executing agency and will purchase the farmers' kenaf by grade and at pre-determined price levels and differentials.

- The provision of fiber transportation services from the farmers' land or, preferably, from village collection centers to the buying units. The provision of such services is considered essential to the success of the marketing program since they are also furnished by private traders and balers and the farmers are likely to continue to sell their fiber (ungraded) to such buyers unless they are offered similar facilities by the program.

- The announcement, at periodic intervals, of purchase prices, by grade, to the participating farmers.

- The purchase of the farmers' kenaf, by grade, at an incentive price for Grade "A" sufficiently high to encourage the growers to improve their fiber quality.

In order to take advantage of the facilities, organization and expertise of the existing baling plants and to forestall their opposition and competition, these plants must be persuaded to act

as buying units under the program; they must, however, be willing to accept the executing agency's supervision as far as grading of the farmers' fiber and prices paid are concerned. On a large Northeast-wide scale, this would require baling plant inspection services which could be combined with the quality control services discussed in the following section.

Marketing of the graded fiber by the baling plant buying units should present no problems since both local consumers (bag mills) and exporters should be prepared to pay a premium for improved quality and properly assorted fiber, always providing that a rigorously enforced quality control program prevents unethical competitors from disposing of mis-labelled fiber at a financial advantage.

Numerous suggestions have been made regarding the establishment of kenaf production and marketing co-operatives which would be able to dispose of their fiber directly to the baling plants, local mills or exporters and thus eliminate one or more middlemen from the marketing process; in theory, such cooperatives would be able to act as their own balers and exporters, establish a reputation for fiber quality and assortment overseas and pass on to their members the increased profits resulting from the by-passing of the regular marketing channel. Whereas small and medium scale cooperative organization for the purpose of kenaf production and local marketing might indeed be encouraged, extreme caution is in order before such organizations are allowed to attempt an incursion into the international fiber market which is a very specialized and speculative field. It is much to be preferred for eventual kenaf cooperatives to use reputable established exporters as their agents or buyers. They should also be discouraged from establishing their own baling plants since, in view of the overall excess capacity of the Thai kenaf baling industry, the pressing and ancillary services can be contracted for with existing plants at substantially less cost.

The export marketing of Thai kenaf is a well organized and smoothly running operation. By law, all exporters must be members of the Thai Jute Association which exercises both regulatory and service functions. Kenaf exporting is a profitable business and demand has been running high for the last several years. Although frequent and admittedly justified complaints are received from overseas consumers regarding the unreliability and inconsistency of fiber grading - a problem to which the Thai Jute Association and many exporters give the most serious attention - it is often argued that this applies equally to every other agricultural commodity and that it has not affected the demand for Thai kenaf: as long as the world market demand remains high, there will be no problem in disposing of all kenaf export availabilities; when there is world-wide excess production, no commodity can be sold, not only kenaf.

While these arguments might appeal to the individual trader, they militate against the overall interest of the Thai kenaf industry whose aim it must be to expand its share of the existing market, to maintain and increase its share of a shrinking market through improved fiber quality and price competitiveness, and to raise the income of the kenaf producers in the Northeast.

The claim is frequently made - including in this report - that a substantial percentage of lower grade fiber is exported under the Grade "A" label. An attempt will be made in the following to substantiate this contention, at least within the limits imposed by available information and statistics. Table 16 lists Thai kenaf fiber exports, by grade, for the years 1966 to 1971. Total exports for the 6-year period amounted to 1,873,000 tons which, incidentally, represents some 77 percent of Thailand's total kenaf fiber production during that period. The table shows that in excess of 44 percent of the fiber shipped abroad was sold under the "Super"

Table 16

Thai Kenaf Exports - By Grade
1966 - 1971

Grade	1966		1967		1968		1969		1970		1971		Total	
	M/T	%	M/T	%										
Super	2,751	0.57	2,378	0.73	2,385	0.83	6,566	2.55	2,966	1.15	223	0.08	17,269	0.92
A	157,706	32.50	119,077	36.73	125,634	43.94	145,531	56.67	124,796	48.18	134,638	51.44	807,382	43.11
B	146,953	30.28	91,332	28.17	86,030	30.10	52,587	20.47	64,372	24.85	59,975	22.91	501,249	26.76
C	115,716	23.85	67,234	20.74	40,370	14.12	18,970	7.40	29,195	11.27	26,521	10.13	298,006	15.91
D	-	-	-	-	-	-	110	0.04	5	0.00	-	-	115	0.01
Cuttings	54,705	11.27	36,236	11.18	28,998	10.14	27,891	10.87	30,220	11.67	34,535	13.19	212,585	11.35
Tangles	6,558	1.35	7,179	2.21	1,246	0.44	4,229	1.65	6,121	2.36	4,207	1.61	29,540	1.58
Caddies	896	0.18	790	0.24	1,226	0.43	916	0.35	1,344	0.52	1,638	0.65	6,810	0.36
Total	485,285	100.00	324,226	100.00	285,889	100.00	256,800	100.00	259,019	100.00	261,737	100.00	1,872,956	100.00
Total Production	622,400		487,800		183,600		344,800		393,100		414,100		2,445,800	

Source: Thai Jute Association

Total Exports = 76.58%
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and "A" grade labels. On the other hand, the local mills are stated to consume an average of 20 percent of Grade "A" fiber which corresponds to the presumed percentage production of that grade in Thailand. Hence, there should be the same 20 percent of Grade "A" and "Super" available for export. Since more than 44 percent were actually shipped under those labels during the 1966 to 1971 period, the claim that a substantial amount of lower grade fiber is actually mis-labelled for export appears to be well substantiated. The table also shows that this tendency has increased during the most recent years. It seems hardly possible to make a stronger case for improved export quality inspection than is presented in the above.

6.5. Quality Control

6.5.1. General

Effective fiber quality control is indispensable for the successful implementation of the Kenaf Development Program. As long as the inexperienced baler continues to inadequately grade the fiber and the unscrupulous trader and baler can afford to pay a higher price for lower quality fiber since he ultimately intends to sell that fiber under a higher grade label, any fiber quality improvement and price incentive program must inevitably fail.

As indicated in Section 6.2. above, the essential grading process takes place at the baling plants. These plants are, therefore, the proper locations where quality control should, ideally, be exercised and enforced and where, incidentally, the major educational effort with regard to quality and grade requirements must be concentrated.

Although it will appear from the above that the baler is principally to blame for deficient grading and even intentional

mis-labelling, the burden of responsibility must equally be shared by the other members of the marketing channel where necessity rather than opportunism may, at times, exert the decisive influence. Thus, the merchants and balers often defend their readiness to purchase inferior quality fiber and/or to pay excessive prices which later forces them to unconscientiously up-grade the fiber by arguing that they have to buy since this is their business; that at the beginning of the season, when plentiful retting water is available to the farmer to produce good quality fiber, they must offer an inducement for him to continue harvesting and retting and that, if they enforce quality standards too strictly, he will not remain their supplier; and that late in the season, when most of the fiber is of low quality due to lack of retting water, there exists strong competition for the small quantities still available and they must meet this competition. The baler is also subject to competitive pressures as well as to the demands imposed upon him by the exporter; in the last analysis, if all exporters would insist on properly graded and labelled fiber, the baler would be forced and, indeed, would be willing to act accordingly which, incidentally, would automatically oblige the lower level merchant to follow suit. The exporter, on his part, is by no means always a free agent since he must satisfy the demands of the overseas brokers which are often more price than quality conscious and which, in fact, frequently insist on price discounts knowing full well that this will force the exporter to include a proportion of lower grades in a bale sold under a higher grade label, the principal concern of the foreign buyer often being his profit rather than the reputation of the Thai kenaf industry.

A rigorously enforced export quality control system will not only lead to improving the reputation and demand for Thai kenaf, but is also essential for the successful implementation of the price incentive program by assuring a dependable grade price

differential. Only when the baler (and exporter) is obliged to deliver true Grade "A" fiber under a contract calling for that quality, will he be willing to pay a higher price for superior fiber in order to realize the higher return he receives from its sale. This will automatically ensure the application of the price incentive phase of the overall program and thus eliminate one of the major restraints on quality improvement.

6.5.2. Agencies Exercising Quality Control

At present, export quality control is exercised by both the Office of Commodity Standards (OCS) of the Ministry of Economic Affairs and by private inspection companies. Some of these latter are conscientious and others less so. When an inspection firm strictly enforces quality standards and rejects a shipment because of improper grading, the overseas buyer and the exporter often agree to employ a less reliable company which will then pass the shipment. In fact, requests for the relaxation of quality control inspection standards are frequently received at times of fiber shortages on the international market so as to reduce prices and that in spite of the fact that that same shortage already contributes to unsatisfactory grading.

It is submitted that, in order to improve grading standards and reliability, control responsibility, should be vested exclusively with the OCS. This will result in the inspection function being carried out by salaried Government officers under the direct control of the Chief of the OCS and his deputies. It has been pointed out in the past that this system opens the door to potential unethical practices and resulting ineffectiveness since civil service salary scales are low and the assignment requires decisions involving large sums in profits or losses to the traders. It is felt, however, that the risks in that direction could be minimized through such devices

as spot-checking of inspectors and the random or rotational selection of inspectors for particular assignments. Furthermore, the OCS should be empowered to revoke the licenses of traders found guilty of attempting to corrupt inspectors.

6.5.3. Baling Plant Quality Control

As pointed out above, quality control would best be exercised at the baling plant level but such a program would, under existing circumstances, be difficult and costly implement. At present, some 200 baling plants operate in Thailand, both upcountry and in Bangkok, many of them on a 24-hour per day basis during the season; this would require the secondment of three or even four inspectors per baling house taking holiday and sickness leaves into account or up to a total of 800 inspectors. At a minimum estimated salary, per diem and other allowances cost of ฿2,500 per inspector per month, this would involve an annual expenditure of some ฿24 million or ฿120,000 per baling plant.

An alternative method of improving baling plant assortment practices, and one strongly recommended, is to require the employment of trained and licensed supervisors by the plants. The training function should be assumed by the OCS (see Section 6.5.5. below) and, upon successful completion of their courses, the supervisors should be issued with a license which can be withdrawn by Government upon proof of unsatisfactory or unethical performance of their duties. A regulation requiring the employment of licensed supervisors by the baling plants - who, failing compliance, would not be permitted to operate - is considered the single most effective measure liable to improve baling plant practices.

6.5.4. Export Quality Control

It is submitted that quality control of Thai export kenaf only (rather than individual baling plant inspection) is adequate to achieve the Kenaf Development Program goals for purposes of establishing export quality control staffing and budgetary requirements, it is further assumed that:

- All inspection is carried out by salaried employees of the Office of Commodity Standards (OCS) of the Ministry of Commerce;
- Export bales are inspected at Bangkok godowns;
- 270,000 tons of a total annual crop of 400,000 tons are exported, i.e. 67.5 percent.

Inspection practices include both the opening of single bales and visual examination of all bales. If a shipment comprises bales from only one baler, 10 to 15 bales may be opened for each 1,000 bales; if fiber from more than one baler is involved (there may be as many as 10 different baling sources in a 1,000 bale shipment), two bales from each baling plant are opened. In addition, all bales are visually inspected during the loading operation.

Inspection is to be carried out by three-man teams consisting of one Senior and two Junior Inspectors. Each such team can inspect 100 tons of export fiber per day and works 30 days per month during the five months export season. Hence, each team can inspect 15,000 tons and 18 or, say, 20 teams will be required for the inspection of the assumed 270,000 tons of annual kenaf exports.

Proposed inspector salaries are as follows:

Senior: B1,250 + 50% allowance	=	B1,875/month
Junior: B 850 + 50% allowance x 2	=	2,625/month
Total	=	B4,500/month =====

Hence, the annual budget requirements for 20 inspection teams are:

$$\text{B4,500} \times 12 \times 20 = \text{B1,080,000/year}$$

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6.5.5. Training of Inspectors and Baling Plant Supervisors

The kenaf trade is comparatively new to Thailand and there exists a substantial lack of knowledge and experience at the various steps in the marketing channel as far as fiber quality and grading is concerned. Hence, an essential and urgent requirement is the education and training of all members of the marketing system, from the farmer thru' the upcountry dealer, the baler and the exporter. In addition, the required number of inspectors must be trained, a process which should be carried out by Government action under the auspices of the OCS through the establishment of a training school for both inspectors and supervisory personnel of baling plant . If desired, the services of an outside specialist in the preparation and grading of packaging material fibers could be secured who would be attached as advisor to the OCS. In that position, he would be responsible for inspector training programs, arrange for courses in fiber grading for agricultural extension officers and baling plant supervisors, and act as an independent arbitrator in disputes regarding fiber quality or compliance to grading standards by balers and exporters.

7. Ribboning

In view of the chronic retting water shortage in the Northeast, every means must be explored which could lead to a more efficient use of the available water. One such method is stalk ribboning prior to retting.

The term "ribboning" is applied to the process of manual or mechanical stripping of the fiber-bearing bast of the kenaf stalk from the central woody core. The resulting bast "ribbon" only, rather than the complete stalk, is then retted in water. The principle, advantages, of ribboning include:

- A reduction of 80 percent or more in transportation costs from the field to the retting facility;
- A 75 to 80 percent reduction in retting water requirements;
- Ribbons can be dried and then stored and retted when convenient without affecting fiber quality;
- Ribbons ret faster and more uniformly than whole stalks,

Ribboning can be done either by hand (as in Taiwan, where the entire 20,000 tons per year jute and kenaf fiber crop is stripped in order to save retting water) or by machine (as in Central America and some African countries). Manual ribboning is about as labor-intensive as stripping of the retted fiber after stalk retting, so that no increase in labor requirements results. It requires only simple wooden implements which the farmer can provide himself.

A standard mechanical decorticator can ribbon the stalks from some 2.5 to 3.0 rai per day with a 10-man crew which would require an estimated 45 to 55 man-days to strip manually. It must be pointed out, however, that machine ribboning is usually introduced to economize on labor and thus to reduce production costs; since the Thai farmer does not take his or his family's labor cost into account,

the introduction of mechanical equipment can not be justified on a cost reduction basis. Rather, it would enable the farmer to cultivate a larger area than at present without adverse effect on fiber quality when he is often forced by family labor scarcity to harvest over-mature stalks during the "second wash" period or to abandon part of his crop entirely as is frequently the case.

It is also emphasized that efficient ribboning, particularly manual stripping, requires stalks of reasonable size and diameter if the bast is not to break during the operation. This necessitates certain modifications in planting methods, particularly the introduction of row planting. Also, the ribbon must be stripped from fresh stalks so that, in the Northeast, the process must be completed before the start of the rice harvest in early December.

After stripping, the ribbon is hung up for drying in the field, much as the retted fiber is dried. Since dry ribbon weighs only about one-fifths as much as whole stalks, occupies only a fraction of the volume as the bulky central woody core has been removed, and contains some 65 percent of fiber compared to 4 to 5 percent for whole stalks, transportation costs to the retting facility in terms of finished fiber are substantially reduced, from 80 percent upwards depending upon the size and condition of the original stalks.

At the retting facility, the weight of retted fiber produced by each cycle in the same volume of water (or size of retting tank) is some 3 to 6 times greater when ribbons rather than whole stalks are immersed due to the higher percentage of fiber in the ribbon and its lesser volume. Also, since dry ribbon can be stored and retted after many months of storage without a deterioration in fiber quality - which is not the case with whole stalks which must be retted within a few days after harvest - the retting season can be extended and ribbon can even be retted shortly after the start

of the rainy season when plenty of water is available in the Northeast.

A comparison of retting water requirements between whole stalk and ribbon retting has already been made in Section 4 of this chapter and shows that retting water requirements could be reduced by from 60 to 95 percent, depending on the availability of permanent water supplies or early in the rainy season retting as mentioned above.

Since the central woody core has been removed during the stripping process, bacterial action during the retting process is faster and more uniform with the result that fiber quality is improved and very little or no under-retted butt-end fiber is produced which must later be removed as "cuttings". This increases the overall value of the fiber.

Whilst it is not recommended at this stage that an attempt should be made to force ribboning on the farmers since this involves a radical modification of traditional methods, it is suggested that selected farmers should be encouraged to try out the process, particularly in areas under the Kenaf Package Project or Kenaf Development Programs where an intensive extension and educational effort can be undertaken and the necessary technical assistance can be provided. Furthermore, the ribboning machines already available and tested should be utilized to further investigate the techno-economic feasibility of mechanized stripping.

CHAPTER IV - THE KENAF DEVELOPMENT COMMITTEE

1. History

On November 25, 1969, the Chairman of the Executive Committee of the National Economic Development Board (NEDB) submitted a memorandum to the Prime Minister regarding the establishment of a Kenaf Development Committee (KDC) which may be summarized as follows:

The Secretariat of the Cabinet advised the Executive Committee of the NEDB of a proposal by the Ministry of Economic Affairs (now Ministry of Commerce) to establish a policy aimed at the correction of the kenaf production problem including the organization of a marketing board. The Cabinet requested the Executive Committee of the NEDB to take this matter under advisement and submit its comments for the Cabinet's consideration.

The Executive Committee of the NEDB had discussed a Kenaf Development Board project already previously as submitted by its Private Sector Planning Sub-Committee and which emphasized a long-term program for fiber quality improvement, price incentives and export quality control. In that connection, the formation of farmer groups was to be encouraged, extension services and such inputs as improved seed and retting facilities were to be provided and a price incentive program for Grade "A" fiber only was to be developed. At the same time, the responsibilities of the Ministries of Agriculture, Industry and Economic Affairs as well as their co-ordinating functions with other Government agencies were to be clearly defined and the budgetary requirements determined. The establishment of a Kenaf Marketing Board was not considered necessary; instead, the program was to be supervised by a Committee composed of the Government agencies and individuals concerned. After consideration of the above proposal, the Executive Committee of the NEDB established a Working Group charged with

the task of drafting the Kenaf Development Program which it accomplished in consultation with the respective Government agencies. Having considered this draft, the Private Sector Planning Sub-Committee again recommended the establishment of a Marketing Board, since it felt that such an organization was required to co-ordinate the programs by the different Ministries and that a Committee would not have the necessary authority; nevertheless, it proposed the formation of a Committee as a first step to initiate program implementation and to further discuss the establishment of a Board.

The Executive Committee of the NEDB considered that the Kenaf Development Program required further detailed elaboration, also that the establishment of a Marketing Board as proposed by the Ministry of Economic Affairs and the NEDB Sub-Committee was premature but should be re-considered after the long-term Kenaf Development Program had been finalized. Instead, a Committee should be appointed, chaired by the Executive Committee of the NEDB, and whose membership would include representatives of the Ministry of Agriculture, Marketing and Co-operative agencies, the Budget Bureau, the Private Sector Planning Unit of the NEDB, the private sector and other qualified persons. The task of implementing the fiber quality improvement program should be assigned to the Ministry of Agriculture which should establish the program promotion areas and provide improved kenaf seed. Its Departments of Agriculture and of Agricultural Extension should co-operate on the provision of retting facilities and consult with the Royal Irrigation Department on water availability. The Ministry of Economic Affairs should be in charge of the price incentive, marketing and quality control phases of the program; with regard to the latter, co-operation should be established with the Office of Industrial Standardization of the Ministry of Industry which already had been given the required authority under the Industrial

Standards Act of 1968. The organization of farmer groups should be the responsibility of the Department of Credit and Marketing of the Ministry of National Development and credit inputs were to be provided by the Bank for Agriculture and Agricultural Cooperatives.

The newly to be appointed Committee jointly with the Ministries concerned would have the task of preparing detailed annual quality improvement, price incentive and quality control programs, including personnel and budgetary requirements and submit same to the Executive Committee for consideration which, if it deemed them practicable and of potential benefit to the people in the Northeast, would submit them to the Cabinet for approval and incorporate them into the National Development Plan.

In consideration of the above, the Executive Committee of the NEDB formally requested the Cabinet to establish the Kenaf Development Committee for the purpose of co-ordinating the Kenaf Development work of the various Ministries and other Government agencies.

2. Committee Objectives, Functions and Membership

In recognition of the fact that kenaf is one of Thailand's major exports as well as being the most important cash crop for the farming population in the Northeast, the establishment of the Kenaf Development Committee (KDC) was authorized in early 1970 with the major assignment of encouraging improved quality fiber production, assuring the producer of a fair incentive return for such improved quality, and co-ordinating the work of the various Government agencies and private entities concerned with the kenaf industry.

2.1. Terms of Reference

- a. Establish and submit to the Government a promotional policy for the production of high quality kenaf to satisfy the demands of both the domestic and export markets, including price stabilization and quality control measures aimed at achieving these objectives;
- b. Co-ordinate the efforts of the Government agencies and private entities directed towards benefitting the kenaf grower and trader through high quality fiber production, evaluate the progress and results of these efforts and identify the problems and obstacles limiting the successful implementation of the promotional policy and propose corrective measures to the Government;
- c. Take under advisement kenaf development projects submitted by Government agencies and submit proposals for their implementation to the Executive Committee of the National Economic Development Board;
- d. Appoint sub-committee and/or working groups as required.

2.2. Project Implementation Method

The implementation of the project will be assigned to the Government agencies already engaged in kenaf development related work with a newly established Government entity assuming overall project responsibility.

a. Kenaf Quality Improvement

The following Government agencies will participate:

Department of Agriculture	Department of Agricultural Extension
Royal Irrigation Department	Community Development Department
Department of Land Cooperatives	Land Development Department
Bank of Agriculture and Agricultural Cooperatives	
Applied Scientific Research Corporation of Thailand	

Overall responsibility for this phase of the project is assigned to the Department of Agricultural Extension.

The Kenaf Quality Improvement Program will comprise the following activities:

(i) Propose annual high quality kenaf production targets; forecast long-range high quality output; co-ordinate targets with the overall Northeast Economic Development Plan.

(ii) Establish kenaf promotion areas based upon geographical considerations and the availability of retting, transportation, marketing and other necessary facilities; encourage farmers in non-promoted areas to produce crops other than kenaf, the choice of crop to depend on demand, location and similar factors.

(iii) Encourage the establishment of farmer groups in the promoted areas in the form of kenaf grower cooperatives to facilitate the provision of extension, marketing and credit services.

(iv) Provide technical assistance to the kenaf farmer groups

in the promoted areas with regard to improved seed production, fertilizer use, and harvesting and fiber processing procedures.

(v) Organize research on kenaf variety selection and planting, harvesting and fiber processing methods.

(vi) Facilitate the provision of credit services to the kenaf farmer groups in the promoted areas in cooperation with the Bank for Agriculture and Agricultural Cooperatives, commercial banks and other financial institutions.

(vii) Improve existing and make provision for additional retting facilities in the promoted areas by encouraging the Kenaf Farmer Groups to excavate their own retting tanks and to organize their communal utilization.

b. Price Stabilization and Marketing

The following Government agencies will participate:

Internal Trade Department	Foreign Trade Department
Office of Export Promotion	Public Warehouse Organization
Industrial Promotion Department	Department of Industrial Works
Ministry of Commerce	Board of Investment
Department of Credit and Marketing Cooperatives	

Overall responsibility for this phase of the project is assigned to the Ministry of Commerce.

The price stabilization and marketing program will comprise the following activities:

(i) Announce the minimum price for high quality (Grade "A") kenaf each season and purchase the fiber directly from individual kenaf farmers and kenaf farmer groups.

(ii) Promote the export of kenaf fiber, finished goods and other kenaf products and conduct research into new kenaf markets.

Consider the establishment of rules and regulations to facilitate free competition and to eliminate export restraints.

(iii) Promote local industries utilizing kenaf as raw material with the aim of expanding the kenaf market and encourage research into new industrial uses of kenaf.

c. Quality Control

The following Government agencies will participate:

Office of Commodity Standards Factory Control Division
Office of Industrial Standardization (Ministry of Industry)

Overall responsibility for this phase of the project is assigned to the Office of Commodity Standards.

The Quality Control Program will comprise the following activities:

(i) Establish strict rules and regulations on kenaf quality standards for the baling plants and exporters.

(ii) Promote the greater involvement in quality control activities of those baling plants which are members of the Jute Balers of Thailand Association and insist on the compliance with quality standards by the Association members.

(iii) Report on the efficiency of the Quality Control Program and identify problems and restraints for Kenaf Development Committee consideration.

2.3. Committee Membership

The committee is composed of representatives from the following sectors:

a. Public Sector - Representatives of the Government agencies concerned;

- b. Producers' Sector - Representatives of farmer groups and cooperatives;
- c. Private Sector - Representatives of exporter, baling plant, kenaf mill and trade associations.

The committee membership is as follows:

- a. Chairman of the Executive Committee of the NEDB Chairman
- b. Mr. Osote Kosin, Advisor to the Prime Minister and Secretary-General of the Office of Export Promotion Deputy-Chairman
- c. Director General of the Internal Trade Department or his representative Member
- d. Director General of the Foreign Trade Department or his representative Member
- e. Director General of the Department of Agricultural Extension Member
- f. Director General of the Public Warehouse Organization Member
- g. President of the Thai Jute Association Member
- h. President of the Jute Balers of Thailand Association Member
- i. Representative of the Bank for Agriculture and Agricultural Cooperatives Member
- j. Representative of the Ministry of Industry Member
- k. Representative of the Ministry of Interior Member
- l. Representative of the Ministry of National Development Member
- m. Representative from the Applied Scientific Research Corporation of Thailand Member
- n. Director of the Economic Projects Division of the NEDB Member
- o. Chief of the Private Sector Planning Unit of the NEDB Member and Secretary

3. Committee Activities

3.1. Quality Improvement Project

The Kenaf Development Committee (KDC) was established in February 1970. During its first two meetings in April and May of that year, it discussed the implementation of a pilot project aimed at the production of high quality kenaf. It was decided that such a program should be set up in nine promotion areas in Changwat Nakornrachsim and three such areas in Changwat Chaiyaphoom and that it should adopt the following general policies:

- Aim at increasing farmer income in the promoted areas through a price support program for farmer groups;
- Promote the establishment of farmer groups so as to make it possible to channel the price support assistance through such groups and provide them with retting tank construction and other technical assistance;
- Provide on a loan basis or distribute improved kenaf seed to the farmers and assist them through the construction of suitably sited retting facilities;
- Provide credit services to the farmer groups;
- Extend technical assistance services to the farmer groups with respect to the planting, fertilization, harvesting and processing of kenaf.

Responsibility for project implementation was assigned to the Department of Agricultural Extension (DAE), the Community Development Department (CDC), the Thai Jute Company (TJC), the Royal Irrigation Department (RID), the Department of Agriculture (DoA), the Department of Local Administration (DLA), the Department of Land

Co-operatives (DLC), and the Applied Scientific Research Corporation of Thailand (ASRCT).

The price support program phase of the project was to be financed by the TJC from which the agencies concerned were to obtain the funds necessary to carry out their buying functions. At the same time, the support price was to be announced to the farmers in advance of the harvest season. The TJC was to contribute approximately B1 million to the program, the remaining financial requirements to be furnished by the agencies involved in the various project phases. The support price was set at B3.00/kg. for Grade "A" kenaf and at B1.80 for Grade "B", this large differential having the purpose of bringing home to the farmers the financial advantage of high quality fiber production.

The Internal Trade Department, of which the TJC is a dependency, argued that the company should not be asked to assume the financial risks resulting from purchasing kenaf at the above price levels and insisted that the TJC would set a price of B2.00/kg. and would purchase only Grade "A" fiber at that price. Further committee discussions on this point can be summarized as follows:

(i) As a public enterprise, the TJC could not be permitted to suffer financial losses for two consecutive years, since, by law, this would result in its dissolution.

(ii) Since the establishment of price differentials for the various kenaf fiber grades with a support price of even B2.20/kg. for Grade "A" might occasion losses to the TJC, the Government should agree to subsidize such losses.

The recommendations of the KDC to the above effect was rejected by the Cabinet who returned the project to the Executive Committee of the NEDB which, after further consideration, submitted the following recommendations:

(i) The high quality fiber production project should be supported.

(ii) The TJC should be required to purchase Grade "A" kenaf at ฿2.20/kg. as proposed by the KDC.

(iii) A three-year program should be set up for purposes of data collection and evaluation which would then form the basis for long-range planning.

(iv) The fiber purchase price should be established each year in accordance with the prevailing kenaf price range.

The Cabinet agreed with these recommendations and authorized the implementation of the project. Accordingly, seventeen farmer groups in eight Amphurs in Changwat Nakornrachsim and three such groups in three Amphurs in Changwat Chalyaphoom were included in the project; their total kenaf planting area amounted to 1,500 rai from which a retted fiber production of 300 tons was anticipated. A subsequent evaluation of the project by the DAE, the TJC and the Private Sector Unit of the NEDB indicated its lack of success and ascribed this to:

- Unavailability of improved seed;
- Insufficient extension personnel;
- Inadequate cooperation between the officers of the DAE and the BAAC.

The TJC did not become involved in the marketing process at all since it maintained that it was obliged only to purchase Grade "A" kenaf at ฿2.20/kg. and since even the "Mixed Grade" price was substantially above that level throughout the season.

3.2. International Jute and Kenaf Buffer Stock

At the request of the Ministry of Commerce, the KDC met in August 1970 to consider a proposal on the establishment of buffer

stocks by the three principal producing countries - India, Pakistan (now Bangladesh) and Thailand - as submitted to the Ninth Session of the Consultative Group on Jute, Kenaf and Allied Fibers at the FAO, Rome. The KDC came to the following conclusions:

(i) The international buffer stock proposed by Pakistan has for its main purpose the stabilization of the price of Pakistan jute; also, it relies largely on funding from the overseas consuming countries. The Thai representative to the FAO session had consulted with a number of foreign buyers who objected that the buffer stock program was likely to lead to higher jute prices and would principally benefit the producers; they also doubted the availability of the required funds.

(ii) Due to the fact that Thailand produces kenaf whereas India and Pakistan produce jute and since these two fibers differ in both quality and price, problems would arise in connection with quota allocations to the member countries and it was feared that the kenaf quota may well be reduced by the jute producing countries to the disadvantage of Thailand.

(iii) Any international buffer stock would have to be related to internal availabilities as well as control over planting areas, fiber output and quality, grading standards and price. Thailand has neither effective control machinery nor a large internal fiber stock as is the case in India and Pakistan.

(iv) Thailand would have to make a substantial contribution towards the international buffer stock organization which, in view of its financial situation, it can not make available.

(v) Thailand has no problem in disposing of its annual production of 350,000 to 400,000 tons of kenaf and sees no advantage to itself in the establishment of an international buffer stock.

3.3. Promotion of Kenaf and Jute Production

The KDC met in May 1971 and discussed three subjects as follows:

(i) Quality Promotion and Price Support Program, Northeast Jute Mill Co., Ltd. (NEJM):

The KDC agreed that the program is likely to achieve its purposes of encouraging the production of high quality kenaf through the provision of credit, input, technical assistance and marketing services, but requested the NEJM and the Secretary of the Committee to prepare a more detailed plan than was then available and submit same for further Committee consideration (Note: the details of this plan, its 1972 implementation and proposals for 1973 programming and execution are described in the following Chapter V).

(ii) Increased Kenaf Production, 1971/1972:

The KDC requested the DAE to submit details on kenaf export market potentials for its consideration and to specify the technical and other farmer assistance services required to implement an expanded kenaf production program.

(iii) Jute Promotion Project:

The KDC considered the project promising and of potential financial advantage to the farmers due to the higher prices offered for jute fiber as compared to kenaf. It requested the TJC to submit a more detailed program for the Committee's consideration.

The NEJM supported Quality Promotion and Price Support Program - the Kenaf Package Project - was further discussed during the KDC's meeting on August 6, 1971, which also considered the advisability of securing the services of an advisor to the project.

A meeting on April 18, 1972, dealt specifically with the incorporation of the Jute Promotion Project into the activities of the Land Resettlement Areas of the Public Welfare Department.

3.4. The Establishment of an International Jute Center

A meeting of the KDC was called on August 17, 1972, to consider the report of the 1970/1971 UNDP Fact-Finding Mission on the Establishment of an International Jute Center. The Committee commented as follows:

(i) The KDC agrees that the decline of the international market for jute, kenaf and allied fibers and finished goods due to price fluctuations, the variations in available supplies and the competition from man-made fibers poses a real problem and will adversely affect the future development of the Thai kenaf industry. These negative effects are felt particularly with regard to the export market potential in the developed countries in Europe, the United States and Japan. The situation can be expected to be further aggravated by the fact that the man-made fiber producers continue to carry out intensive research on the future application of such fibers for packaging materials, carpet backing and other specialty uses, whereas the jute and kenaf industry does so only to a limited extent.

(ii) To overcome the above problems, the Jute Fact-Finding Mission recommends an overall development program including:

- Research and technical assistance in the field of agriculture aimed at productivity and quality improvement;
- The rehabilitation of the marketing system;
- The establishment of buffer stocks;
- A price stabilization program;
- Research into the development of new end uses for jute and kenaf;
- Technical assistance aimed at improving the operation and management of the jute and kenaf manufacturing industries;
- Promotion and publicity efforts.

Whilst the KDC agrees that the measures proposed by the Mission, will be of benefit to the jute and kenaf industry, it wishes to state its belief to the effect that, from each individual producing country's point of view, the impact of the program must be considered in relation to the already on-going development projects in such country and the significance of the jute and kenaf industry within the overall economic framework.

(iii) Kenaf industry development work is already in progress in Thailand, including:

- Agriculture:

Research into varietal selection, seed improvement and disease resistance varieties;

A retting facility development project;

A kenaf "Package Project" under KDC auspices and with the cooperation of the Department of Agriculture, the Bank of Agriculture and Agricultural Cooperatives, the Northeast Jute Mill, as well as other agencies; the project includes technical assistance services, credit facilities, input supplies and market services at a guaranteed minimum price;

A jute development program initiated by the Thai Jute Association and the Siam Gunny Group and assisted by the Department of Agriculture.

- Industry:

A research project by the Applied Scientific Research Corporation of Thailand into the use of kenaf for paper pulp, and a fiber quality improvement project;

The recent establishment of a Textile Institute by the Department of Industrial Promotion with UNIDO assistance which, although it will concentrate initially on the cotton industry, will expand its activities subsequently also into the industrialization of jute and kenaf.

(iv) So far, there is a certain lack of coordination between the different in-country kenaf and jute development projects; nor do the projects as yet enjoy a substantial budgetary support. It will be the task of the KDC to improve internal coordination between the projects. Meanwhile, the KDC is somewhat doubtful as to the support it can furnish to an International Jute Center prior to the effective improvement of the domestic programs.

(v) The Mission proposes the establishment of an International Jute Center with the functions listed in Paragraph 2 above to be financed by the producing countries and with an annual operating budget of approximately US\$11 million, including the operation of four national offices. A substantial proportion of this budget is to be financed by the UNDP and the IBRD during the initial five-year period. The KDC agrees, in principle, that the proposed Center would indeed benefit the producing countries as a result of its agricultural and industrial technical advisory services and its market expansion activities, but wishes to make the following two principal observations:

(v).1. The benefit accruing to the various participating producing countries will be greater to the larger producers, i.e. India and Bangladesh. Thailand can expect to benefit principally from the Center's agricultural research activities, its technical assistance to industrial operations, and its research into the promotion of new end-uses.

(v).2. The Mission report estimates an annual expenditure of approximately \$11 million:

\$ 650,000 for the Headquarters Unit
1,570,000 for the Regional Offices
670,000 for the Technical Center
8,000,000 for Market Development and Publicity

A substantial amount of this annual budget would be provided by the UNDP and the IBRD during the first five years in order to relieve the initial financial burden on the producing countries.

In an attempt to quantify Thailand's contributions to the project, the KDC has used two approaches:

- (a) If Thailand's contribution is based on its share of fiber exports in the international market, it would amount to 13 percent.
- (b) If Thailand's contribution is based on its share of finished goods exports in the international market, it would amount to 2 percent.

A 13 percent contribution would amount to approximately \$1.4 million and a 2 percent contribution to approximately \$220,000 annually.

These amounts represent substantial contributions from the Government budget and further discussions on the subject will be required.

(vi) After consideration of the various aspects of the proposed International Jute Center, the KDC agrees that the solution of the problem of declining raw fiber and goods markets is vital and that a market develop research program and the improvement of agricultural and industrial production would contribute to such solution. On the other hand, the required investment is very substantial and represents a serious financial burden for the producing countries.

The KDC feels that Thailand should participate in the discussions and negotiations relating to the project in order to obtain a detailed outline of the Center's work plan and expenditures on which to base its recommendations for further consideration of the project by the Thai Government.

CHAPTER V - THE KENAF PACKAGE PROJECT

- Introduction

The Kenaf Package Project, a pilot development program incorporating the complete range of inputs and services considered necessary for the effective implementation of the proposed Kenaf Master Development Program aimed at increasing the percentage of Grade "A" fiber production to 40 percent of the overall output, was started in 1972 in Changwats Nakornrachsima and Chaiyaphoom under the direction of a specially appointed Sub-Committee of the Kenaf Development Committee. The Kenaf Advisor's contract terms of reference specifically state that he is to "help establish the National Executive Council (NEC) approved Package Project to be carried out (under Kenaf Development Committee auspices) by the Bank of Agriculture and Agricultural Cooperatives (BAAC), the Northeast Jute Mill, and the Agricultural Extension Department". Accordingly, he investigated the results of the Project's operation during the 1972 season and submitted his recommendations for project improvement and implementation in 1973 in a special report which is reproduced in this present Chapter V.

The report was discussed in the above Sub-Committee's meeting of November 14, 1972, and a summary of the discussions is included in this chapter.

It is pointed out that, since the following Kenaf Package Project report had to be prepared as a self-contained memorandum for consideration as a specific phase of the overall Kenaf Development Program, it duplicates, in part, the findings and recommendations contained in other sections of the overall Kenaf Advisory Report presented herein.

THE KENAF PACKAGE PROJECT

1972/1973 and 1973/1974

Erwin J. Sholton
Agri-Business Consultants
c/o National Economic Development Board
October 15, 1972

Agri-Business Consultants
c/o N E D B

October 15, 1972

Kenaf Package Project

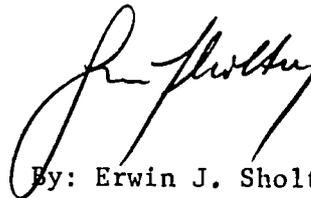
Attached hereto, please find a draft report on the implementation of the 1972 Kenaf Package Project as well as tentative recommendations for 1973 Package Project Implementation.

It is emphasized that this draft is based on preliminary discussions and exchanges of opinion only and that it will have to be further modified and improved upon in order to assure the successful implementation of next year's program.

The draft report is circulated amongst the RTG agencies and private entities concerned with the purpose of eliciting their comments and criticisms and your contribution to its revision and refinement will be greatly appreciated.

Exhibit II summarizes the comments of the General Manager of the Government jute mill organization - which includes the Northeast Jute Mill Co., Ltd., - on this draft report.

Very truly yours,
Agri-Business Consultants



By: Erwin J. Sholton

EJS/ut.

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- Summary

- The 1972 Kenaf Package Project

In 1972, the first steps were taken to implement a KDC proposed and NEC approved Kenaf Package Project aimed at assisting the kenaf farmers in selected areas in Changwats Nakornratchasima and Chaiyaphoom to produce a higher percentage of Grade "A" fiber than heretofore and providing a price incentive to encourage the growers to undertake the additional responsibilities and work necessary to achieve that end. A Sub-Committee composed of officers of the various RTG agencies concerned was established to organize and supervise the project. Due to the delayed start of the Committee's activities, the various facets of the 1972 program were only partially implemented.

Those kenaf producing farmer groups which were already clients of the BAAC in the above two Changwats were included in the project; they were comprised of 4,632 farm families which had planted 64,607 rai to kenaf and anticipated a total production of some 12,000 tons of retted fiber. Due to the fact that the BAAC had a headstart in financing these farmer groups and thanks to the Bank's efficient organization, the input credit phase of the 1972 Package Project was implemented most satisfactorily.

The remaining inputs envisaged - improved seed, fertilizer, insecticides and pesticides, and retting tanks - were furnished only partially or not at all largely due to the delayed start of the program.

The provision of extension and technical assistance services was hampered both by such late program start as well as by lack of DAE and DoA personnel; nevertheless, three demonstration visits to the Nong Soong Agricultural Research Station were organized and a limited amount of extension officer and BAAC supervisor training was carried out.

The kenaf marketing service phase of the program was implemented only to a very limited extent and thus did not achieve the desired effect. The Kenaf Buying Center of the NEJM at Nakornrachsima which had been designated as the Buying Unit for the 1972 Package Project was located too far distant from the principal fiber production areas which were concentrated in Changwat Chaiyaphoom thus requiring the expenditure of too much time and transportation costs to attract the Chaiyaphoom farmers to the Buying Unit and they continued to sell their fiber largely to neighboring merchants, even at a lower price. A farmer request to provide free collection and transport to the NEJM center was not acted upon, although such service had been included in the original program design.

The price incentive phase of the project was not effectively implemented due to the fact that no thorough program had been established, since the prevailing open market fiber prices were substantially higher than originally anticipated, and since the NEJM Buying Center was reluctant to shoulder the anticipated financial losses resulting from the program's price incentive stipulation as long as it was the only buyer offering such an incentive.

- 1973 Package Project Refinement and Implementation

The 1973 Kenaf Package Project envisages the inclusion of 100,000 rai of kenaf plantings in Changwats Nakornrachsima and Chaiyaphoom with a total retted fiber production of 20,000 tons and a Grade "A" production target of 40 percent or 8,000 tons. This requires a minimum 55 percent increase over the 1972 figure in the number of farmer groups to at least 675 groups. In order to facilitate program supervision and implementation, it is recommended that the entire 1973 Package Project be concentrated in Changwat

Chaiyaphoom. The possibility of achieving the above increase in qualified kenaf farmer groups must be discussed promptly with the BAAC. Concurrently, an assurance must be obtained from the FAAC that total estimated credit facilities of some \$12.5 million in production and retting tank construction credits will be made available to these farmer groups.

The supply of 100 percent improved kenaf seed to the Package Project members would require 200 tons of such seed. Since the available information indicates a potential availability of less than 10 tons, the collection of seed from good size kenaf stalks still standing in the field must be organized at once; a price of \$4.00/kg. should be offered for such seed. It is quite obvious that the improved seed supply phase of the 1973 project can only be carried out to a very limited extent.

Until such time as the increase in profitability through the application of artificial fertilizer is definitely established, no such fertilizer should be included in the Package Project inputs. Insect and pest control measures are, however, essential and the method and cost of implementing an effective control program in the project area must be promptly discussed with the DoA.

It is estimated that, in order to make sufficient retting water available to the project members to enable them to achieve the target of 25 percent increase in Grade "A" fiber production, a minimum of 5,000 retting tanks must be constructed in the project area prior to August 1973. The maximum present retting excavating capacity of the DoA amounts to 1,000 tanks during the period. It is recommended that the number of bulldozers and bucket excavators presently available to the "Kenaf Retting Pond Improvement Pilot Project" be tripled by the end of November 1972 thus enabling the DoA to excavate 3,000 tanks by August 1973, that 1,500 tanks be excavated by paid manual labor, and that 500 farmers be

encouraged to construct their tanks on a self-help basis. The possibility, means and cost of tripling the DoA's excavating equipment must be discussed at once with that agency and the availability of the required construction credits with the BAAC.

The success of the 1973 Package Project will largely depend on the availability of adequate extension and technical assistance services. In the five kenaf producing Amphurs of Changwat Chaiyaphoom, 10 agricultural extension-officers and 15 BAAC credit supervisors are presently active. At the rate of one extension officer to 500 farm families, this number of officers would be sufficient to cover the estimated 6,750 kenaf farmers under the 1973 project, always provided that they can devote most of their time to these farmers, a somewhat unlikely assumption in view of the preponderance of production of other crops, particularly rice, in the five Amphurs. This problem must be discussed promptly with the DAE and the BAAC. At the same time, an intensive training program of the prospective kenaf extension officers and BAAC supervisors must be instituted by the DoA; in this connection, use should be made of the already available films and instruction pamphlets on improved kenaf production and processing.

As the 1972 experience has shown, the location of the Buying Unit is of primary importance. For Changwat Nakornrachsim, the NEJM Buying Center should again act as project purchasing agency, provided its management can be persuaded to implement every aspect of the marketing service phase of the project. In any case, a new Buying Unit must be established in Changwat Chaiyaphoom and it is suggested that the services of one of the existing baling plants be secured for that purpose, both for reasons of economy and in order to assure the cooperation of the private marketing channel rather than to foment its opposition and competition. Early discussions are, therefore, essential with both the NEJM and

balers in Chaiyaphoom regarding their cooperation during the 1973/1974 season and to obtain their assurance that they will submit to the project rules and supervision.

The provision of free fiber transportation services is another essential phase of the Package Project. Their availability and cost must be discussed with the selected Buying Unit(s) at an early opportunity.

Although opinions as to a positive response by the kenaf farmers to a price incentive program differ fairly widely, it is the majority opinion that such a response will be forthcoming, always provided that the full and complete range of credit, input, technical assistance and marketing services is furnished to the farmers. It is further assumed that the present percentage distribution of Grade "A", "B" and "C" fiber production is of the order of 15-50-35 percent and that it might be improved to a 40-50-10 percentage ratio as the result of the successful implementation of the Package Project. It is also agreed that in order to provide an adequate incentive for increased Grade "A" and a corresponding dis-incentive for low grade fiber production, Grade "A" fiber must be purchased at a minimum premium of $\text{฿}0.50$ above the prevailing "Mixed Grade" price, Grade "B" at that price, and Grade "C" at $\text{฿}0.80$ below that price. This would give the grower an increase in income of $\text{฿}120$ per ton or $\text{฿}24$ per rai which is considered adequate for the above incentive purposes, particularly since it is asserted that most upcountry merchants downgrade the farmer's fiber unfairly and purchase it at some $\text{฿}0.20$ below the "official" going rate, which would raise the increase in income to $\text{฿}320$ per ton or $\text{฿}64$ per rai respectively.

At an incentive price of $\text{฿}120$ per ton, the price incentive program phase of the 1973 Package Project with its 20,000 tons of anticipated total fiber production would, at first sight, require a

subsidy of the order of B2.4 million. However, it is believed that arrangements can be made with some of the local mills and exporters under which these would purchase graded Package Project fiber at the set price differentials since these buyers, with their higher quality fiber requirements, would certainly not lose and would probably gain by such an arrangement through economics in re-grading and the assurance of fiber purchases in the desired quality ratio. The successful conclusion of such arrangements - and the effective Package Project compliance with fiber grading standards - would reduce the price incentive program cost to zero.

Early discussions must be held with selected mills and exporters regarding their interest in participating in the 1973 program.

As far as the subsequent Kenaf Master Development Plan implementation is concerned, a radical improvement in the overall marketing system with special emphasis on effective and uncompromising quality inspection is essential if the Master Plan is to achieve its aims of increasing farmer income and re-establishing the good name of Thai kenaf on the international market.

In the course of a meeting of the Kenaf Package Project Subcommittee, which discussed the preceding 1973 implementation program of the Advisor's, it was decided that, in view of the lack of positive results in 1972, the project should be repeated on the same 60,000 rai in 1973, a supervised farmer seed production program instituted, and 2,000 of the required 3,000 retting tanks excavated by manual labor since funds for purchases of additional equipment were not available. The Department of Agricultural Extension indicated its willingness to provide one or two additional officers to the project. As in 1972, the Northeast Jute Mill Co., Ltd., will act as buying unit; the provision of fiber transportation services was rejected. A fixed guaranteed price of B2.50/kg. for

Grade "A" fiber was re-established for 1973 but, in view of the fact that this price would not provide any incentive to the farmer since 1973 "Mixed Grade" prices were anticipated to remain above that level, it was later agreed to pay a \$0.50/kg. incentive or "floating guaranteed" price for Grade "A" fiber above the prevailing "Mixed Grade" price, always provided that the required funds would be made available to the buying unit beforehand.

The overall 1973 Kenaf Package Project costs are estimated at \$15.9 million; some \$10 million of this amount will be furnished by BAAC credits and \$216,000 for extension services from that Department's budget. The remaining \$5.76 million include \$1.44 million in short-term incentive price financing requirements as well as \$4.32 million for retting tank construction equipment and fiber transport truck purchases which, although rejected by the Subcommittee, it might still be possible to re-instate in the interest of more effective project implementation.

1. History, Objectives and Operation Plan

The Kenaf Package Project was conceived by the Kenaf Development Committee (KDC) in 1971. The National Economic Development Board (NEDB), in its capacity of Secretariat to the KDC, prepared a detailed memorandum on the purposes and organization of the Package Project and submitted it to the National Executive Council (NEC) in September 1971. The NEC formally approved the Project in March 1972. An English translation of the relative memorandum is attached to this report as Exhibit I.

The Package Project was designed as a pilot program to test its method of implementation in actual field practice and to apply the results, after the introduction of necessary modifications, to the Kenaf Master Development Plan for the Northeast.

The objectives of the Package Project may be summarized as follows:

- Encourage the formation of farmer groups amongst kenaf growers;
- Assist the farmer groups through the provision of input credits;
- Provide improved kenaf seed and technical assistance to the farmer groups;
- Encourage the kenaf growers to improve fiber quality through a price incentive program.

In order to achieve the above objectives, a Sub-Committee of the KDC was to be appointed consisting of responsible representatives of the Northeast Jute Mill Co., Ltd. (NEJM), the Bank of Agriculture and Agricultural Cooperatives (BAAC), the Ministry of Agriculture (MoA), the Department of Cooperatives, and three qualified individuals. The following duties were assigned to the Sub-Committee:

- Determination of the kenaf promotion area based on existing

- client farmer groups of the BAAC in Changwats Chaiyaphoom and Nakornrachsima;
- Provision of input credits to the farmer groups through the BAAC;
 - Provision of improved seed, retting facilities and technical assistance through the Department of Agriculture (DoA) and the Department of Agricultural Extension (DAE);
 - The establishment of a fiber buying unit, the provision of fiber transport facilities to the farmers to that unit, and the purchase of the farmers' kenaf at the prices periodically established and announced by the Sub-Committee;
 - Deduct the loan amount due to the BAAC at the time the farmers sell their kenaf to the buying unit;
 - Periodic progress reports to the KDC for purposes of inter-agency activity coordination.

The financial requirements of the various phases of the Package Project implementation were to be furnished by the agency concerned with each project phase.

2. 1972 Package Project Implementation

2.1. The Package Project Sub-Committee

The Sub-Committee in charge of the 1972 Package Project implementation was duly established with the following membership:

- | | |
|---|--|
| Mr. Wuth Yuranateme | , Chief, NEJM Kenaf Buying Center, Nakornrachsima, Chairman (deputized by the Manager, NEJM) |
| Mr. Manus Chaimun | , Manager, BAAC, Nakornrachsima |
| Mr. Chinda Chansombat | , Manager, BAAC, Chaiyaphoom |
| Mr. Amnuay Kasipar | , Chief, Kenaf Project, DoA, Bangkok |
| Mr. Kanchit Kantangkul | , Chief, Northeast Planning Center, NEDC, Khon Kaen |
| Mr. Adul Chiewchan | , Assistant Changwat Agricultural Extension Officer, Chaiyaphoom |
| Mr. Narong Kritsanasuwan | , Assistant Changwat Agricultural Extension Officer, Nakornrachsima |
| * The Changwat Cooperatives and Credit Officer, | Nakornrachsima |
| * The Changwat Cooperatives and Credit Officer, | Chaiyaphoom |

The NEJM has been designated as Secretary to the Sub-Committee but the position has not been filled. In the meantime, the BAAC at Nakornrachsima and Chaiyaphoom respectively acts as Secretary.

The Sub-Committee held its first meeting on July 28, 1972, at the Korat Branch of the BAAC; a second meeting was held at the same location on August 10, 1972, and a third meeting on September 12, 1972, at the Chaiyaphoom Town Hall.

* Did not attend Sub-Committee meetings.

2.2. The Package Project Promotion Area

As laid down in the NEC/NEDB directive, the determination of the promotion area was based on the existence of farmer groups which were already clients of the BAAC in Changwats Nakornrachsim and Chaiyaphoom and which produced kenaf. A survey carried out by the BAAC after the organization of the Sub-Committee in July 1972 established that such groups included 4,362 farm families with a total of 64,607 rai planted to kenaf and an anticipated production of some 12,000 tons of retted fiber. The Nakornrachsim promotion area comprised 850 farm families in three Amphurs with 13,800 rai under kenaf and an estimated production of 2,940 tons of fiber, and the Chaiyaphoom promotion area included 3,512 farm families in five Amphurs with 50,807 rai under kenaf and an estimated production of 9,212 tons of fiber (see table, Exhibit I).

It should be pointed out that the above farmer groups were not specifically selected for participation in the 1972 Package Project prior to the kenaf planting season, but that they were included in the project after the (delayed) establishment of the Sub-Committee, as they happened to fulfill the required conditions of being kenaf producing groups who already were BAAC clients. Hence, they were not provided with the originally envisaged seed supplies and other inputs and only with part of the planned technical assistance, retting tank construction and similar support services; nor were their loans tailored to the provision of such supplies, inputs and services.

The BAAC states that a farmer group comprises an average of 9 to 10 members.

2.3. Provision of Input Credits

The credit services provided by the BAAC to the kenaf farmer groups in the promotion area conformed, without any doubt, most

closely to the guidelines laid down for the Package Project as far as assistance to the growers is concerned and, so far, represent the most positive achievement under the 1972 program.

The average loan per farmer amounted to some ฿3,000 to ฿3,500 where it should be emphasized that these loans were extended for all of the farmers' crops, principally rice, and not for kenaf alone. The BAAC, under its policy of providing credit for cash outlays only estimates a loan requirement of ฿100 per rai or a total of ฿1,000 for the average 10 rai kenaf production area per farm family.

These inputs credits are in the form of short-term loans at an interest rate of 12 percent per year (compared to 14 percent per year for the private banks). If the farmer groups offer promissory notes, as did 80 percent in Nakornrach\$ima and 50 percent in Chai-yaphoom in 1972, the interest rate is reduced to 10 percent per year, since the BAAC can re-discount these notes with the Bank of Thailand.

Although loans from private lenders bear a higher interest rate, the BAAC feels that many farmers will continue to utilize such loans since they are obtainable by individual farmers whereas the BAAC only lends to farmer groups, since they frequently are given at least partly in kind, and since even some farmer groups do not qualify for BAAC credit.

Loans are extended either in a lump sum or as required, say:

- At the time of planting (for tractor hire, seed, fertilizer, labor);
- At the time of inter-cultivation (for weeding and thinning labor, fertilizer);
- At the time of harvest (for stalk transport, retting labor).

Although it has not done so in 1972, the BAAC is ready to extend credit for retting tank construction. These would be medium-

term, 3-year loans at 12 percent interest. Loans are also available for tractor and agricultural implement purchases, but little demand is anticipated as the farmers prefer to hire tractors using the regular BAAC production loans.

Kenaf Package Project loans will be extended only on condition that they are utilized for kenaf production; compliance is checked by BAAC supervisors. These supervisors are often agricultural school graduates and, it is planned, will be trained by the DoA in improved kenaf production practices. They thus form a nucleus of "extension workers" and can make a substantial contribution to the overall extension service effort under the Package Program (see Section 2.5. below).

The BAAC states that it recovers the loans it extends to farmer groups routinely in its normal course of operations; in fact, it claims a 98 percent recovery rate. Hence, the Package Project provision that the buying unit should deduct the loan amount from the payments made to the farmers at the time they sell their fiber to the unit is, in the BAAC's opinion, unnecessary.

2.4. Inputs

The Package Project envisages that kenaf production inputs should consist principally of the following:

- Improved kenaf seed to be furnished by the DoA;
- Fertilizer;
- Insecticides and pesticides, including spraying and dusting equipment;
- Retting tanks to be constructed by the farmer group members themselves, paid manual labor, commercial contractors, or the DoA under its Kenaf Retting Pond Improvement Pilot Project.

Due to the delayed start in the Package Project implementation program, none of these inputs were furnished during the 1972 season.

2.5. Extension and Technical Assistance Services

Again, these services were somewhat limited in scope under the 1972 Package Project due to the delayed start of project implementation.

However, the DoA arranged for three kenaf demonstration visits to the Nong Soong Agricultural Research Station as follows:

- August 18 - 30 BAAC credit supervisors and 60 farmers;
- August 23 - 70 farmers;
- August 25 - 70 farmers.

The Department of Agricultural Extension (DAE) is hampered by the lack of staff as far as technical assistance requirements under the Package Project are concerned. It presently has only one extension officer in each Amphur including, for example, the five kenaf producing Amphurs in Changwat Chaiyaphoom (Muang, Chaturat, Ban Net Varong, Konsuwan, Ban Kwao). This is, obviously, inadequate in view of the number of kenaf farmers involved and, particularly, since the Amphur officers must look after all crops and not only after the kenaf producers. The DAE recently undertook a survey of additional staff requirements for Changwat Chaiyaphoom as a result of which it sent seven additional officers to the Changwat so that there are now two extension officers in seven out of a total of eleven Amphurs in Chaiyaphoom.

The BAAC, on the other hand, has fifteen credit supervisors in the five kenaf Amphurs. Each supervisor is supposed to visit 20 farm families per day. At 25 working days per month, this would mean visits to 500 farm families each month at most. However, the supervisors are actually often able to reach more than one farm

family per visit by calling village or group meetings. Since the supervisors must take care of all farmers in their zone of assignment and not only of the kenaf growers, it must be assumed that the intensive coverage envisaged under the Package Program can not, in practice, be achieved.

The integration of the kenaf extension work of both the DAE and the BAAC might, nevertheless, produce the desired results. Thus, the BAAC financed 5,500 kenaf growers in five Amphurs in Changwat Chaiyaphoom in 1972; at 500 farm visits per month, this would require - on paper - the exclusive services of eleven kenaf extension officers. A reasonable coverage could thus be achieved by the combined efforts of the DAE's two extension officers and the BAAC's three credit supervisors in each Amphur on the average. A detailed survey of the exact technical assistance personnel requirements under the Package Program must be carried out prior to the start of the 1973 season.

In the meantime, all credit is due to the BAAC for its efficient credit supervisory and technical assistance organization.

2.6. kenaf Marketing Services

This phase of the Package Program envisages the following services to the kenaf farmers in the promoted areas:

- The establishment of a fiber buying unit;
- The provision of fiber transportation facilities to the buying unit;
- The announcement, to the participating farmers, of purchase prices, by grade, at periodic intervals;
- The purchase of the farmers' kenaf, by grade, at an incentive price for Grade "A" sufficiently high to encourage the growers to improve fiber quality.

2.6.1. Fiber Buying Unit

The Kenaf Buying Center of the NEJM at Nakornrachsima was designated as buying unit under the 1972 Package Project. This decision was taken since the NEJM is a Government-owned operation, since it has been operating its own separate buying center under qualified and experienced management for many years, and since the NEJM management agreed to undertake the purchasing function under the Package Project on a pilot basis.

One of the major problem posed by this decision is the location of the NEJM buying center at Nakornrachsima, whereas the principal production area in 1972 was around Chaiyaphoom, some 120 kms. away. As a result, only very few farmers delivered their kenaf to the buying unit and continued to sell it to nearby merchants. This applied even to the Package Program farmers in Changwat Nakornrachsima. The local merchants will visit the kenaf growers' farms even if they are located far from town and the farmers are willing to sell their fiber under these circumstances even if they obtain a lower price. It will require an intensive educational effort in addition to the assistance and incentive provided under the Package Program to persuade the majority of the farmers to change their selling practices.

In the meantime, an essential first step is the establishment of additional buying units close to the production area, specifically at or near Chaiyaphoom so as to relieve the farmers both of the transportation cost of their fiber to the NEJM buying center and of the loss of time involved in a visit to that center.

2.6.2. Fiber Transportation Facilities

In actual practice, no fiber transportation facilities were provided to the kenaf farmers under the 1972 Package Program.

The cost of transportation of 1 kg. of kenaf from Chaiyaphoom to the NEJM buying center at Nakornrachsima was stated to amount to 8 satang/kg. With a very few exceptions, the Chaiyaphoom kenaf growers refused to pay this cost and the NEJM buying center, in turn, refused to assume these charges. It argued that the farmers would (or should) receive an 8 satang/kg. lower price at Chaiyaphoom than at Nakornrachsima, since the local merchant would have to bear this cost, and that the price incentive offered by the buying unit would more than compensate the farmer for these costs in any case. The great majority of the farmers obviously was not convinced by this argument and continued to insist on free-of-charge collection of their fiber within a reasonable distance from their farms.

It is felt that, without the provision of free collection and transportation facilities, the percentage of Package Project kenaf delivered to the buying unit (or units) will remain small, at least until the conclusion of an intensive farmer education program.

2.6.3. Price Incentive

The determination of an adequate and realistic incentive price for Grade "A" kenaf fiber at a level likely to induce the growers to expend the required additional investment and work to increase the percentage of better quality fiber is, without any doubt, the most difficult and sensitive problem in connection with the implementation of the Package Program and, subsequently, of the overall Kenaf Master Development Plan. It is complicated by the presently prevailing high kenaf prices, well above the "normal" $\text{฿}2.00/\text{kg.}$ for "Mixed Grade" at farm level where the originally envisaged $\text{฿}2.50/\text{kg.}$ over-price would indeed have signified an attractive incentive to the grower.

Furthermore, the effectiveness of any price incentive program is intimately connected with and dependent upon an effective fiber

quality inspection program for both internal and export marketing. As long as the unscrupulous trader can afford to pay an excessive price for lower quality fiber knowing full well that he will be able to sell that fiber under a higher grade label, any price incentive program is bound to fall short of its goal.

The price incentive phase of the 1972 Package Program simply did not work, although most of the very few farmers included in the program who delivered their fiber to the NEJM center at Nakorn-rachsima expressed themselves satisfied with the prices they were paid.

Part of this failure was due to the fact that no thorough price incentive program was actually established for the 1972 Package Project. In fact, at the start of the program, a guaranteed price of $\text{฿}2.50/\text{kg.}$ for Grade "A" fiber was set, presumably on the assumption that the "Mixed Grade" price would be $\text{฿}2.00/\text{kg.}$ Since this latter price was substantially higher throughout the season so far, the originally chosen guaranteed price would actually have represented a dis-incentive and could thus never be applied. It appears that, in actual practice, lower than $\text{฿}0.50/\text{kg.}$ incentive prices were paid for Grade "A" fiber under the Package Program; the following price differentials were cited by the manager of the NEJM buying unit at two levels of "Mixed Grade" prices prevailing on September 15 and October 1, 1972, respectively:

<u>Date</u>	<u>"Mixed Grade"</u> <u>(Baht/kg.)</u>	<u>Grade "A"</u> <u>(Baht/kg.)</u>	<u>Grade "B"</u> <u>(Baht/kg.)</u>	<u>Grade "C"</u> <u>(Baht/kg.)</u>
Sept. 15	3.70	4.00	3.85	3.35
Oct. 1	3.00	3.30	3.00	2.50

The $\text{฿}0.30$ incentive price for Grade "A" over the "Mixed Grade" price obviously did not provide a sufficient inducement; nor, it might be added, could the variation in price differentials between Grades "A" and "B" offer such an inducement.

On October 10, 1972, the NEJM buying unit had posted the following prices, for both members and non-members of the Package Program:

Grade "A"	=	฿3.40
Grade "B"	=	฿3.20
Grade "C"	=	฿3.00

The application of these reduced price differentials was the result of the NEJM unit's decision to discontinue the Package Program incentive scheme, since it was decided that the unit could not, alone in the Thai kenaf industry, afford to incur the losses occasioned by the program's price incentive stipulation.

3. 1973 Package Project Refinement and Implementation

3.1. Package Project Area of Coverage

Under the Kenaf Master Development Plan, the area of coverage of the 1973 Package Project - which is to serve as a pilot project on the basis of the results of which the master plan is to be further refined - is to be extended over 100,000 rai in Changwats Nakornrachsim and Chaiyaphoom. Assuming an actual Grade "A" production of 15 percent and an increase in that grade by 25 percent of overall production as the result of the various Package Program inputs and services, the following results are anticipated:

Promoted Area	100,000 Rai
Total Production	20,000 Tons
Present Grade "A" Production (15%)	3,000 Tons
Increase in Grade "A" Production (25%)	5,000 Tons
Total Grade "A" Production (40%)	8,000 Tons.

The successful implementation of this expanded program requires the correction of the various deficiencies of the 1972 Package Project, provision of the necessary inputs in credit, materials, facilities, staff and services, and an intermediate solution for the marketing of the graded fiber pending the definite solution of the fiber inspection problem. This does not appear impossible to achieve given the necessary cooperation, staff and funds. The details of the Package Project refinement requirements are discussed in the following sections, including references to overall kenaf fiber industry development problems as required.

3.2. Kenaf Farmer Groups

The BAAC will have to act as the principal and, probably, only source of credit for the kenaf farmers under the 1973 Package Project.

In 1972, it financed a total of 4,362 kenaf farm families belonging to farmer groups in Changwats Nakornrachshima and Chaiyaphoom composed, on the average, of some ten members each or approximately 436 farmer groups who had planted a total of 64,607 rai to kenaf. It was stated that these constituted all of the kenaf producing farmer groups in these two Changwats who were already clients of the BAAC. In order to allow the 1973 Package Project to cover an area of 100,000 rai, the number of qualified farmer groups would have to be increased by some 55 percent to 675 groups with 6,750 members. Since, presumably, the additionally required 240 kenaf farmer groups either have not yet been formed and/or have not qualified for loans under BAAC regulations, their organization and qualification prior to, say, March 1973 will constitute a formidable task for the BAAC.

In the interest of facilitating supervision and the furnishing of the various services, it might also be argued that these farmer groups should be located in a single Changwat, where Chaiyaphoom would be the obvious choice, always provided a suitable buying unit (or units) could be established in that Changwat. Since the BAAC financed 3,512 kenaf farm families in Chaiyaphoom or some 350 farmer groups in 1972, its Changwat office would have to organize an additional 325 kenaf farmer groups prior to March 1973.

Immediate discussions should be held with the BAAC regarding its kenaf farmer group organization and qualification potential as well as its preferences with respect to the above two alternatives. Consideration should also be given to the possibility that the number of farmer groups involved may increase by as much as a further 50 percent if the average kenaf planting area per farm family should drop from the 1972 figure of 15 rai to the more "normal" figure of 10 rai.

3.3. Input Credits

In view of the willingness and, indeed, interest of the BAAC to cooperate with the Kenaf Package Project as well as the overall Kenaf Master Development Plan, the problem of securing adequate input credits for the 1973 project should be easily solved, provided the BAAC succeeds in organizing the additionally required qualified kenaf farmer groups in time.

Assuming an average production credit of B100 per rai, B10 million in loan funds would be required for this type of short-term credit. Assuming further that 25 percent of the kenaf farmers will require medium-term retting tank construction loans at the rate of one tank for every ten rai at a cost of B1,000 per tank, an additional B2.5 million in loans would be required. Thus, the total credit facilities to be provided by the BAAC to the 1973 Kenaf Package Project members would amount to B12.5 million.

The availability of these funds should be ascertained immediately from the BAAC.

3.4. Inputs

3.4.1. Improved Kenaf Seed

At a seeding rate of 2 kg./rai, a total of 200 tons of improved seed will be required for the 100,000 rai Package Project area in 1973. At a production rate of 30 kg. of seed per rai, this is equivalent to a seed planting area of 666 rai in 1972. The Chief of the Kenaf Project of the DoA has stated, on the other hand, that all kenaf seed multiplication stations normally produce only some 8 tons per year and that, in 1973, it is planned to produce some 30 tons of seed (which can only be used for the 1974 crop).

From the above, it is quite obvious that the requirement for the provision of improved seed to the Package Project kenaf growers

will have to be dropped from the 1973 program. It is suggested that, as an emergency measure, steps be taken immediately to arrange for the collection of seed from good size kenaf stalks still standing in the field in Changwats Nakornrachsima and Chai-yaphoom and that a price of ฿4.00/kg. be offered for such seed. Even then, only a small fraction of the Package Project kenaf farmers could be supplied with such "selected" (rather than improved) seed in 1973.

It goes without saying that an intensive variety research and improved seed multiplication program must be initiated immediately under the Kenaf Master Development Plan.

3.4.2. Fertilizer

Past research on fertilizer application on kenaf plantings of the Thai varieties in the Northeast has not proven the commercial benefits of fertilizer use except at times of exceptionally high fiber prices, since the optimum fiber yield increases never exceeded 25 percent, or from an average yield of 200 kg. of retted fiber per rai to 250 kg. At a low fertilizer cost of ฿2.00/kg. and the recommended rate of application of 50 kg./rai, it would require a minimum fiber selling price of ฿2.00/kg. just to break even, not counting labor. At ฿3.00/kg. for "Mixed Grade" kenaf, the optimum additional income would amount to ฿50/rai and at ฿2.50/kg. to ฿25/rai.

Hence, at the present stage of (incomplete) research, it is doubtful whether an intensive fertilizer promotion program should be undertaken amongst the Package Project kenaf farmers and it is suggested that the available resource in funds and personnel would be more profitably directed towards such endeavours as crop protection and fiber processing and marketing.

3.4.3. Crop Protection

Insect and pesticide control are essential phases of any kenaf improvement program and must definitely be included in the 1973 Package Project. The DoA states that the cost of such control on kenaf, including the cost of the pesticides and insecticides and the amortization of the sprayers and dusters, averages $\text{฿}16.50/\text{rai}$ per application. The loan financing of these operations should be discussed promptly with the BAAC.

3.4.4. Retting Facilities

The Applied Scientific Research Corporation of Thailand (ASRCT) has estimated that a retting pond surface area of 1 percent of the kenaf planting area is required for good quality fiber production during the September to December retting period. At 1,600 sq.m. per rai, this is equivalent to a retting facility water surface area of $1,600 \times 100,000/100$ or 1,600,000 sq.m. = 1,000 rai or 1 percent of the 1973 Package Project planting area.

Under its "Kenaf Retting Pond Improvement Pilot Project", the DoA constructs "standard" retting tank excavations 25 m. long by 4 m. wide by 1 m. deep, i.e. with a water surface area of 100 sq.m. On the basis of the ASRCT retting water surface area requirement estimate, this would be equivalent to 16,000 retting tanks for 100,000 rai of kenaf. The DoA, on the other hand, estimates these requirements at 1 tank for 10 rai or 10,000 tanks for 100,000 rai.

It is further generally assumed that adequate retting facilities (ponds, roadside ditches, rivers) are available in the Northeast to ret some 200,000 tons of good quality kenaf fiber or 50 percent of the projected long-term production of Thailand. Applying this assumption to Changwats Nakornrachsima and Chaiyaphoom - obviously a somewhat risky procedure without an exact retting

facility availability survey - new retting tank requirements would be reduced to 8,000 units (ASRCT) and 5,000 units (DoA) respectively.

The above mentioned "Kenaf Retting Pond Improvement Pilot Project" of the DoA presently has at its disposal three bulldozers and three bucket excavators, each capable of excavating one standard tank per day. At 20 working days per month during the December 1972 to August 1973 period, the project team can excavate 1,080 or, say, 1,000 tanks for the 1973 Kenaf Package Project thus leaving a minimum shortage of 4,000 tanks.

The average cost, to the DoA, amounts to $\text{B}875$ per tank or $\text{B}875,000$ for the 1,000 tanks it is prepared to excavate for the 1973 Package Project.

In theory, the remaining 4,000 tanks could be excavated by one of the following two methods:

Manual labor - 1 man-day/cu.m. excavation		
= 100 man-days/tank at $\text{B}12.00$	=	$\text{B}1,200$
Hired D-4 bulldozer = $\text{B}200$ /hour for		
7 hours	=	$\text{B}1,400$

Obviously, the farmer group members could save themselves all tank construction expense by contributing their own labor free-of-charge. However, since the average farmer group consisting of 10 members will plant 100 rai to kenaf and will thus require at least five new retting tanks at an expenditure of 500 man-days, it appears somewhat unrealistic to anticipate a large-scale selfhelp tank construction program.

A more practical solution to the retting tank construction problem for the 1973 Package Project might be the following:

	<u>No. of Tanks</u>	<u>Cost (Baht)</u>
- Increase the DoA's excavating equipment to 18 units (by donation, secondment or purchase)	3,000	2,625,000
- Construction by paid labor	1,500	1,800,000
- Self-help construction	<u>500</u>	<u>-</u>
Total	5,000 =====	4,425,000 =====

The above construction costs could well be financed through the BAAC's medium-term loans.

3.5. Extension and Technical Assistance Services

On the assumption that the 100,000 rai Kenaf Package Project will be concentrated in Chaiyaphoom in 1973, the following extension personnel would be presently available to the farmer groups in the five kenaf producing Amphurs (see Section 2.5. above):

Agricultural Extension Service Officers	10
BAAC supervisors	<u>15</u>
Total	25 ==

The 1973 Package Project will comprise some 6,750 farm families (see Section 3.2. above). At the presently accepted factor of one extension officer to 500 farm families, the total requirements would amount to 14 extension officers. Hence, there is already an adequate number of extension personnel available in the five kenaf producing Amphurs in Changwat Chaiyaphoom, even considering that (a) the extension personnel will have to look after both kenaf farmers and producers of other crops, and (b) the 1972 average of some 15 rai per kenaf farmer will be reduced to the more "normal" ratio of 10 rai per farmer thus increasing the number of farm families involved in the program by some 50 percent.

The above 25 extension personnel must be thoroughly trained in kenaf production and processing practices by the DoA staff of the None Soong Agricultural Experiment Station prior to the 1973 kenaf planting season. This will require the frequent secondment of one of the Station's kenaf specialists to Chaiyaphoom and the availability of such a specialist should be promptly discussed with the Chief of the Kenaf Project of the DoA.

Apart from training courses at None Soong, use should be made of available training tools such as the colored movie and the instruction pamphlets prepared under Ministry of Agriculture/USOM auspices in 1968/1969. Copies of the film are available; adequate numbers of the instruction pamphlets should also still be available, particularly with the Office of Accelerated Rural Development, or they could be reprinted without much difficulty. After the completion of the training of the extension personnel, sufficient copies of the film should be made available to them for showing to farmer groups as well as a sufficient number of the eight instruction pamphlets for distribution to each and every kenaf farmer member of the 1973 Package Program.

3.6. Kenaf Marketing Services

This aspect of the 1973 Kenaf Package Project will, undoubtedly, create the most serious problem and require the most intensive effort and planning for its solution.

3.6.1. Fiber Buying Unit

The experience of the 1972 Package Project operation has shown that the location of the buying unit is of primary importance and that it must be situated close to the production area so as to make it easily accessible to the farmers, the majority of whom will,

otherwise, continue to sell their fiber to nearby merchants even at a lower price than that offered by the buying unit.

As discussed previously, it seems preferable to concentrate the 1973 Package Project operations in Changwat Chaiyaphoom. It is suggested that the easiest method of establishing a buying unit in that location would be to secure the cooperation of one of the existing baling plants.

It is submitted that the cooperation of the existing marketing channel, particularly the baling plants, is essential to the success of the Package Project as well as to that of the subsequent Kenaf Master Development Plan. In the first place, the establishment, organization and management of new buying units would pose almost insuperable logistic and financial problems whereas in excess of 200 buying and baling units are already in existence in the North-east, many of them well financed and under experienced management, who could function as Kenaf Package Project and Master Development Plan buying units under the supervision of the project management. Secondly, if the project were to attempt to set up an independent buying organization, it would create immediate opposition from the established merchants/balers who, for the simple reason of self-preservation, would have to compete with the project's units and could easily foil the success of the project plans.

It is, therefore, essential to enter into immediate discussions with Chaiyaphoom baling plants as to their interest in acting as Package Project buying units and their willingness to submit to the project rules and supervision..

It is believed that, for the estimated 20,000 tons total 1973 Package Project production, one suitably located buying unit would be adequate, always provided that the fiber transportation problem is solved effectively (see Section 3.6.2. below).

3.6.2. Fiber Transportation Facilities

As discussed in Section 2.6.2. of the present chapter, the absence of fiber transportation services to the Package Project kenaf growers greatly contributed to the insignificance of the amount of fiber sales by project members to the NEJM buying center at Nakornrachsima. The major complaints were:

- Cost of transportation for both the grower and his fiber;
- Rejection by the NEJM buying center of some low grade fiber which wasted the seller's time and transportation costs;
- Waiting time at the NEJM buying center before the sale was finalized.

Although the NEJM argued that the 8 satang/kg. transportation costs from Chaiyaphoom to Nakornrachsima would be offset by a correspondingly lower price offered by the buyers at Chaiyaphoom who would, subsequently, have to bear these costs themselves, this is simply not the case as the distance Chaiyaphoom - Bangkok does not differ greatly from that of Nakornrachsima - Bangkok. The argument also overlooks the fact that the Chaiyaphoom buyer ships his fiber largely in pressed bales for which the Transportation costs per kilogram are lower than for the farmer's "druu".

The NEJM's policy of outright rejecting sub-standard quality fiber may be justified from the mill's point of view, but is most certainly not conducive to encouraging farmers to bring their kenaf to the buying unit, particularly not if loss of time and transportation costs are involved and since the local merchant accepts such fiber, even though at a low price. Similarly, the (unavoidable) waiting time at the NEJM center before the fiber sale is finalized represents a dis-incentive to the seller.

The obvious solution is for the buyer to go to the seller, within reason, rather than vice versa, as is the practice of a great many local kenaf buyers in the Northeast (as well as in India and Bangladesh).

If the buying unit is located close to the production area, farm door purchasing or, preferably, village collection center purchasing will pose no great logistic or financial problems. In any case, since the local merchants follow this practice - and still seem to make a profit in spite of the cost involved - the Package Project buying unit has no choice but to follow suit.

The means of transportation required and the cost of the village purchasing/transportation operation will depend on the relative locations of the buying unit and the production areas. This problem must be discussed with the selected local buying unit or units as soon as possible.

3.6.3. Price Incentive

3.6.3.1. Kenaf Farmer Response to Price Incentives

Opinions as to the response of kenaf farmers to a price incentive program aimed at inducing them to increase the percentage of Grade "A" fiber production vary greatly depending on the person interviewed - and often his personal interest or lack thereof as far as increased Grade "A" production is concerned.

On the negative side, the opinion is expressed that the farmers will not respond at all to a price incentive program, the reasons given (and their potential remedies, where applicable) being:

- Lack of retting water (retting facilities to be constructed);
- Lack of transportation facilities to buying unit (to be provided);

- Lesser amount of work involved in the production of low quality fiber;
- Unwillingness to allow the stalks to remain longer in the retting water, as is necessary for the production of superior quality fiber, as the farmer wants to sell his fiber as quickly as possible;
- Lack of knowledge of and time loss involved in fiber grading.

The last three objections can, obviously, only be overcome by an intensive farmer education program (Note: plus an effective price incentive program) and all negative respondents insist that such a program plus the provision of improved seed, including pest and disease resistance, leading to higher fiber yields, of retting water and of extension services is of more interest to the growers than price incentives.

On the positive side, the opinion is expressed by a majority of the persons interviewed that, on condition that the inputs, facilities, services and credit envisaged under the Package Program are effectively provided, the farmers will indeed respond to a price incentive program where the most difficult problem cited is again that of farmer education emphasizing the financial advantages of the program and the elimination of the grower's logistic and financial problems.

3.6.3.2. Potential Increase in Superior Quality Fiber Production

Opinions as to the present percentages of Grade "A", "B" and "C" kenaf fiber production vary within quite narrow limits - but differ substantially from the grade distribution figures shown in the official export statistics.

The assessments made by five experienced kenaf specialists concerned with upcountry fiber trading, mill management and

agro-economic advisory services are listed as follows:

<u>Source</u>	<u>"A" (%)</u>	<u>"B" (%)</u>	<u>"C" (%)</u>
Trader	20	50	30
Trader	20	50	30
Mill Manager	20	50	30
Mill Manager	15	50	35
Advisor	15	50	35

Whereas the majority opinion leans towards a 20-50-30 percent present grade distribution, it has been decided, in order to remain on the conservative side, that the 15-50-35 percent grade distribution figure should be used for Package Project and Kenaf Master Development Plan programming.

The assessments of the same five specialists as to the potential Grade "A", "B" and "C" percentage distribution as a result of the successful implementation of the Package Project, including price incentives, are shown below:

<u>Source</u>	<u>"A" (%)</u>	<u>"B" (%)</u>	<u>"C" (%)</u>
Trader	40	50	10
Trader	45	45	10
Mill Manager	35	45	20
Mill Manager	40	50	10
Advisor	40	50	10

An average "improved" grade distribution of 40-50-10 percent for Grades "A", "B" and "C" respectively will be used as a basis for Package Project and Kenaf Master Development programming.

3.6.3.3. Required Price Incentive Level and Spread

Opinions are almost unanimous that an effective price incentive program will have to provide for the following:

- A minimum ₱0.50/kg. incentive price for Grade "A" above Grade "B";
- A Grade "B" price at the level of the prevailing "Mixed Grade" price, since this grade represents and will continue to represent some 50 percent of total production;
- A strong price dis-incentive for Grade "C" of the order of ₱0.80/kg. to discourage production of that grade.

On this basis, the following list shows proposed grade prices at different price levels for "Mixed Grade" as well as farmer's revenues when he sells "Mixed Grade" and graded fiber respectively, assuming a 40-50-10 percent grade distribution:

<u>Mixed Grade</u>	<u>"A"</u>	<u>"B"</u>	<u>"C"</u>	<u>Farmer Revenue/Ton</u>	
				<u>Mixed Grade</u>	<u>Graded</u>
₱4.00	₱4.50	₱4.00	₱3.20	₱4,000	₱4,120
3.50	4.00	3.50	2.70	3,500	3,620
3.00	3.50	3.00	2.20	3,000	3,120
2.50	3.00	2.50	1.70	2,500	2,620
2.00	2.50	2.00	1.20	2,000	2,120

The ₱120 additional revenue per metric ton or ₱24 per rai appears a rather small incentive to encourage the farmer to take on additional responsibilities and work to more than double his production of Grade "A" fiber from the present 15 percent to the projected 40 percent. It is, however, the consensus of opinion that such an incentive is indeed adequate, always on condition that the farmer is provided with the full range of Package Project services. It is further argued that, since many buyers downgrade the farmer's fiber unfairly and pay him, on the average, ₱0.20/kg. less than the current "Mixed Grade" price, the proposed price incentive actually amounts to ₱320 per ton or ₱64 per rai.

3.6.3.4. Cost of Price Incentive Program

At first sight, the cost of the Package Project price incentive program appears to amount to ฿120 per ton or ฿2.4 million for the 1973 project (or ฿28.8 million per year after the implementation of the priority first 4-year phase of the Kenaf Master Development Plan). If no changes are instituted in the present kenaf fiber marketing system, these annual subsidy outlays will indeed be required.

Assuming a ฿3.00/kg. "Mixed Grade" price level and, as occurs frequently, an actual price of ฿2.80/kg. paid to the farmer by an unscrupulous merchant, that merchant will presently purchase an average of 150 kg. "A", 500 kg. "B" and 150 kg. "C" grade fiber for an outlay of ฿2,800 per ton whereas he will have to pay ฿3,120 under the Package Project system. Since experience has shown that he will then bale and sell at least 40 percent, if not more, under the Grade "A" label, he has made an extra profit of ฿320 per ton. As stated previously, a strict and effectively enforced fiber quality control program is essential to the success of any Kenaf Development Program in Thailand in the interest of the farmer, of the consumers - both domestic and foreign - and of the Government.

As far as the 1973 Package Project is concerned, its projected 20,000 tons fiber output can probably be sold without much difficulty to the local mills, although only to a few of such mills. Discussions with mill management have resulted in definite assurances that the mill(s) in question would not only be willing but anxious to purchase Package Program graded fiber at a ฿120 per ton surcharge provided the assumed 40-50-10 grade distribution is indeed achieved and the fiber is properly graded.

In spite of the total annual kenaf fiber consumption of the local mills of some 120,000 to 125,000 tons, the sale of much more

than the original 20,000 tons of "improved" graded fiber will, unfortunately, be beset with problems, since the majority of the mills are not very fiber quality but rather price conscious, since they produce mostly Heavy-C bags for which superior quality fiber is not required to any great extent, and since they do not place sufficient importance on their batching operations. Increased emphasis by the mills on lighter finished goods production with its resulting increased profits and wider export market scope would not only raise foreign exchange revenues for Thailand but would also lead to an increased local demand for improved graded fiber.

As far as export marketing of Package Project fiber is concerned, the present price differential between Grades "A" and "B" amounts to 5 pounds sterling per ton delivered European port, equivalent to roughly 25 satang/kg. or only one-half the price incentive proposed for Grade "A" under the Package Project. This small overseas price differential is largely due to the fact that the buyer anticipates, based on past experience, that he will receive only a limited percentage of true Grade "A" fiber in his "A" labelled bale and that the quality differential between actual "A" and "B" bales is not worth more than 25 satang/kg. This is borne out by the fact that some of the reliable Thai exporters who grade more carefully and have thus acquired outstanding reputations overseas are able to sell "Super" and even "Selected Super" grades at premium prices of, at times, as much as 15 to 20 pounds sterling above the official Grade "A" price. Such exporters are, obviously, potential clients for improved Package Project fiber. It is also reasonable to assume that, once the Package Project is expanded into the Kenaf Development Master Plan and the overseas buyer can place more confidence in his Grade "A" purchases, the price differential between the "A" and "B" grades will widen - and, incidentally, that between Thai "A" and Bangladesh White D (BWD) (to which good

quality Thai "A" is widely considered equivalent as far as mill use is concerned) will narrow.

Hence, the cost of the 1973 price incentive program may vary from a maximum of \$2.4 million to zero, where the latter figure will not be impossible to achieve. A very substantial annual subsidy to the Kenaf Development Master Plan can only be avoided by a drastic modification in the overall marketing system with special emphasis on quality control.

4. Immediate Action Requirements

Discussions must be entered into immediately with the agencies listed and on the subjects specified in the following in order to promote the successful implementation of the 1973 Package Project:

BAAC

- Organization of a minimum of 675 qualified kenaf farmer groups, preferably concentrated in Changwat Chaiyaphoom only;
- Availability of an estimated \$12.5 million in production and retting tank construction credits;
- Loan financing of a crop protection program;
- Availability of credit supervisors to kenaf farmer groups.

DoA

- Organization of an immediate selected seed collection program;
- Implementation and cost of an effective crop protection program;
- Increase in retting tank excavating equipment;
- Training of kenaf extension officers of the DAE and BAAC.

DAE

- Organization of an immediate selected seed collection program;
- Kenaf extension officer availability;
- Distribution of films and pamphlets on improved kenaf production and processing (sources: DoA, ARD, USOM).

NEJM

- Operation of a 1973 Package Project Buying Unit, including the provision of fiber transportation services.

Chaiyaphoom Baling Plants

- Operation of a 1973 Package Project Buying Unit, including the provision of fiber transportation services.

Selected Jute Mills

- Purchase of 1973 Package Project fiber at incentive price differentials.

Selected Kenaf Exporters

- Purchase of 1973 Package Project Fiber at incentive price differentials.

THE KENAF PACKAGE PROJECT

The Kenaf Extension and Price Incentive Program
Northeast Jute Mill Co., Ltd.

Kenaf is a major crop in the economy of Thailand. Farmers in many provinces grow kenaf as their main crop, particularly in the Northeast. Amongst the major problems of the kenaf farmers are, at present, the market uncertainty which results in severe kenaf price fluctuations from year to year: the lack of proper attention to cultural practices, retting and washing in order to produce better quality fiber; and the fact that the farmer lacks capital or borrows money from local lenders at very high interest rates.

The Kenaf Promotion Program must cover the marketing, credit and technical problems simultaneously. Several agencies have already been engaged in the promotion of kenaf production and marketing. Thus, the Northeast Jute Mill Co., Ltd. is purchasing kenaf from farmers, the Bank for Agriculture and Agricultural Cooperatives extends farm credit, and the Department of Agriculture, the Department of Agricultural Extension and the Applied Scientific Research Corporation of Thailand provide technical assistance to kenaf growers. In order to fully benefit the farmers, a program aimed at the improvement of kenaf quality must be organized which closely coordinates the efforts of the various Government agencies concerned.

Objectives

The operation of the Kenaf Extension and Price Incentive Program must have the following objectives:

1. Encourage cooperation between kenaf growers to form farmer groups who can channel the sale of their fiber directly to the jute mills.

2. Encourage kenaf farmers to improve fiber quality and produce high quality kenaf through a fair price incentive program.

3. Assist the farmers through the provision of credit for fertilizer, retting facility construction and improved retting and washing practices so as to facilitate the production process.

4. Provide the farmers with good quality seed and technical assistance with regard to cultural practices, retting, washing and grading.

Operations

In order to achieve the above objectives, the program will be operated in the following manner:

1. The appointment of a Sub-Committee to the Kenaf Development Committee with the manager of the Northeast Jute Mill Co., Ltd., or his deputy as its Chairman. Representatives from the Bank of Agriculture and Agricultural Cooperatives, the Ministry of Agriculture, the Department of Cooperatives and three other qualified persons to be in charge of program implementation. The Northeast Jute Mill Co., Ltd., will serve as Secretary to the Sub-Committee.

2. The duties of the Sub-Committee will be as follows:

2.1. Determine the promotion area based on existing farmer groups which are already clients of the Bank of Agriculture and Agricultural Cooperatives and of the Northeast Jute Mill Co., Ltd.

2.2. Purchase kenaf from the farmers at a guaranteed price which will be established by the Committee and announced periodically to the farmers in advance.

2.3. Provide credit for quality improvement purposes to the farmers, such as for retting facilities, the acquisition of agricultural equipment and tools, fertilizer, etc.

2.4. Provide the farmers with quality kenaf seed and demonstrate improved fertilizer application, cultural, retting and washing methods.

2.5. Purchase kenaf from the farmers or, preferably, farmer groups at the Committee established prices and provide them with transportation facilities for their fiber. A kenaf procurement unit is also to be set up.

2.6. Deduct the loan repayment amounts from the farmer groups after they have sold their fiber.

3. The Sub-Committee will periodically report to the Kenaf Development Committee on its operations so as to facilitate coordination between the Government agencies concerned.

Financial Requirements

1. The Bank for Agriculture and Agricultural Cooperatives has already been extending credit to kenaf farmers under its existing activities and to the extent determined by its regulations.

2. The Northeast Jute Mill Co., Ltd., has been purchasing kenaf at the rate of about 15,000 tons per year. Since the Ministry of Industry has merged the three Government-owned gunny bag mills which now use a single procurement unit, this unit can purchase kenaf fiber to the extent of approximately 30,000 tons annually.

3. The financial requirements of the operation will be financed by the agency in charge of each aspect of the program.

Agencies Concerned

1. The Northeast Jute Mill Co., Ltd.
2. The Bank for Agriculture and Agricultural Cooperatives.
3. The Ministry of Agriculture through its Department of Agriculture, Agricultural Extension and Cooperatives.

1972/1973 Plan of Operation

1. As per the survey carried out by the Bank for Agriculture and Agricultural Cooperatives, there are at present 4,362 farm families in the promotion area of 64,607 rai with an anticipated kenaf fiber production of approximately 12,000 tons located in two Changwats, i.e. Chaiyaphoom and Nakornrachsimma (see attached table).

2. The Northeast Jute Mill Co., Ltd. will guarantee kenaf prices only for the promotion areas and delivered to its procurement units either at Korat or other locations where additional units will be set up as required.

3. The Bank for Agriculture and Agricultural Cooperatives will extend credit to the farmer groups in the promotion area for the purpose of quality improvement.

4. The Northeast Jute Mill Co., Ltd., the Bank for Agriculture and Agricultural Cooperatives and the Ministry of Agriculture will provide technical assistance to the farmers in the promotion area.

Kenaf Extension and Price Incentive Program
Chaiyaphoom and Nakornrachsima

Changwat	Amphur	Bank Customers	Growing Area (Rai)	Production (Tons)
Chaiyaphoom	Muang Chaiyaphoom	883	23,014	1,593
	Bang Kwa	751	6,913	1,620
	Chaturas	619	6,862	1,599
	Bumnejnarong	309	3,798	734
	Konswan	950	10,220	3,666
Total		3,512	50,807	9,212
Nakornrachsima	Bua-Yai	350	5,000	1,000
	Kong	400	7,000	1,400
	Chumpuang	100	1,800	540
Total		850	13,800	2,940
Grand Total		4,362	64,607	12,152

Comments by General Manager, Government Jute Mills

(i) Establishment of Additional Buying Units:

Agreement in principle, but problem of qualified personnel.

(ii) Fiber Transportation Facilities (Section 2.6.2.):

The provision of free collection and transportation facilities will encourage the farmers to form the false idea that Government projects provide "charity services". Instead, the farmers should be assisted in helping themselves by persuading them to organize small co-operatives who would hire a truck for the delivery of their fiber to the buying unit. Many farmers travel a long distance in any case to sell their kenaf.

(iii) Price Incentive:

The terms "price incentive" and "price guarantee" need to be clarified. The project was to provide a "price guarantee" in which case the price differentials listed are adequate.

(iv) Fiber Buying Unit:

Cooperation of existing baling plants:

No comment; only time can prove the correctness or fallacy of this assumption.

(v) Fiber Transportation Facilities (Section 3.6.2.):

Rejection of low-grade fiber:

Buying unit must apply grading and quality standards.

Fiber purchase method (loose or pressed):

The NEJM buys loose, not baled kenaf, in spite of which farmers and other traders are willing to sell to the NEJM.

Waiting time to accomplish fiber sales:

No complaints received from sellers for the last ten years; the Package Project members should not be granted special favors.

(vi) Required Price Incentive Level and Spread (Section 3.6.3.3.):

Should be analyzed in detail by all concerned.

(vii) Project Rules and Supervision:

Who will determine project rules and supervision? Co-operation must be based on accepted objectives.

5. 1973 Program Implementation Discussion by the Kenaf Package Project Sub-Committee

A meeting of the Kenaf Package Project Sub-Committee of the Kenaf Development Committee was called on November 14, 1972, in order to discuss the project's performance during the 1972 season, the advisor's report, and the proposed 1973 program implementation. The following gentleman attended the meeting:

Mr. Krit Sombatsiri	Chairman
Deputy Secretary-General, NEDB	
Mr. Chinda Jimrevat	Northeast Jute Mill Co., Ltd.
Mr. Wuth Yurantemee	Northeast Jute Mill Co., Ltd.
Mr. Somchat Phumpuang	BAAC, Bangkok
Mr. Chinda Chansombat	BAAC, Chaiyaphoom
Mr. Manus Chaimun	BAAC, Nakornrachsim
Mr. Amnuay Kasipar	Department of Agriculture
Mr. Anek Sutharoj	Department of Agricultural Extension
Mr. Staporn Kavitanorn	N E D B
Mr. Erwin J. Sholton	Kenaf Advisor, NEDB
Mr. Patha' Metharom	N E D B
Mr. Apichai Chirattiyangkul	N E D B
Miss Chirawan Pipitpoka	N E D B
Mr. Tongchai Anantakul	N E D B

5.1. 1973 Kenaf Package Project Area of Coverage

Although it had originally been the intention to expand the promoted area from 60,000 rai in 1972 to 100,000 rai in 1973, it was decided that such expansion should not be undertaken but that the project should be repeated for one more year on the original scale. It was felt that, due to the late start of the 1972 project and because of various organizational problems, it had not demonstrated the desired results and had thus not provided the

essential data on which to base a substantially larger program.

5.2. Inputs

5.2.1. Credit Services

The Bank of Agriculture and Agricultural Cooperatives (BAAC) had rendered effective credit and credit supervisory services in 1972 and is expected to contribute in an equally efficient manner to the 1973 project.

5.2.2. Improved Kenaf Seed

The provision of the 120 tons of improved seed which would be required for the entire 60,000 rai kenaf planting area under the 1973 Package Project will not be possible, as the Department of Agriculture (DoA) can only make a maximum of 8 tons of such seed available. In addition, that seed represents varieties which are non-resistant to stem rot disease. Prior to the conclusion of trials aimed at selecting varieties resistant to that disease, the DoA feels that "red stem" kenaf is less susceptible and suggests that multiplication efforts should be concentrated on that variety for the time being.

It was proposed that the Department of Agricultural Extension (DAE) should provide the BAAC with (presently DoA produced) improved seed which the latter would distribute to selected farmers for seed multiplication purposes and charge its cost against the farmers' loans. The DoA and the DAE would closely supervise and advise such farmers as to improved seed production methods and the DAE would purchase the seed crop from them using regular budget funds. Since the 1973 budget has already been finalized, the program will have to be postponed until 1974.

The question arises as to the cost of such farmer produced improved seed. As already discussed in Chapter III, Section 2, of this report, at a price level of ₪3.00/kg. for "Mixed Grade" retted kenaf fiber and the presently obtainable low seed outputs of 30 kg./rai, the DAE would have to pay the grower ₪20/kg. of seed in order to provide him with the same revenue (or ₪16.70 and ₪13.30 at "Mixed Grade" fiber prices of ₪2.50 and ₪2.00/kg. respectively); this compares with actual DoA seed production costs of ₪4.00/kg. It is debatable whether, in view of these cost comparisons, it would not be preferable to organize a large-scale DAE/DoA seed multiplication program which would be self-financing and would provide the growers with improved seed at reasonable cost.

The above once more emphasizes the indispensability of the prompt implementation of a crash program for kenaf research and seed multiplication.

The fertilizer input and crop production phases of the Package Project were not discussed by the Meeting.

5.2.3. Retting Facilities

The DAE and the DoA will promptly make a survey of the farmer groups under the 1973 Package Project and establish their requirements for new retting tanks; it is expected that this survey will locate a number of tanks already constructed by the DoA. Excavation of new tanks at the selected sites with the equipment of the "Kenaf Retting Pond Improvement Pilot Project" of the DoA will be started in January 1973 and it should be possible to complete close to 1,000 such tanks by the end of August of that year.

It was felt that it would be impossible to obtain the necessary funds to increase the number of bulldozers and bucket excavators

presently available to the DoA and it was suggested that the estimated remaining 2,000 tanks required should be constructed with manual labor, financed by BAAC loans. It is submitted that the timely implementation of such a comparatively large-scale manual excavation program might be somewhat difficult to achieve and that, if the BAAC is willing to extend loans for an estimated 2,000 such tanks to farmer groups at \$1,200 per tank or a total of \$2.4 million, it might be possible to make similar loan facilities available to the DoA's "Kenaf Retting Pond Improvement Pilot Project" for additional equipment purchases.

5.2.4. Extension and Technical Assistance Services

The DAE expressed its willingness to make one or two additional officers available to the Package Project. Depending upon the degree to which these and the extension officers already located in the kenaf producing Amphurs of the Package Project can devote their activities to kenaf advisory work and since the project can also count on the assistance of the BAAC's credit supervisors, adequate advisory services can then be provided to the kenaf growers in the Package Project area.

The DoA undertook to promptly agree with the DAE and the BAAC on an intensive extension officer and credit supervisor training program in kenaf production and processing.

5.3. Marketing Services

5.3.1. Kenaf Buying Unit

It was decided that the Kenaf Buying Center of the Northeast Jute Mill Co., Ltd., should continue to function as the sole buying unit for the 1973 Package Project. The Center's manager felt that its location did not present a serious problem as far as

the willingness of the Chaiyaphoom farmers to transport their fiber to the Center is concerned since, lately, some 40 tons of kenaf had been offered for sale to the Center by such farmers; the Center would arrange to eliminate the waiting time for Package Project member farmers who came to sell their fiber.

Whilst the interest of the NEJM's Kenaf Buying Center to continue to act as project buying unit is much appreciated, it is submitted that the offering of 40 tons of fiber by the Chaiyaphoom kenaf farmers does not provide proof of their willingness to travel to Nakornrachsima in 1973 to dispose of their output, since they are estimated to have produced more than 9,000 tons in 1972, and that it would still be advisable to organize a second buying unit at Chaiyaphoom, where any Chaiyaphoom Package Project farmer wishing to offer his fiber to the NEJM Center would, of course, be free to do so.

5.3.2. Fiber Transportation Services

The advisor's proposal to provide free fiber transportation services to the Package Project farmers from village collection centers to the buying unit(s) was rejected since it was felt that the project should not be burdened with the costs involved in providing such services and that it would tend to create the impression of the farmers being pampered by offering facilities which they could well provide themselves. Instead, it was proposed to encourage the formation of kenaf farmer marketing groups who would collect the fiber from their members and transport it by group-owned trucks to the buying unit, the purchase of these trucks to be financed by BAAC medium-term credits.

It is submitted that (a) it would be more economical for the marketing groups to hire trucks for their (seasonal) fiber shipments than to take out loans for truck purchases, and (b) that,

in spite of the "give away" aspect of the provision of free transportation services, such services are essential, at least at the beginning and most assuredly from village collection centers rather than from individual farms, if the growers are to be persuaded to sell their fiber to the Package Project buying unit(s) since similar services are offered by private merchants and baling plants. Once the growers are convinced of the advantage to sell their fiber to the buying unit, such free services can be gradually reduced and finally eliminated.

5.3.3. Guaranteed vs. Incentive Price

Before discussing the conclusions of the Meeting on this subject, the following points must be re-emphasized:

It will not be possible to successfully implement any guaranteed or incentive price program without a concurrent effective and strictly enforced quality control program. As long as the unscrupulous merchant is able to offer an "A" grade price for "B" grade or even lesser quality fiber in the knowledge that he will then be able to sell it under the Grade "A" label - as is the case in times of strong demand - the farmer will be likely to sell to that merchant since he receives the same price for what is for all practical purposes "Mixed Grade" which the Package Project offers him for Grade "A", and which requires more time and effort to produce.

The buying unit - whether it be the NEJM's Center or any other organization - should not be required to finance itself, even on a short-term basis, the cost of guaranteed or incentive price Package Project fiber purchases; instead, the provision of the necessary funds from outside sources should be arranged prior to the start of the buying season by the project management. At the same time, the buying unit should be authorized to retain for

itself any part of the Package Project fiber, at Project prices, it wishes to purchase and to shift the responsibility for the sale of the remainder to the project management.

The Meeting decided to fix a guaranteed price for the 1973 Package Project and that at $\text{B}2.50/\text{kg}$. for Grade "A" fiber and considered that the adoption of an incentive price as proposed by the advisor would be difficult to put into practice.

Essentially, the adoption of an incentive price program is identical to that of a variable guaranteed price as provided for in the NEC/NEDB Package Project directive which specifies the purchase of kenaf from the farmers "at a guaranteed price which will be established by the Committee and announced periodically to the farmers in advance". Such a variable guaranteed (or incentive) price for Grade "A" fiber will provide the necessary attraction to the grower to expend the required additional time and effort to produce that quality at all prevailing price levels which a fixed guaranteed price is unable to do. In fact, last year's fixed guaranteed price of $\text{B}2.50/\text{kg}$. for Grade "A" fiber had no incentive effect at all since even the "Mixed Grade" price level was substantially above that level all through the season.

The term "guaranteed price" obviously implies a commitment to purchase all Grade "A" fiber at that price irrespective of the prevailing market price level. In an extreme case, when demand is low such as occurred in the past and when farm level "Mixed Grade" prices fell to $\text{B}1.50/\text{kg}$. and less, this could involve very considerable expenditures on the part of the executing agency. At a "Mixed Grade" price of $\text{B}1.50/\text{kg}$., a fixed guaranteed price of $\text{B}2.50/\text{kg}$. for Grade "A", and on the assumption of the production of 40 percent Grade "A" fiber out of an overall output of 400,000 tons per year or 160,000 tons as the result of the successful implementation of the Kenaf Master Development Program,

the Executing Agency might have to expend up to P400 million since, at a P1.00/kg. price differential, the farmers can be expected to offer all of their Grade "A" fiber to the Agency. This would also require the setting up of a large-scale purchasing and storage organization which involves numerous problems. Although a successful program of this type would achieve the desirable purpose of providing the kenaf farmer with a guaranteed minimum income even at very low fiber price levels, its implementation has so far not been envisaged under the Kenaf Master Development Program.

The above problems could be avoided through the NEDB/NEC proposed variable guaranteed price (or incentive price) system which follows the prevailing price level trend and which provides the required attraction to the farmer for Grade "A" fiber production at all such levels. As to the P0.50/kg. incentive price spread between "Mixed Grade" and Grade "A" proposed in the foregoing Package Project report, this spread appears to agree with that set under the fixed guaranteed price program as it is understood that the P2.50/kg. guaranteed price for Grade "A" was established on the assumption that the prevailing "Mixed Grade" price would be P2.00/kg.

5.4. Estimated 1973 Kenaf Package Project Cost

The estimated costs of the implementation of the 1973 Package Project may be summarized as follows (60,000 rai promoted area):

- Improved Seed

Requirements = 120 tons

Availability = 8 tons at P4.00/kg. (DoA) P 32,000

- Retting Tank Construction

Requirements = 3,000 units

DoA construction = 1,000 units at P1,000 P1,000,000

Manual excavation = 2,000 units at P1,200 2,400,000

P3,400,000
=====

- Retting Tank Construction Equipment

For "Kenaf Retting Pond Improvement Pilot Project" (DoA);

To construct 1,000 tanks from January to August, 1973:

1 set of equipment consisting of:

6 Bulldozers D-4 @ P500,000	P3,000,000
1 Low-Boy truck-trailer, 15 tons	480,000
3 Pickup trucks, 2 tons, diesel, @ P80,000	<u>240,000</u>
	<u>P3,720,000</u>
	=====

- Pest and Disease Control

50% of promoted area sprayed once	P 495,000
= 30,000 rai at P16.50/rai	=====

- Extension Services

1 family = 10 rai kenaf	
60,000 rai kenaf = 6,000 families	
1 extension worker per 1,000 families	
6 extension workers required at P36,000/year	P 216,000
	=====

- Fiber Transport Trucks

60,000 rai will produce 12,000 tons fiber	
12,000 tons fiber to be transported in	
100 working days = 120 tons/day at	
4 round-trips per 10-ton truck per day	
= 40 tons per truck per day	
= 3 trucks at P200,000	P 600,000
	=====

- Incentive Price Financing

P120/ton x 12,000 tons	P1,440,000
	=====

- BAAC Production Credit Requirements

60,000 rai promoted area

฿100/rai production credit

฿6,000,000
=====

- Summary

Improved Seed	฿ 32,000
Retting tank construction	3,400,000
Retting tank construction equipment	3,720,000
Pest and disease control	495,000
Extension services	216,000
Fiber transport trucks	600,000
Incentive price financing	1,440,000
BAAC production credit requirements	<u>6,000,000</u>
Total	<u>฿15,903,000</u> =====

Sources of financing:

BAAC:

Improved seed	฿ 32,000
Retting tank construction	3,400,000
Pest and disease control	495,000
Production credit	<u>6,000,000</u>
Total BAAC	<u>฿ 9,927,000</u> =====

Department of Agricultural Extension:

Extension services (DAE budget)	฿ 216,000 =====
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Executing Agency:

Retting tank construction equipment	฿ 3,720,000
Fiber transport trucks	600,000
Incentive price financing	<u>1,440,000</u>
Total executing agency	<u>฿ 5,760,000</u> =====

It will be seen that, of the \$15,903 overall Package Project costs, \$9,927,000 will be financed through BAAC credits and \$216,000 from the DAE budget. The balance of \$5,760,000 to be provided by the Executing Agency is composed of \$1,440,000 in short-term incentive price financing and \$4,320,000 in retting tank construction equipment and fiber transport truck purchasing costs, the provision of such equipment and trucks having been rejected by the Kenaf Package Project Sub-Committee.

CHAPTER VI - THE PIONEER KENAF DEVELOPMENT PROJECT

- Introduction

At the request of the National Economic Development Board, the advisor held discussions with officials of the Mekong Committee and the World Bank regarding these agencies' potential support of the Kenaf and Jute Development Program through a specific Mekong Committee designed and World Bank supported approach known under the designation "Pioneer Projects" which are concentrated high-intensity core type package operations covering all aspects of the crop with which they concern themselves, from seed production through marketing of the product. It is understood that, if agreement is reached on the implementation of a Pioneer Kenaf (and Jute) Development Project in the Northeast between the RTG, the Mekong Committee and the Bank, the project might be financed on a grant basis.

The following chapter has been prepared as a self-contained outline of a proposed Pioneer Kenaf Project for specific discussions between the National Economic Development Board, the Mekong Committee and the World Bank and thus necessarily recounts many aspects of Kenaf and Jute Development discussed in greater detail in other chapters of this report.

PIONEER KENAF DEVELOPMENT PROJECT
NORTHEAST THAILAND

A Report Prepared for the
National Economic Development Board, Royal Thai Government
In Cooperation with the
United States Operations Mission to Thailand
Agency for International Development
Bangkok, Thailand
Under Contract No. AID 493-052-T
By Erwin J. Sholton
Agri-Business Consultants
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PIONEER KENAF DEVELOPMENT PROJECT
NORTHEAST THAILAND

- Summary

Kenaf is one of Thailand's major export commodities and the most important cash crop in the Northeast where it normally furnishes an annual income of \$800 million or more to some 200,000 farm families as well as providing industrial employment to more than 40,000 workers. The principal problems of the industry are low fiber yields, low average fiber quality, and unreliability of fiber grading; their solution would tend to stabilize kenaf demand and prices and, thus, positively affect the economy of the region. The Government is presently promoting a comprehensive Kenaf Package Project and subsequent Kenaf Master Development Program to both of which the proposed more concentrated and higher intensity Pioneer Project would furnish essential techno-economic data and other assistance and support services.

It is suggested that the Pioneer Project should operate on the basis of the Nucleus Farm concept and comprise from one to four farm units, each servicing some 500 farmers with a total planting area of about 5,000 rai and an annual retted fiber production of 1,000 to 1,250 tons. The project will produce its own selected seed for distribution to the growers, install one or more retting centers with a total capacity adequate for the processing of the entire member farmer crop and provided with permanent water supplies, and furnish the required stalk transportation trucks; it will also arrange for farm credit through the Bank of Agriculture and Agricultural Cooperatives and make fertilizer and pest and disease control facilities available. A complete range of intensive technical assistance services will be supplied to the members, from land preparation through final processing. Stalk

retting and fiber grading will be done by the growers at the retting center(s) under project staff supervision and the fiber will be purchased by grade, an adequate incentive price being paid for high quality fiber. Baling and marketing of the fiber will be arranged for by the project management. The technoeconomic feasibility of manual and machine ribboning will be investigated.

The project will employ two extension officers and two retting and grading supervisors for each Nucleus Farm unit and the Nucleus Farm Group should be placed under the direction of a qualified manager assisted by two expatriate kenaf specialists, namely an agronomist and a retting, grading and marketing specialist, who would also act as advisors to the Kenaf Package Project and the Kenaf Master Development Program.

Preliminary Project cost estimates are as follows:

	<u>Capital Costs</u>	<u>Operating Costs (Annual)</u>
Per Nucleus Farm Unit	¥ 6,800,000 (\$340,000)	¥ 4,600,000 (\$230,000)
Per Nucleus Farm Group	¥22,000,000 (\$1,100,000)	¥11,700,000 (\$585,000)

Annual operating costs would be reduced to ¥3,300,000 (\$165,000) and ¥6,600,000 (\$330,000) respectively, if the credit assistance to be furnished by the Bank for Agriculture and Agricultural Cooperatives is taken into account.

1. General Background Information

1.1. The Thai Kenaf Industry

Kenaf is one of the major export commodities of Thailand and the most important cash crop in the Northeast where poor soil conditions severely limit the choice of agricultural crops yielding an acceptable return. Although kenaf would, obviously, produce greater yields under more favorable soil and rainfall conditions than those prevailing in the region, the average production of 200 kgs. of retted fiber per rai (1,250 kgs. per hectare) is sufficient to provide the necessary financial incentive to the farmers to produce the crop. On the assumption of an annual production of 400,000 tons at ฿2.00/kg. farm price for "Mixed Grade" fiber (it presently fluctuates between ฿3.00 and ฿4.00/kg.) and an average planting area of 10 rai per farm family, the cash income to the growers amounts to some ฿800 million per year shared by approximately 200,000 families. Kenaf production also generates work and income to a great number of shopkeepers, kenaf traders and transport workers and creates employment for some 30,000 workers in about 200 baling plants for seven months of the year and for over 11,000 workers in the ten local bag mills on a year-round basis and that largely in rural areas where few other industrial employment opportunities exist.

The principal problems of the Thai kenaf fiber industry are comparatively low yields per unit area, low average fiber quality, and unreliability of fiber grading. The latter two have resulted in an excessively low world market price for Thai kenaf compared to jute, the other principal natural packaging fiber. Thus, an increase in the ratio of high quality fiber production and the consistent application of international grading standards could be expected to raise the overall export demand for Thai kenaf and

reduce the above price differential. The successful implementation of a yield improvement and quality control program would, therefore, materially contribute to a stabilization of kenaf prices and production and profoundly affect the economy of the Northeast where there is as yet no alternative enterprise in sight which promises a comparative source of cash income to the farming population.

In awareness of this fact, the Government is presently promoting a Kenaf Package Project - to be followed in subsequent years by a Kenaf Master Development Program - which comprises a full range of credit, improved seed, retting facility construction and technical assistance inputs as well as price incentive and marketing services. It is felt, however, that these ambitious and large scale programs, starting with a 100,000 rai production area in 1973 and planned to encompass 1.2 million rai with an output of 240,000 tons by 1976, require to be supported by and could substantially profit from the achievements of a smaller, high-input intensive Pioneer Kenaf Project including from one to four Nucleus Farms, each servicing neighboring kenaf growers with a production area of some 5,000 rai (800 hectares) and a yearly output in the range of 1,000 tons of retted fiber.

1.2. Fiber Production and Processing

Kenaf is presently grown in Northeast Thailand with primitive methods and only a minimum of technical knowledge or support, although a reasonable - but so far inconclusive - effort has been undertaken to provide the basis for a substantial potential improvement in kenaf fiber production and processing.

Although there is general agreement that one of the essential assistance requirements to the Thai kenaf farmer is research into and the production and distribution of improved high-yielding and

disease resistant seed, this indispensable aspect of any affective kenaf development program has been seriously neglected in the past. For an overall annual fiber production of 400,000 tons, an estimated 4,000 tons of improved seed will be required each year; this compares with a 1972 seed multiplication program of 8 tons and a 1973 program of 30 tons. In addition, a crash program must be implemented for the selection and multiplication of stem-rot resistant varieties since this disease is rapidly spreading in the Northeast and already affects an estimated 30 percent of the planting area in some Changwats.

Row planting is practiced only rarely although it has been established that the adoption of this planting system alone increases fiber yields by up to 25 percent apart from facilitating weeding, thinning and fertilization. The commonly used method of broadcast seeding results in uneven stands and in excessive weeding labor requirements so that this essential operation is often carried out inefficiently or neglected altogether. Fertilizer is applied only rarely, where it should be pointed out, however, that it has been found that, with the presently used kenaf varieties and at the actual level of research, fertilizer application increases fiber yields by only about 25 percent and does not repay its cost and the additional labor requirements except when fiber prices are above a certain level.

The most important problem of the kenaf industry in Northeast Thailand is the lack of sufficient retting water to produce a greater percentage of high quality fiber or, for that matter, to process the entire kenaf crop. Except in areas close to the few rivers, the water accumulations disappear rapidly after the end of rainy season and retting facilities are limited to isolated ponds and roadside ditches; due to their repeated use for one retting cycle after the other, the mostly stagnant water carrying

facilities become progressively more polluted which adversely affects the quality of the retted fiber. This applies particularly to the so-called "second wash", the kenaf retting which takes place after the completion of the rice harvest about the end of January.

1.3. Fiber Marketing

After retting, washing and drying, the kenaf farmer prepares a loosely compressed fiber bale or "drum" which he then sells usually to the village merchant who passes it on, through one or more additional marketing steps, to the district buyer, the baling plant, a local bag mill or the exporter.

The farmer himself does not grade the fiber but, instead, sells it as "Mixed Grade". The first rough grading normally takes place at the village merchant level; final grading is done either at the baling plant or at the local bag mill. The practice of "Mixed Grade" fiber marketing removes any incentive for the farmer to invest the additional time and effort required to produce superior quality fiber, since the price differential paid for good or inferior quality "Mixed Grade" is usually minimal or non-existent. In fact, since low quality, dirty fiber weighs more than clean fiber, he may find that he realizes a greater return from the lower quality. The further limitation on the production of high quality fiber due to the lack of adequate retting facilities has already been mentioned.

At the baling plant (or at the local mill), the field bales are opened, the fiber is graded according to quality (principally color, strength and length), the under-retted bottom portions (cuttings) are removed and, for export, the fiber is packed into wooden boxes and then compressed into high-density bales. The major deficiency in this marketing step is the lack of attention -

both intentional and unintentional - to proper and conscientious grading, a practice which adversely affects the reputation of Thai kenaf on the international market.

It is the present aim of the Government to stabilize kenaf fiber production in the Northeast at the 400,000 to 450,000 tons per year level. Some 130,000 tons are consumed by the ten local bag mills and by traditional village industry - a consumption which is expected to increase to 150,000 tons or more at an early date - so that an annual export surplus of 270,000 to 300,000 tons would be available. Experience has shown that such a surplus can be disposed of on the international market without too much difficulty but, in the long range and in view of the increasing competition from man-made fibers, only if the proportion of superior quality Thai kenaf is increased and reliable grading standards are maintained.

2. Basic Requirements for the Improvement of the Thai Kenaf Industry

The essential requirements for the improvement of kenaf fiber production and processing in Northeast Thailand may be summarized as follows:

- High-yielding and disease resistant variety research, including both local and introduced varieties; cultural practices and time-of-planting, time-of-harvesting and quality improvement research;
- Improved seed production and distribution;
- Introduction of row planting and improvements in weeding, thinning and fertilization practices;
- Provision of adequate retting facilities and instruction in proper retting and grading practices;
- Introduction of manual and/or machine ribboning to economize on retting water requirements, improve fiber quality and enable the individual farmer to effectively process a larger crop area;
- Modification of the "Mixed Grade" purchasing method, including pre-grading at the farm level and price incentive payments for high quality fiber;
- Improved quality control inspection to assure reliable and conscientious fiber grading and export baling.

It is estimated that, through the provision of adequate inputs, technical assistance, price incentive payments and marketing services, the present Grade "A", "B" and "C" quality ratio of 15-50-35 percent can be improved to a 40-50-10 percent ratio resulting in an overall increase of 100,000 tons of Grade "A" fiber based on a total annual production of 400,000 tons and increasing farm level income by \$48 million per year.

3. The Pioneer Kenaf Development Project

3.1. Nucleus Farms

It is proposed to establish a "Nucleus Farm" or a group of such farms in the center of the kenaf production areas in the Northeast (Khon Kaen - Kalasin - Mahasarakam region) under the Pioneer Project, such farm or farms to extend a complete range of input and technical assistance services to the neighboring producers and to serve as prototypes for the Kenaf Package Project and the Kenaf Master Development Program aimed at the overall improvement of the Thai kenaf fiber industry.

A basic Nucleus Farm unit should service a planting area of some 5,000 rai (800 hectares or 2,000 acres) or approximately 500 kenaf farmers. Such an area could well be assembled within a 5 to 6 miles radius of the Nucleus Farm at suitable locations in the Northeast thus facilitating access to the central installations for the member farmers. A unit of this size would have an initial yearly output of some 1,000 tons of retted fiber which, it is expected, would increase to 1,250 to 1,500 tons within two or three years as a result of the provision of selected seed and the introduction of improved cultivation and processing methods.

The Nucleus Farm Group should consist of four individual units located within easy reach of each other so as to assure effective centralized supervision. Also, the 4,000 to 6,000 tons anticipated annual fiber output of the Group corresponds to the capacity of an average-size baling plant in the Northeast and would make it economical to contract with such a plant so as to allow complete control over grading and baling practices. Similarly, the group could sell its fiber under its own mark through one or more selected exporters and, as a result of the quantities involved, would be able to exert its influence on such exporter(s) as far as overseas marketing practices are concerned.

3.2. Nucleus Farm Services

3.2.1. Seed Production

Assuming a Nucleus Farm Group covering a total of 20,000 rai, the standard seed requirement of 2 kg./rai and the present (low) seed production rate of 30 kg./rai, some 1,333 rai would have to be set aside annually for the production of improved seed. It is believed however, that efficient management could raise the seed production rate to at least 60 kg./rai since average yields of 75 kg./rai and better have already been achieved in seed production experiments in the past. A total seed planting area requirement of 650 rai yearly will, therefore, be assumed. The initial seed stock could be obtained from the Nong Soong Agricultural Research Station of the Department of Agriculture.

Seed production costs are estimated at \$120 to \$150 per rai equivalent to \$78,000 to \$97,500 or, say, \$100,000 for the 650 rai annual planting area.

3.2.2. Retting Facilities

One of the principal functions of the Nucleus Farms will be to provide adequate retting facilities to the kenaf growers. For this purpose, retting tanks with permanent water supply and control facilities should be constructed and that preferably at the Nucleus Farm sites in order to permit expert control and supervision of fiber processing. This requires that the Nucleus Farms be located near a permanent source of water, such as a perennial stream, below one of the existing water storage dams, or near an irrigation system distribution canal.

Designs for standard tanks 25 m. long by 4 m. wide by 1 m. deep have been developed for the Northeast as have retting center layouts and different types of water supply and control systems

to suit varying conditions. It is proposed that some 10 percent of the tanks in each center should be soil-cement or Cinva-Ram brick lined so as to test the superiority or otherwise as well as the economic return of this type of construction.

Recent Department of Agriculture estimates show that each of the above standard size tanks, but tanks containing stagnant and not replenishable water, will produce about 4 tons of retted fiber in a 3-month season of which, however, only the first 2 tons will be high quality fiber due to the progressive pollution of the water. With the provision of permanent water supplies and water exchange control facilities, the retting season can be doubled to 6 months and fiber quality can be maintained at a high level. However, ambient and water temperatures will fall later on in the season so that retting time requirements will gradually increase; it is therefore assumed at present that production per tank in the Nucleus Farm retting centers will rise to only 7 tons during the 6-month retting period. Hence, some 175 such tanks will have to be provided for each Nucleus Farm unit for an annual retted fiber output of about 1,250 tons using the traditional stalk retting method.

On the other hand, production of retted fiber per tank can be at least tripled if the stalks are ribboned prior to retting, as described in the following Section 3.2.3., and only the ribbon is retted. If this method was applied to the entire production of the member farmers, tank requirements could be reduced to about 60 units. Also, whereas stalk retting must take place within a few days after harvesting if damage to the fiber is to be avoided, the ribbon can be dried and stored almost indefinitely. Theoretically, this permits ribbon retting on a year-round basis, but only a 9-month retting season is assumed here since other work commitments of the growers should be taken into account.

Tank requirements would then be reduced to some 40 units as a result of the 50 percent increase in retting time.

The cost of bulldozer excavation per tank to the Department of Agriculture's "Kenaf Retting Pond Improvement Pilot Project" amounts to \$1,000 to which should be added another \$1,000 for the provision of the water supply and control facilities. Hence, the estimated construction cost of a 175 tank retting center will amount to \$350,000. Once partial ribboning has been introduced, these 175 tanks will then be able to process the fiber from a larger planting area than the originally envisaged 5,000 rai per Nucleus Farm unit.

It is, of course, open for debate whether the 175 tanks should indeed be concentrated in a single retting center which will involve maximum stalk transportation costs or whether several smaller centers should be established in "sub-areas", which would somewhat reduce the efficiency of supervision and of the educational effort. This decision will have to be made after the exact Nucleus Farm and service area locations are established and the capital outlay for truck purchases (Section 3.2.4.) is taken into consideration.

3.2.3. Ribboning

The term "ribboning" is applied to the process of manual or mechanical stripping of the fiber-bearing bast of the kenaf stalk from the central woody core. The resulting bast "ribbon" only, rather than the complete stalk, is then retted in water. Some of the principal advantages of ribboning include the already mentioned fact that it reduces retting tank and retting water requirements by some 75 to 80 percent - certainly a most important consideration for the Northeast kenaf industry - that the stripped ribbon can be stored almost indefinitely and retted at one's convenience thus

permitting year-round operations, that ribbons ret faster and more uniformly than whole stalks, and that transportation costs from the field to the retting facility are reduced by some 80 percent. However, the ribbon must be stripped from fresh stalks and the stalks must be of reasonable size and diameter if the ribbon is not to break during stripping, particularly manual stripping. This will require certain modifications in planting methods, particularly row planting, as already practiced in Taiwan, for example, where all kenaf - and jute - is ribboned before retting so as to economize on retting water.

Ribboning can be done either by hand (as in Taiwan) or by machine (as in Central America and a number of African countries). Manual ribboning is about as labor-intensive as stripping of the retted fiber after stalk retting, so that no increase in labor requirements results. A standard mechanical decorticator can ribbon the stalks from approximately 2.5 to 3.0 rai per day with a 10-man crew which would require an estimated 45 to 55 man-days to strip manually. It should be pointed out, however, that mechanical ribboning is usually introduced to economize on labor and thus to reduce production costs; since the Thai farmer does not take his and his family's labor cost into consideration, the introduction of expensive equipment can not be justified on a cost reduction basis; rather, it would enable the farmer to harvest a larger area than at present without adverse effect on fiber quality as is actually the case when he is forced by family labor scarcity to harvest over-mature stalks during the "second wash" period or to abandon part of his crop altogether as frequently happens.

For manual ribboning, only simple wooden implements are required which the farmer could provide himself. If machine ribboning of the entire crop was to be decided upon, 25 mechanical ribboners would have to be purchased by the Nucleus Farm unit for

its 5,000 rai kenaf area which could then be rented out to the farmers and payment collected from retted fiber deliveries. At the start, it would probably be advisable to encourage the farmers to do most of their ribboning manually and to provide, say, two mechanical ribboners to test the process and to be placed at the disposal of those farmers who do not succeed in completing the manual ribboning of their crop.

At an estimated cost of \$320,000 per mechanical ribboner, including spare parts and delivered to the Nucleus Farm, the required investment would amount to \$640,000 per Nucleus Farm unit.

3.2.4. Stalk Transport

Stalk transport truck requirements are based on the following assumptions:

- 100 percent stalk transport to the Nucleus Farm retting center;
- Maximum transportation distance of 8 km. (5 miles) and average distance of 4 km.;
- Average fresh stalk weight per rai = 6 tons;
- A three-month harvesting season;
- Four round-trips per truck per day;
- An average 5-ton stalk load per truck.

Each truck will then be able to transport 20 tons of stalks per day or 1,500 tons in 75 days (25 working days per month x 3 months) which is equivalent to the stalk yield from 250 rai. Hence, 20 trucks of 5-ton stalk capacity each would have to be provided. At an estimated cost of \$120,000 per truck, this would require a capital outlay of \$2.4 million.

3.2.5. Fiber Baling

Although it would probably be possible for the Pioneer Kenaf Development Project to contract for the sale of its comparatively small annual production (1,000 to 1,500 tons per Nucleus Farm unit or 4,000 to 6,000 tons for the Nucleus Farm Group) directly with one or two of the local mills to whom field baled fiber or "drums" would be acceptable, it is suggested that the project should arrange for the high-density baling of its fiber so as to include export grading and baling practices in the improvement program. This will entail complete control over the baling operation, either through the establishment of the group's own baling plant or through contracting for the baling of the group's fiber by an established baler willing to accept the project management's supervision. This latter arrangement is to be preferred, since it would eliminate the plant investment requirement, assure already experienced baling operation, utilize existing baling plant capacity in the Northeast and involve private enterprise in the undertaking.

Baling contract charges have been cited at ₱20 to ₱25 per 400 lb. bale or ₱90 to ₱115 per metric ton equivalent to an annual expense of ₱90,000 to ₱135,000 per Nucleus Farm unit or ₱360,000 to ₱540,000 for the Group.

3.2.6. Nucleus Farm Inputs

Selected Seed: It is proposed to supply the farmers with Nucleus Farm selected seed at planting time free-of-charge and to deduct the seed costs only at the time they deliver their fiber to the Pioneer Project organization.

Fertilizer: Again, fertilizer should be supplied to the farmers free-of-charge, if and when required and subject to the limitations indicated in Section 1.2. above, and the cost deducted

when the fiber is delivered. Assuming that only 25 percent of the 5,000 rai planting area will be fertilized at a cost of ฿100 per rai, annual fertilizer costs will amount to ฿125,000 per Nucleus Farm unit.

Pest and Disease Control: It is stated that the required services can be obtained from the Central Control Unit at Nakorn-rachsimma at the rate of ฿80 per rai. Assuming pest and disease control measure requirements for 25 percent of the planting area, annual costs will amount to ฿100,000 per Nucleus Farm unit to be recovered from fiber deliveries.

Ribboners: The necessary equipment should be placed at the farmers' disposal free-of-charge at harvesting time and a rental fee, based on the amount of ribbon produced, deducted from the sales price of the farmers' fiber.

Retting Facilities: Once again, the use of the central retting facilities should be charged for only at the time of fiber sale, the fee to be based on the amount of fiber produced by each farmer in the Nucleus Farm's retting tanks.

Credit Facilities: The Bank for Agriculture and Agricultural Cooperatives (BAAC) should be requested to supply the farmers' credit requirements. The BAAC operates most effectively in the Northeast and is already involved in the Kenaf Development Committee's "Kenaf Package Project". This would relieve the Pioneer Project of a substantial amount of operating capital requirements.

3.2.7. Technical Assistance Services

One of the most important services to be rendered by the Pioneer Project to the kenaf farmer would be a complete range of technical assistance. It has been found that the grower is most receptive to new ideas and methods provided their advantages are

explained in detail and their implementation is demonstrated to him. The lack of such services, due to an insufficient number of qualified extension officers, is a major contributory reason for the unsatisfactory progress of the Thai kenaf industry.

In order to furnish the necessary intensive assistance to the approximately 500 farmers serviced by each Nucleus Farm unit, two field assistants should be employed and trained by the Project's senior staff and by the Chief, Kenaf Project, of the Department of Agriculture. Two further technicians will be required to supervise the fiber retting and grading operations. At an estimated annual cost of B36,000 per technician, the total cost per year to each Nucleus Farm unit will amount to B144,000.

The Pioneer Project should be placed under the direction of a qualified manager, assisted and advised by two expatriate kenaf specialists, namely an agronomist and a fiber retting, grading and marketing expert. These specialists could also act as advisors to the Kenaf Package Project and the Kenaf Master Development Program. At the same time, the services of the expatriate kenaf research specialist to be assigned to the planned (separate) research and seed multiplication station should be made available to the Pioneer Project as required.

3.2.8. Fiber Marketing

In order to realize the basic purpose of the Kenaf Pioneer Development Project - as that of the other Government sponsored Kenaf Development Programs - to increase the income of the farmer and thus to raise his standard of living, he must be provided not only with the inputs, facilities and technical assistance necessary to enable him to produce higher yields and better quality fiber but he must also be given the incentive to exert the effort required to do so. This can only be achieved by securing for the

farmer a better price for better quality fiber. Hence, rather than allowing him or more commonly, obliging him, to sell unassorted "Mixed Grade" fiber, he must be taught to grade his fiber before sale. In the Pioneer Project, this can best be done at the Nucleus Farm retting centers under the supervision of the retting center technician and the fiber grading specialist. The fiber must be separated into the standard "A", "B" and "C" grades and should be purchased from the farmer at an incentive price differential of $\text{₱}0.50$ above the ruling "Mixed Grade" price for Grade "A", at the current "Mixed Grade" price for Grade "B", and at $\text{₱}0.80$ below that price for Grade "C". The above grade price differential proposals are based on discussions with Northeast traders, balers, jute mill managers and Government officials and are expected to be applied also under the 1973 Kenaf Package Project.

3.2.9. Tractor Services

It will be noted that no provision has been made in the foregoing for the Nucleus Farm to furnish tractor services to the farmers for land preparation and related operations. Although mechanized land preparation is always desirable, it has been found that the rather rudimentary preparation achieved by the farmer with his water buffalo, wooden plow and wooden rake is quite adequate for kenaf in the sandy upland soil of the Northeast. If it should be desired to furnish these additional services to the farmer, it is estimated that some twelve tractors with the necessary implements will have to be provided to each Nucleus Farm for the proposed 5,000 rai planting area.

3.3. Estimated Project Costs

Pending a more detailed assessment of the Pioneer Project capital and operating costs and revenues, including the question

of stalk transport, preliminary estimates are submitted as a general outline only in Tables VI-1 and VI-2.

Table VI-1

Estimated Capital Costs

	Per Nucleus Farm Unit ₪	Per Nucleus Farm Group ₪
	<u>₪</u>	<u>₪</u>
- Land purchase: to be provided free-of-charge by the RTG		
500 rai per unit	-	-
2,000 rai per group	-	-
- Retting tanks, incl. water supply and control facilities, at ₪2,000		
175 tanks per unit	350,000	-
700 tanks per group	-	1,400,000
- Ribboning machines, incl. spares at ₪320,000		
2 machines per unit	640,000	-
8 machines per group	-	2,560,000
- Stalk transport trucks, at ₪120,000*		
20 trucks per unit	2,400,000	-
80 trucks per group	-	9,600,000*
- Staff housing, buildings and roads	2,000,000	4,000,000
- Motor vehicles (staff)	400,000	760,000
- Tractors and implements, at ₪200,000 per set		
2 sets per unit	400,000	-
8 sets per group	-	1,600,000
- Contingencies (10% approx.)	<u>610,000</u>	<u>2,080,000</u>
Total Estimated Capital Cost	6,800,000 =====	22,000,000 =====
	(\$340,000) =====	(\$1,100,000) =====

* See Section 3.2.2.

Table VI-2

Estimated Annual Operating Costs

	Per Nucleus Farm Unit ₪	Per Nucleus Farm Group ₪
- Seed production, at ₪150/rai	25,000*	100,000*
- Fertilizer	125,000*	500,000*
- Pest and disease control	100,000*	400,000*
- Baling charges	135,000	540,000
- Operating, maintenance and amortization costs:		
Retting facilities (20% of cost)	70,000*	280,000*
Ribboners (20% of cost)	130,000	520,000
Tractors and implements (30% of cost)	120,000	480,000
Motor vehicles (40% of cost)	160,000	640,000
Stalk transport trucks (40% of cost)	960,000*	3,840,000*
Staff housing, buildings and roads (10% of cost)	200,000	400,000
- Staff:		
1 General manager	100,000	100,000
- Field assistants:		
4 Assistants per unit	144,000	-
16 Assistants per group	-	576,000
- Ribboner and tractor operators and helpers	100,000	400,000
Retting center attendants (6 months):		
6 Attendants per unit	12,000	-
24 Attendants per group	-	48,000
- Expatriate consulting services (2 specialists)	1,800,000	1,800,000
- Contingencies (10% approx.)	<u>419,000</u>	<u>1,076,000</u>
	4,600,000	11,700,000
	=====	=====
	(\$230,000)	(\$585,000)

Note:

The items marked with an (*) could be paid for by the BAAC credits to the farmers (and./or will be recovered from the farmers at the time they sell their fiber); operating cost requirements would then be reduced approximately to the following amounts:

Per nucleus farm unit	₪3,300,000 (\$165,000)
Per nucleus farm group	₪6,600,000 (\$330,000)

CHAPTER VII

THE KENAF MASTER DEVELOPMENT PROGRAM

A Report Prepared for the
National Economic Development Board, Royal Thai Government
In Cooperation with the
United States Operations Mission to Thailand
Agency for International Development
Bangkok, Thailand
Under Contract No. AID 493-052-T
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THE KENAF MASTER DEVELOPMENT PROGRAM

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8. The Executing Agency
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CHAPTER VII -- THE KENAF MASTER DEVELOPMENT PROGRAM

Summary

(i) Program Goals and Time Frames

The Kenaf Master Development Program, including the 1973 Kenaf Package Project, is designed to increase the proportion of Grade "A" fiber production in a 400,000 overall annual crop planted on 2 million rai from the present estimated level of 60,000 tons (15%) to 160,000 tons (40%) so as to raise farm income in the Northeast, increase foreign exchange revenue from fiber exports, and assure a steady export demand for Thai kenaf. The program is to be implemented in two phases with the Phase I (1973 to 1976) efforts concentrated on 720,000 rai in the six Changwats with the greatest average kenaf production areas; Phase II will cover the remaining 1.28 million rai in all 16 Changwats between 1977 and 1980.

The achievement of the Master Program goals requires a complete range of inputs and marketing services as follows:

- Improved seed supplies;
- Retting tank construction;
- Pest and disease control;
- Extension services;
- Farm credit;
- Fiber purchases by grade at incentive prices;
- Fiber quality control.

The program must also be supported by an intensive research effort and it must be co-ordinated by an Executing Agency.

(ii) Improved Seed Supplies

The supply of improved kenaf seed to the farmers is considered one of the most important Master Program aspects. This will require

the production of 4,000 tons of such seed annually, if 100 percent of improved seed requirements are to be met, as is deemed essential to the success of the program by the Advisor. It is emphasized, however, that the RTG officials participating in the Master Program preparation reject this assumption and consider the supply of 10 percent of such seed as adequate. The required seed could be produced either on specific seed farms operated by the Ministry of Agriculture or on supervised peasant farms; as an interim measure, the Executing Agency might arrange for the purchase of high quality kenaf stalks, prior to harvest, from selected farmers for subsequent seed production.

(iii) Retting Tank Construction

Additional retting facility requirements to enable the growers to increase Grade "A" production to the desired level are estimated at 100,000 tanks by 1980. Tank construction costs have been established at \$1,000 per unit utilizing the mechanical equipment of the "Kenaf Retting Pond Improvement Pilot Project" of the Department of Agriculture and it has been assumed that sufficient additional equipment will be made available to that project for the excavation of all tanks required.

(iv) Credit

The Bank for Agriculture and Agricultural Cooperatives (BAAC), which already renders most efficient credit services in the Northeast, is expected to furnish all production and retting tank construction credit requirements. However, the BAAC assumes that only 50 percent of the farmers under the Master Program, associated in farmer groups, will qualify for its credit services. Further consideration should be given to this problem, as it implies the exclusion of the non-qualifying farmers from what is considered as essential Master Program service.

(v) Extension Services

Extension worker requirements have been calculated on the basis of one such worker for every 1,000 farm families; 200 kenaf extension officers will have to be placed in the field by 1980.

(vi) Incentive Price Financing

In order to persuade the grower to assume the additional responsibilities and exert the necessary increased effort to raise his high quality fiber output, he is to pre-grade it in the field and a \$0.50/kg. incentive price is to be paid to him for his Grade "A" production by the Master Program buying units which will amount to a \$120 per metric ton incentive at all "Mixed Grade" price levels. The necessary funds are to be secured by the Executing Agency through short-term loans and placed at the disposal of the buying units.

(vii) Quality Inspection

Quality inspection is to be exercised exclusively by the Office of Commodity Standards. For the inspection of 270,000 tons of export fiber at the Bangkok godowns, 20 three-man teams of inspectors will be required and that from the very start of the Master Program.

(viii) The Executing Agency

The appointment of an Executing Agency is indispensable for the effective supervision, co-ordination and implementation of the Master Program and is also a pre-condition if international agency assistance is to be sought for the program. The Ministry of Agriculture (kenaf production and processing) or the Ministry of Commerce (marketing and quality control) are most closely concerned with the program efforts and goals. In the past, the Thai Jute

Company, a dependency of the Ministry of Commerce, has been considered as a potentially suitable Executing Agency.

(ix) Financial Requirements and Sources of Financing

Reference is made to Table 26 (Summary of Cumulative Annual Expenditures) and Table 27 (Sources of Financing).

Total cumulative Kenaf Master Development Program costs over the 1973 to 1980 time span are estimated at ¥851 million with a maximum annual expenditure of ¥200 million in 1980. The total program costs are broken down as follows:

BAAC credits	¥580,000,000
Department of Agricultural Extension budget	26,900,000
Office of Commodity Standards budget	8,600,000
Executing Agency:	
Short-term incentive price financing credits	179,000,000
Equipment purchases	57,500,000

Of the total, ¥758 million are either self-financing or recoverable items, so that actual "investment" costs are reduced to ¥93 million.

On the other hand, the anticipated increase in Grade "A" production will provide an additional yearly revenue of ¥48 million to the Northeast farmers and an equal amount in additional foreign revenue to Thailand.

The research budget and the budget for the capital costs of the pest and disease control program had to be omitted from the Master Program as the required information could not be obtained in time from the Divisions concerned.

1. Program Goals and Time Frames

The Kenaf Master Development Program is designed to raise farm income in the Northeast, increase foreign exchange revenue from fiber exports, and assure a steady demand for Thai kenaf even in a shrinking international market by increasing the proportion of Grade "A" fiber production from the present level of approximately 15 percent to some 40 percent of overall output or, on the basis of an average annual total kenaf production of 400,000 tons, from 60,000 tons to 160,000 tons per year. The assumptions as to extension, credit, input and marketing requirements and budgetary allocations necessary to meet such needs as detailed in this chapter are to be confirmed or otherwise by the 1973 Kenaf Package Project discussed in the preceding Chapter V.

The Master Program is to be implemented in two phases, where promotional priority will be given to those Changwats with the greatest average kenaf production areas during the last several years (see Chapter I, Section 2) and in 1972. Specifically, the Phase I program efforts will be concentrated in six Changwats beginning in 1974 and will be extended to the remaining Changwats under Phase II as from 1977 onwards (Table 17).

Assuming an overall kenaf production target of 400,000 tons per year and an average fiber yield of 200 kg./rai, a total planting area of 2 million rai annually will have to be brought under the Kenaf Master Development Program. It is anticipated that the annual planting area in the Northeast will indeed fluctuate close to that figure once kenaf prices have fallen to a more "normal" level of around £2.50/kg. for "Mixed Grade" after the regularization of Bangladesh jute exports. It is intended to cover 720,000 rai under Phase I and 1.28 million rai under Phase II of the Master Program.

Table 17

Kenaf Master Development Program Promoted Areas

<u>Changwat</u>	<u>Average Planting Area, 1962 to 1971 (Rai)</u>	<u>Planting Area 1972 (Rai)</u>
<u>Phase I - 1974 to 1976</u>		
Khon Kaen	330,800	310,000
Maharakam	289,900	358,000
Chaiyaphoon.	274,800	348,000
Nakornrachsim	211,400	363,000
Ubon/Yasothon	194,700	227,000
Kalasin	99,100	152,000
<u>Phase II - 1977 to 1980</u>		
Buriram	99,600	217,000
Roi-Et	95,500	153,000
Srisaket	82,200	187,000
Surin	73,000	172,000
Udon Thani	81,100	132,000
Nakorn Phanom	25,200	101,000
Loei	13,400	n.a.
Sakorn Nakorn	9,400	n.a.
Nong Khai	6,800	n.a.

For purposes of program establishment, the 1973 Kenaf Package Project has been included in the Master Program. At the same time, the yearly increase in area of coverage has been staggered on the assumption that, once the groundwork has been laid, the required staff, inputs and facilities can be made available to an ever increasing extent in subsequent years. The area of coverage or "promoted area" for the 1973 to 1980 Master Program has been set as shown in Table 18.

The Kenaf Master Development Program goals and input requirements are summarized in Table 19. The component items of this summary are detailed in the following sections of this chapter.

Table 18

Kenaf Master Development Program
Promoted Area of Coverage

<u>Year</u>	<u>Previously Promoted Area (Rai)</u>	<u>Promoted Area Step-up (Rai)</u>	<u>Comulative Total Promoted Area (Rai)</u>
1973	-	60,000	60,000
1974	60,000	120,000	180,000
1975	180,000	240,000	420,000
1976	420,000	300,000	720,000
1977	720,000	320,000	1,040,000
1978	1,040,000	320,000	1,360,000
1979	1,360,000	320,000	1,680,000
1980	1,680,000	320,000	2,000,000

Table 19
Kenaf Master Development Program
Summary

Item	Package Project	Phase I			Phase II			
	Year	1973	1974	1975	1976	1977	1978	1979
Promoted Area	60,000	180,000	420,000	720,000	1,040,000	1,360,000	1,680,000	2,000,000
Increase in Grade "A" Production (Tons)	3,000	9,000	21,000	36,000	52,000	68,000	84,000	100,000
Improved Seed Requirements (Tons)*	120	360	840	1,440	2,080	2,720	3,360	4,000
Retting Tank Requirements (No.)	3,000	6,000	12,000	15,000	16,000	16,000	16,000	16,000
Bank Credit Requirements (Million Baht)	6.0	15.0	33.0	51.0	68.0	84.0	100.0	116.0
Extension Worker Requirements (No.)	6	18	42	72	104	136	168	200
Marketing Costs (Million Baht)	2.52	5.40	11.16	18.36	26.04	33.72	41.04	49.08

Note: * The RTG Master Plan Group favors supplying only 10% of improved seed requirements (Section 3) instead of 100 percent as shown.

2. Increase in Grade "A" Fiber Production

Reference is made to Table 20. Retted fiber production is assumed to be 200 kg./rai and the present output of Grade "A" fiber is estimated at 15 percent of overall production. An increase of 25 percentage points in Grade "A" fiber output is anticipated as a result of Master Program implementation thus raising the total to 40 percent or, on the basis of an overall annual kenaf fiber output of 400,000 tons, from the present 60,000 tons to 160,000 tons by 1980.

Table 20

Kenaf Master Development Program
Increase in Grade "A" Production

Year	Promoted Area			Non-Promoted Area			Grade "A" Production		
	Area (Rai)	Production (Tons)	Grade "A" (40%)(Tons)	Area (Rai)	Production (Tons)	Grade "A" (15%)(Tons)	Total (Tons)	Increment (Tons)	Cumulative Incr. (Tons)
1972	-	-	-	2,000,000	400,000	60,000	60,000	-	-
1973	60,000	12,000	4,800	1,940,000	388,000	58,200	63,000	3,000	3,000
1974	180,000	36,000	14,400	1,820,000	364,000	54,600	69,000	6,000	9,000
1975	420,000	84,000	33,600	1,580,000	316,000	47,400	81,000	12,000	21,000
1976	720,000	144,000	57,600	1,280,000	256,000	38,400	96,000	15,000	36,000
1977	1,040,000	208,000	83,200	960,000	192,000	28,800	112,000	16,000	52,000
1978	1,360,000	272,000	108,800	640,000	128,000	19,200	128,000	16,000	68,000
1979	1,680,000	336,000	134,000	320,000	64,000	9,600	144,000	16,000	84,000
1980	2,000,000	400,000	160,000	-	-	-	160,000	16,000	100,000

3. Improved Seed Requirements

The estimates in Table 21 referring to these requirements are based on the following assumptions:

- Seed requirements for fiber production = 2 kg./rai
- Seed production per rai of seed planting area = 60 kg. The present seed yield per rai is stated to be only 30 kg. according to information furnished by the Department of Agriculture. It is assumed, however, that the intensive research efforts into variety selection, including stem rot disease resistance, which are indispensable supporting activities to the Kenaf Master Development Program, will double seed output to 60 kg./rai (Chapter III, Section 2).
- Seed production costs = ₱180/rai.

The Department of Agriculture states that its present seed production costs amount to ₱120/rai; they are assumed to increase by 50 percent due to the doubling of the seed yield.

As emphasized repeatedly in this report, one of the most urgent basic requirements for successful Kenaf Development Program implementation is the immediate organization of an intensive research program aimed at selecting high fiber and seed producing kenaf varieties with resistance to stem rot disease (Chapter III, Section 1). Without such research, the Master Program goals can not be achieved.

Table 21 is based on the assumption that 100 percent of the improved seed requirements will be furnished to the kenaf farmers in the promoted areas. This means an annual requirement of 4,000 tons of such seed by 1980 to be produced on 67,000 rai. As pointed out previously, only some 30 tons of improved (but not stem rot disease resistant) seed will be available for the 1973 Kenaf Package Project compared to a requirement for 120 tons. The achievement

Table 21

Kenaf Master Development Program
Improved Seed Requirements*

Year	Promoted Area (Rai)	Seed Reqs. (Tons)	Seed Farm Area (Rai)	Seed Production Cost (Baht)
1973	60,000	120	2,000	360,000
1974	180,000	360	6,000	1,080,000
1975	420,000	840	14,000	2,520,000
1976	720,000	1,440	24,000	4,320,000
1977	1,040,000	2,080	34,667	6,240,000
1978	1,360,000	2,720	45,333	8,160,000
1979	1,680,000	3,360	56,000	10,100,000
1980	2,000,000	4,000	66,667	12,000,000

Notes: Seed requirements = 2 kg./rai

Seed yield = 60 kg./rai

Seed production = ~~฿~~180/rai

*The RTG Master Plan Group favors supplying only 10 percent of improved seed requirements

of the improved seed requirement goals for subsequent years will require a most intensive effort.

Because of the above problems and since it appears difficult to ultimately organize a 67,000 seed production area each year, the suggestion has been made during Master Program discussions that only 10 percent of improved seed need be furnished to the farmers in the promoted areas. This suggestion should be discounted most strongly as such a procedure would completely undercut the program efforts. In Thailand as in India and Bangladesh, it must be the aim to supply 100 percent of the improved seed requirements. It is pointed out that this is the Advisor's opinion and that it is not shared by the group of RTG officials who participated in the Master Program discussions.

As far as seed multiplication procedures are concerned, it is assumed in the above that the entire seed requirements will be produced under Department of Agriculture and/or Department of Agricultural Extension auspices, mainly for reasons of seed production costs. In principle, it would be preferable to produce the seed on peasant farms supervised by either or both of these two Departments but, as explained in Chapter III, Section 2, of this report, this would lead to seed costs of $\text{฿}13.35$ to $\text{฿}20.00/\text{kg}$. at the 30 kg./rai seed production level and to half that costs at the anticipated 60 kg./rai level. This compares to $\text{฿}3.00$ to $\text{฿}4.00/\text{kg}$. production costs on Department of Agriculture and/or Department of Agricultural Extension operated seed farms which offer the additional advantage of better control and supervision. Alternatively, such seed farms could be operated by the Executing Agency of the Kenaf Program. Seed production costs will be recoverable from sales to the farmers.

4. Retting Tank Requirements

The requirements for additional retting facilities to enable the farmers in the promoted areas to achieve the desired increase in Grade "A" fiber production as listed in Table 22 have been calculated on the basis of one new "standard" tank (Chapter III, Section 4) per 10 rai of planting area and on the generally accepted assumption that, overall in the Northeast, sufficient adequate retting facilities are available to produce 200,000 tons of good quality fiber (i.e. fiber with a 40 percent Grade "A" ratio) or 50 percent of the overall fiber production goal of 400,000 tons.

Retting tank construction costs are estimated at \$1,000 per unit using "Kenaf Retting Pond Improvement Pilot Project" equipment as per the above cited Chapter III, Section 4.

Table 22

Kenaf Master Development Program
Retting Tank Requirements

Year	Promoted Area Increment (Rai)	No. of Tanks Required	Construction Costs (฿)
1973	60,000	3,000	3,000,000
1974	120,000	6,000	6,000,000
1975	240,000	12,000	12,000,000
1976	300,000	15,000	15,000,000
1977	320,000	16,000	16,000,000
1978	320,000	16,000	16,000,000
1979	320,000	16,000	16,000,000
1980	320,000	16,000	16,000,000
Total	2,000,000	100,000	100,000,000

Notes: 1 Tank for every 10 rai of promoted area, but assumed that 50 percent of required retting facilities are already available (rivers, streams, ponds, roadside ditches)
Construction cost per tank = ฿1,000

5. Bank Credit Requirements

The combined production and retting tank construction credit requirements are shown in Table 23. The figures indicated in that table are based on information supplied by the Bank for Agriculture and Agricultural Credit (BAAC).

The BAAC supplies \$100/rai production credits to kenaf growers. This amount is considered adequate. Such credits are furnished under the Bank's short-term loan program and carry a 12 percent per year interest rate.

Retting tank construction credits have not yet been provided by the BAAC, as there was no requirement for such credits in the absence of a tank construction program. Medium-term credits for 3 years are proposed, again with a 12 percent annual interest charge. It is submitted that such a credit program will be acceptable to the growers.

The BAAC supplies credit not to individual farmers but only to farmer groups. It will be noted that the figures in Table 23 are based on the BAAC's assumption that only 50 percent of such farmer groups will qualify for and/or desire BAAC credit services. Some reservations are expressed on this subject since one-half of the growers would then not enjoy the privileges of an aspect of the overall plan which, by general agreement, constitutes one of the essential inputs. The BAAC argues that the farmers not belonging to groups or who are members of groups which do not qualify for BAAC loans either do not require any loans at all or have access to other loan sources such as private banks and merchants. Although it is agreed that, since kenaf is the most profitable cash crop in the Northeast, kenaf growers can obtain credit more easily than the producers of other crops, it is also a fact that private banks and, particularly, the merchants charge higher interest rates than the

Table 23

Kenaf Master Development Program
Bank Credit Requirements

Year	Promoted Area (Rai)	No. of Rai Financed	Production Credit (. million baht)	Retting Tank Constr. Credit	Total Credit
1973	60,000	30,000	3.0	3.0	6.0
1974	180,000	90,000	9.0	6.0	15.0
1975	420,000	210,000	21.0	12.0	33.0
1976	720,000	360,000	36.0	15.0	51.0
1977	1,040,000	520,000	52.0	16.0	68.0
1978	1,360,000	680,000	68.0	16.0	84.0
1979	1,680,000	840,000	84.0	16.0	100.0
1980	2,000,000	1,000,000	100.0	16.0	116.0

Notes: The BAAC estimates that only 50% of the farm families will qualify (and/or desire) credit services
 Average production credit = ฿100/rai (short-term)
 Average retting tank construction credit = ฿1,000/unit (medium-term)

BAAC so that the growers excluded from that Bank's credit services are placed at a financial disadvantage vis-a-vis the members of the qualifying farmer groups. It is suggested that the above bears further investigation.

6. Extension Worker Requirements

The extension worker requirements listed in Table 24 are based on the following assumptions:

- Each farm family plants an average of 10 rai to kenaf;
- 1 Extension worker is required for each 1,000 farm families.

In this respect, reference is made to Chapter III, Section 1.2. The Department of Agricultural Extension estimate that each extension worker can effectively service 1,000 farm families appears reasonable although admittedly a minimum requirement and only on condition that the extension worker concerns himself exclusively with the kenaf farmers and does not have to divert his attention to the production of other crops. He will also be supported by the BAAC's credit supervisors, one of whom is assigned to each 500 farm families financed by the Bank but who have to cover all types of crops produced by the BAAC financed farmer groups.

The cost of placing one extension worker into the field is estimated at B36,000 per year (Chapter III, Section 1.2.). No allowance has been made for supervisory extension personnel since the kenaf extension workers are scheduled to work under the direction of Kenaf Extension and Demonstration Center officers.

Table 24

Kenaf Master Development Program
Extension Worker Requirements

Year	Promoted Area (Rai)	No. of Farm Families	No. of Extension Workers	Cost (฿)
1973	60,000	6,000	6	216,000
1974	180,000	18,000	18	648,000
1975	420,000	42,000	42	1,512,000
1976	720,000	72,000	72	2,592,000
1977	1,040,000	104,000	104	3,744,000
1978	1,360,000	136,000	136	4,896,000
1979	1,680,000	168,000	168	6,048,000
1980	2,000,000	200,000	200	7,200,000

Notes: Average kenaf planting area per farm family = 10 rai
 1 Extension worker required for each 1,000 farm families
 (supported by 1 BAAC supervisor per each 500 farm families)
 Annual cost of placing 1 extension worker into the field
 = ฿36,000/year

7. Fiber Marketing Services

The estimated staff and financial requirements of this aspect of the Kenaf Master Development Program are summarized in Table 25. Marketing service requirements are divided into two aspects: fiber quality inspection and short-term incentive price financing.

With regard to quality inspection, it is assumed that:

- All inspection is carried out by salaried employees of the Office of Commodity Standards of the Ministry of Commerce;
- Exported bales only are inspected at Bangkok godowns;
- 270,000 tons of a total annual crop of 400,000 tons are exported, i.e. 67.5 percent.

One team of inspectors, consisting of one Senior and two Junior Inspectors, can inspect 100 tons of export fiber per day on the average, and that during the entire 5-month export season working 30 days per month or a total of 150 days. Hence, each team can inspect 15,000 tons of export fiber per season and 18 or, say, 20 inspection teams will be required for the 270,000 tons of annual kenaf exports. Salaries should be based on the following scales:

1 Senior Inspector	=	฿1,250 + 50% allowance	=	฿1,875/month
2 Junior Inspectors	=	฿ 850 + 50% allowance x2=		<u>฿2,625/month</u>
		Total	=	฿4,500/month

฿4,500/month x 12 = ฿54,000/year/team

Hence, annual budget requirements for 20 teams

$$= \text{฿}54,000 \times 20 = \text{฿}1,080,000/\text{year}$$

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Since, once the implementation of the Kenaf Master Development Program is decided upon, it will be advisable to inspect all export fiber from the start, whether produced in the promoted areas

Table 25

Kenaf Master Development Program
Marketing Costs

Year	Promoted Area (Rai)	Production (Tons)	Incentive Price Financing (฿)	Inspectors' Salaries (฿)	Total Marketing Cost (฿)
1973	60,000	12,000	1,440,000	1,080,000	2,520,000
1974	180,000	36,000	4,320,000	1,080,000	5,400,000
1975	420,000	84,000	10,080,000	1,080,000	11,160,000
1976	720,000	144,000	17,280,000	1,080,000	18,360,000
1977	1,040,000	208,000	24,960,000	1,080,000	26,040,000
1978	1,360,000	272,000	32,640,000	1,080,000	33,720,000
1979	1,680,000	336,000	40,320,000	1,080,000	41,400,000
1980	2,000,000	400,000	48,000,000	1,080,000	49,080,000

or not, the full number of 30 inspectors required for the examination of 270,000 tons of total exports is inserted in the estimate of budget requirements starting in 1973 under this heading.

The estimated cost of the short-term financing of the price incentive program is calculated on the basis of \$120/ton (see Chapter V, Section 3.6.3.4.). Such costs are included on the assumption that, as discussed in Chapter V, Section 5.3.3., the Kenaf Master Development Program buying units should not be required to finance these themselves, even on a short-term basis, but that the provision of the necessary funds should be arranged by the Executing Agency.

8. The Executing Agency

It is difficult to suggest as to whether the Ministry of Agriculture or the Ministry of Commerce should be charged with the overall task of implementing the Kenaf Master Development Program. The research, extension, improved seed supply, retting tank construction, pest and disease control, and harvesting and retting aspects of the Program, in other words kenaf production and processing, obviously fall within the responsibility of the Ministry of Agriculture. On the other hand, the equally important marketing phases fall just as clearly within the sphere of activities of the Ministry of Commerce. The latter already has a specific quality control division, the Office of Commodity Standards, which has been in charge of kenaf export inspection for many years. Also under the Ministry of Commerce is the Thai Jute Company, an organization set up for the purpose of operating a limited kenaf price support program but which is largely inactive; however, it has the advantage of being an already established agency whose terms of reference closely correspond to the responsibilities it would have to assume as Executing Agency for the Kenaf Program. It is suggested that immediate discussions be held with the Ministry of Commerce as to its interest in having the Thai Jute Company act in that capacity. At the same time, an approach should be made to the Ministry of Agriculture with regard to its willingness to assume overall program responsibility through one of its existing dependencies or through a newly to be established office.

The importance of the early designation and organization of an Executing Agency for the Kenaf Program can not be over-emphasized since the National Economic Development Board, which has so far acted as project coordinator, is neither in a position nor willing to assume that responsibility and is anxious to transfer its planning activities to a specifically designated body charged

with the implementation of all aspects of kenaf development. The establishment of such an organization is also an essential precondition if international agency assistance is to be sought for the Kenaf Program.

9. Estimated Financial Requirements

The estimated costs of the Kenaf Master Development Program may be summarized as shown in Table 26, where reference is made to Tables 24 thru' 25, except for the additional items listed below.

- Retting Tank Construction Equipment

1 "Kenaf Retting Pond Improvement Pilot Project" (DoA) equipment set (cost = ₪3,720,000) required for the construction of 1,000 tanks/year; hence:

<u>Year</u>	<u>No. of Tanks To be Built</u>	<u>Total Sets Required</u>	<u>Sets Available</u>	<u>Addl. Sets Required</u>	<u>Cost (₪)</u>
1973	3,000	3	1	2	7,440,000
1974	6,000	6	3	3	11,160,000
1975	12,000	12	6	6	22,320,000
1976	15,000	15	12	3	11,160,000
1977	16,000	16	15	1	3,720,000
1978	16,000	16	16	-	-
1979	16,000	16	16	-	-
1980	16,000	16	16	-	-

- Pest and Disease Control

50 percent of promoted areas sprayed once;

Cost of application - ₪16.50/rai; hence:

Table 26

**Kenaf Master Development Program
Summary of Cumulative Annual Expenditures (\$)**

Item Year	Package Project	Phase I			Phase II				Total
	1973	1974	1975	1976	1977	1978	1979	1980	
Improved Seed	360,000	1,080,000	2,520,000	4,320,000	6,240,000	8,160,000	10,100,000	12,000,000	44,780,000
Retting Tank Construction	3,000,000	6,000,000	12,000,000	15,000,000	16,000,000	16,000,000	16,000,000	16,000,000	100,000,000
Retting Tank Constr. Equit.	7,440,000	11,160,000	22,320,000	11,160,000	3,720,000	-	-	-	55,800,000
Pest and Disease Control	495,000	1,485,000	3,465,000	5,940,000	8,580,000	11,220,000	13,860,000	16,500,000	61,545,000
Extension Services	216,000	648,000	1,512,000	2,592,000	3,744,000	4,896,000	6,048,000	7,200,000	26,856,000
Fiber Transport Trucks	600,000	1,200,000	-	-	-	-	-	-	1,080,000
Production Credit	3,000,000	9,000,000	21,000,000	36,000,000	52,000,000	68,000,000	84,000,000	100,000,000	373,000,000
Quality Inspection	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	8,640,000
Incentive Price Financing	1,440,000	4,320,000	10,080,000	17,280,000	24,960,000	32,640,000	40,320,000	48,000,000	179,040,000
Total	17,631,000	35,973,000	73,977,000	93,372,000	116,324,000	141,996,000	171,408,000	200,780,000	851,461,000

<u>Year</u>	<u>Promoted Area (Rai)</u>	<u>Treated Area (Rai)</u>	<u>Cost (₪)</u>
1973	60,000	30,000	495,000
1974	180,000	90,000	1,485,000
1975	420,000	210,000	3,465,000
1976	720,000	360,000	5,940,000
1977	1,040,000	520,000	8,580,000
1978	1,360,000	680,000	11,220,000
1979	1,680,000	840,000	13,860,000
1980	2,000,000	1,000,000	16,500,000

- Fiber Transport Trucks

To be purchased only in 1973 and 1974; thereafter, the available trucks to be used when and where required.

4,000 tons of fiber to be transported per truck per season.
Cost per 10-ton truck = ₪200,000.

Note: Truck purchase rejected by Kenaf Package Project Subcommittee, but still recommended by the Advisor.

Hence:

<u>Year</u>	<u>Fiber Production (Tons)</u>	<u>No. of Trucks</u>			<u>Cost (₪)</u>
		<u>Required</u>	<u>Available</u>	<u>Addl. No. Req'd.</u>	
1973	12,000	3	-	3	600,000
1974	36,000	9	3	6	1,200,000

- Sources of Financing, Annual Basis

The probable sources of financing of the various items of expenditure are detailed in Table 27.

It will be seen from Tables 26 and 27 that total estimated direct Kenaf Master Development Program costs amount to ₪851 million over the 1973 to 1980 time span and maximum annual expenditure

Table 27

**Kenaf Master Development Program
Sources of Financing, Annual Basis (₪)**

Item Year	Package Project	Phase I			Phase II				Total
	1973	1974	1975	1976	1977	1978	1979	1980	
BAAC:									
Improved Seed	360,000	1,080,000	2,520,000	4,320,000	6,240,000	8,160,000	10,100,000	12,000,000	44,780,000*
Retting Tank Construction	3,000,000	6,000,000	12,000,000	15,000,000	16,000,000	16,000,000	16,000,000	16,000,000	100,000,000*
Pest and Disease Control	495,000	1,485,000	3,465,000	5,940,000	8,580,000	11,220,000	13,860,000	16,500,000	61,545,000*
Production Credit	<u>3,000,000</u>	<u>9,000,000</u>	<u>21,000,000</u>	<u>36,000,000</u>	<u>52,000,000</u>	<u>68,000,000</u>	<u>84,000,000</u>	<u>100,000,000</u>	<u>373,000,000*</u>
Total	<u>6,855,000</u>	<u>17,565,000</u>	<u>38,985,000</u>	<u>61,260,000</u>	<u>82,820,000</u>	<u>103,380,000</u>	<u>123,960,000</u>	<u>144,500,000</u>	<u>579,325,000*</u>
Dept. of Agric. Extension:									
Extension Services	216,000	648,000	1,512,000	2,592,000	3,744,000	4,896,000	6,048,000	7,200,000	26,856,000
Office of Commodity Standards:									
Quality Inspection	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	1,080,000	8,640,000
Executing Agency:									
Retting Tank Constr. Equt.	7,440,000	11,160,000	22,320,000	11,160,000	3,720,000	-	-	-	55,800,000
Fiber Transport Trucks	600,000	1,200,000	-	-	-	-	-	-	1,800,000
Incentive Price Financing	<u>1,440,000</u>	<u>4,320,000</u>	<u>10,080,000</u>	<u>17,280,000</u>	<u>24,960,000</u>	<u>32,640,000</u>	<u>40,320,000</u>	<u>48,000,000</u>	<u>179,040,000*</u>
Total	<u>9,480,000</u>	<u>16,680,000</u>	<u>32,400,000</u>	<u>28,440,000</u>	<u>28,680,000</u>	<u>32,640,000</u>	<u>40,320,000</u>	<u>48,000,000</u>	<u>236,640,000</u>
Total	17,631,000	35,973,000	73,977,000	93,372,000	116,324,000	141,996,000	171,408,000	200,780,000	851,461,000

Note: * Items recoverable or self-financing

to \$200 million in 1980.

Of the total \$851 million program costs, \$580 million will be financed through Bank for Agriculture and Agricultural Cooperatives credits, \$26.9 million from the Department of Agricultural Extension budget and \$8.6 million from the Office of Commodity Standards budget. The Executing Agency will have to provide \$236.5 million, but \$179 million of that amount is represented by short-term incentive price financing credits; the major Executing Agency expenditure is accounted for by retting tank construction equipment costs.

Also, of the total \$851 million program costs, \$758 million are either self-financing or recoverable items, so that actual "investment" costs are reduced to \$93 million.

On the other hand, the increased Grade "A" fiber production anticipated from Kenaf Master Development Program implementation will provide an additional yearly revenue of \$48 million to the Northeast farmers. In addition, the export earnings of Thailand can be expected to increase by a similar amount of \$48 million per year.

CHAPTER VIII - JUTE IN THAILAND

1. The Relationship Between Jute and Kenaf

The true jute plant belongs to the genus Corchorus. Although Thai kenaf is known in the trade as "Thai Jute", it does not belong to the same genus but rather to the Hibiscus family and specifically to the species Hibiscus sabdariffa. Both are bast fibers, that is fibers contained in the vegetable layer surrounding a central woody stalk, the plants are similar in appearance, and both fibers are used essentially for the same purposes, namely the manufacture of twines, gunny bags, hessian, decorator fabrics and similar products. However, kenaf is basically a somewhat coarser fiber so that its spinning quality compares with that of only the lower qualities of jute and it can not efficiently be used in the manufacture of the finer goods such as light hessian, carpet backing and other specialty products, although a certain percentage of kenaf can be blended into the jute batch used for the spinning of even the finer yarns. On the other hand, kenaf can be used as a 100 percent substitute for the manufacture of medium weight hessian and both medium and heavy bags and it is thus employed in the kenaf mill industry in Thailand as well as in the mills in many of the developing countries of Asia, Africa and Latin America. Due to its basic lower quality as far as fiber fineness is concerned, kenaf also commands a lower price than jute on the international market which makes its use attractive to the consumer and assures kenaf of a certain percentage of the world market even at times of ample jute export availabilities.

Although jute is grown most successfully on frequently flooded and silt-enriched riverine soils - a condition which has led to the establishment of the traditional production areas in India and Bangladesh as well as the Irawaddy Delta in Burma and the Amazon

Region in Brazil - it can also be cultivated on almost all other soil types (with the exception of lateritic and gravelly soils), from sandy loam to clay, provided certain minimum soil quality and soil PH conditions are met. Hence, the Northeast or rather certain areas of the Northeast are indeed suitable for jute fiber production, as has been demonstrated during the last several years. In fact, higher average jute than kenaf fiber yields per rai have been achieved in many instances, a circumstance which has led some members of the industry to predict that jute will - and should - replace kenaf completely at an early date, particularly since it also commands a higher price.

It is submitted, however, that such complete or even large-scale substitution is neither feasible nor desirable. Firstly, only certain parts of the Northeast offer suitable climatic and soil conditions for jute and kenaf should and will remain the principal upland cash crop for the farmers in most of the region; secondly, the fact that higher jute than kenaf fiber yields have been obtained reflects the lack of kenaf research achievements in the area of high-yield variety breeding and selection rather than the basic superiority of jute in that respect - a deficiency which is to be remedied by the proposed intensive kenaf research effort - and since it is generally recognized that kenaf out-yields jute on the upland soil types of the Northeast; and thirdly, Thai kenaf preempts a definite and well-defined portion of the world bast fiber market due to its lower price combined with its suitability for blending with jute and thus reducing the overall batch cost. Furthermore, Thai true jute will have to compete directly with jute from Bangladesh which is vastly more experienced in the international jute trade, will strongly and probably successfully fight any large-scale competitive intrusion, including the well-established use of subsidies, and whose growers profit from the experience gained by many generations of family production.

Nevertheless, there is definitely a place for true jute cultivation in the Northeast, provided the areas where its production is promoted are carefully chosen, areas of traditional kenaf production are selected where the growers are already familiar with the largely similar cultivation and processing methods, the jute promotion program is supported by an intensive research and extension effort, and proper assortment, quality control and marketing practices are instituted from the start.

2. Summary of Jute Agronomics and Production

Two species of jute are cultivated for commercial fiber production: C. capsularis, a round-capsuled type grown in lowlands subject to flooding, and C. olitorius which bears elongated capsules and is planted on upland soil. Intensive breeding programs were begun in India at the start of this century which resulted in the selection of two varieties, D154 of C. capsularis and Chinsuar Green of C. olitorius; these varieties were released about 1920 and continued to be grown predominantly until the early 1950's, when new varieties selected from local types became available, although D154 continues to be popular. Important new varieties are JRC 212 and JRC 321 of C. capsularis and JRO 620 and JRO 632 of C. olitorius. JRO 632 has consistently outyielded Chinsuar Green and has replaced it in most C. olitorius areas in India and Bangladesh. JRC 321 is early maturing, has good fiber quality, and is popular in areas where jute is sown early. Variety selection work continues to be carried on in both India and Bangladesh.

Both jute species grow well on slightly acid to slightly alkaline soils rich in organic matter and nitrogen. The best soils for the crop are those associated with riverine areas which are frequently flooded and enriched with silt and have pH values of 6.0 to 6.5. On the other hand, although lateritic and gravelly soils are unsuitable, jute can be grown successfully on almost all other soil types, from sandy loam to clay, provided the texture and pH are adjusted.

India and Bangladesh produce the bulk of the world's raw jute, although limited quantities have been grown for many years in such countries as China, Taiwan, Japan, Nepal, Burma and Brazil. Jute is cultivated most successfully between 20 to 30 degrees North and South latitude so that it should be considered as a sub-tropical rather than a tropical crop (an exception is Brazil where special

varieties have been selected). The crop requirements as to soil, atmospheric humidity, rainfall, temperature and daylength are fairly exacting as is the need for ample retting water and inexpensive manpower which restricts the areas where jute can be produced successfully and economically.

Jute is grown in the rainy season at temperatures ranging from 21 to 38°C. and a relative humidity of 60 to 95 percent. The traditional jute growing areas receive an annual rainfall of 1,000 to 2,500 mm., with 1,500 mm. being the optimum for the crop. Some 400 to 750 mm. of rain should fall during the first six weeks, from land preparation to the first intercultural operation. Young jute plants are very sensitive to water logging which also interferes with hand weeding. Hence, the planting date should be selected so as to allow weeding to be completed and the plants to reach a height of 90 to 120 cm. before the start of the heavy monsoon rains.

Depending upon the date of arrival of the pre-monsoon showers, jute is sown in India and Bangladesh between February and June, where the month of April is the recommended period for both species. However, it is frequently sown earlier than that in Assam and Bangladesh and later in Bihar and Uttar Pradesh. Under less than optimum conditions, earlier sowing of C. capsularis and later sowing of C. olitorius is recommended.

In most areas, the seed of C. capsularis is broadcast at the rate of 9 to 11 kg. per hectare (1.4 to 1.8 kg./rai) and that of C. olitorius at 6 to 7 kg. per hectare (0.6 to 0.7 kg./rai). These rates correspond to more than 400,000 seeds per rai whereas the number of plants at harvest rarely exceeds 80,000 per rai. Most farmers broadcast the seed mixed with wood ash or fine earth. With row planting, seed rates are reduced by 50 percent and yields are increased by up to 25 percent in C. capsularis and 16 percent

in C. olitorius; also, most of the hand hoe cultivation is reduced by some 20 percent. However, since sowing with hand operated seed drill requires specially good soil preparation and is slower than broadcasting, row planting is not yet accepted to the extent desirable and jute seed is still broadcast on most farms.

The crop is weeded 3 to 6 times during the first 7 to 8 weeks. the first weeding being done when the plants are 10 to 20 cms. tall. The first 2 to 3 weeding operations are combined with thinning. The best yields are obtained when thinning is completed within 3 weeks from sowing. The optimum spacing is 10 x 10 cm. for broadcast crops, and about 7.5 cm. between plants in the row and in rows 30 cm. apart in row planted crops.

Jute can be harvested at any time after it is 90 days old until the fruit is mature. The best quality fiber is obtained by harvesting at the flowering stage; with later harvests, yields are higher but the quality deteriorates progressively. Harvesting at the small pod stage results in the best combination of yield and quality.

The jute stalks are harvested, bundled, shocked, retted, stripped and the fiber washed in the same manner as kenaf and the scarcity or pollution of the retting water poses similar problems for both crops. C. olitorius fiber is generally considered to be of better quality than that of C. capsularis.

Both jute species are short-day plants with a critical photoperiod of about 12½ hours. Flowering is delayed by exposure to longer photoperiods, and shorter photoperiods induce flowering in 30 to 35 days. Very early sowing causes premature flowering in both species due the prevailing short daylength; this is followed by a second vegetative period and by flowering at the normal time. C. olitorius is more photo-sensitive than C. capsularis.

The flowering phase - the period between the appearance of the first and the last flower of a plant - lasts about 4 weeks in C. capsularis with the main flush of flowering in the second week. In C. olitorius, the flowering phase and the vegetative phase co-exist during 8 to 10 weeks and flowering occurs in periodic flushes. The highest seed germination rates are obtained from mature and browning and from fully brown fruits in C. olitorius but only from fully brown fruits in C. capsularis. Thus, while good seed of C. capsularis can be obtained even from fruits not fully ripe, only seeds from fully ripe fruits should be collected from C. olitorius; since these ripe fruits also tend to burst and shed their seed, special care is required in collecting seeds from the latter.

The seed of C. capsularis is round to oval in shape whereas that of C. olitorius is cylindrical. The fruit of C. capsularis contains 35 to 50 seeds and that of C. olitorius 150 to 240 seeds. The weight of 1,000 well dried seeds of the former is about 3.3 grams and of the latter about 2.0 grams. The seeds of C. capsularis are mostly chocolate brown whilst C. olitorius seed ranges in color from bluish-green to steel-grey and even dull black. Heavy rainfall at the time of seed maturity causes some seed to germinate in the fruits and burst them open. Drying seed in the sun reduces moisture content to as low as . percent which lowers the risk of fungal infection and increases longevity during storage. Seeds stored in plastic lined gunny bags under reasonably dry room conditions may remain viable for up to 4 years while seeds not properly dried and stored can lose viability in less than one year.

3. History of the Thai Jute Fiber Industry

3.1. The Jute Production Promotion Program

Jute has been grown in the Central Plain of Thailand since the 1940's, particularly in Changwats Ayuthya and Nakorn Sawan, and several thousand tons were exported annually until the mid-1950's when production started to decline due to pressure on the land for rice production, the low yields obtained from the local unimproved varieties, and uncertain prices for the fiber; this in spite of the fact that the jute was cultivated on the alluvial soils along the rivers which offer optimum growing conditions for this crop.

The interest in jute production in Thailand revived in 1969 and 1970 and rose further in the following year due to the world shortage of jute as a result of the Indo-Pakistan war and the disturbances preceeding that event in what is now Bangladesh. It was felt oportune to promote the greatly expanded production of the fiber in view of the favorable market conditions and prices and the Thai Jute Association became actively involved in the project. Some of the standard Indian Jute varieties had been introduced into Thailand in 1966, presumably D154 of C. capsularis and Chinsura Green of C. olitorius; subsequently, a small quantity of the improved JRO 632 variety of C. olitorius was obtained and the seed multiplied.

The Thai Jute Association encouraged farmers in Nakorn Sawan to grow the C. capsularis variety in 1970. Unfortunately, the results were unsatisfactory, partly due to the lack of interest and expertise of the farmers and partly because of exceptional flood conditions. It was then decided to promote jute production in the Northeast in the following year where the farmers are already familiar with the cultivation and processing of kenaf which follows similar lines to that of jute. Accordingly, the Thai Jute Association distributed 2,000 kg. of the JRO 632 variety to farmers in

Udorn in 1971; the distribution was done through baling plants which, in turn, undertook to purchase the jute fiber produced at a guaranteed price of ฿1.00/kg. higher than the prevailing price for kenaf. The farmers were also requested to sell the seed crop to the balers for the following year's plantings. As a result of the farmers lack of expertise in the specific problems of growing jute - as opposed to kenaf - only 700 tons of fiber were assembled by the balers who also succeeded in purchasing 20 tons of seed from the growers. In spite of the lack of success of the 1971 program, the interest of the farmers in the Udorn area in jute production persisted due to the potentially higher yields obtainable and the ฿1.00/kg. price mark-up. Udorn or rather selected areas in this and the neighboring Changwats have the advantage of earlier rains than the more southern portions of the Northeast which is of importance to jute production in the region.

A number of activities by various agencies, with the Kenaf Development Committee acting as coordinator, were initiated in 1972 in order to further promote the production of that crop, including:

Department of Agricultural Extension:

- Selected priority promotion areas in six Northeastern Changwats (Khon Kaen, Kalasin, Mahasarakam, Chaiyaphoom, Nakornrachsima and Ubon);
- Arranged for a conference at the Northeast Agricultural Center to acquaint farmers, extension officers and balers with the jute promotion program and to provide them with technical know-how;
- Published 30,000 pamphlets on jute growing prepared by the Department of Agriculture,
- Established demonstration and seed multiplication plots;

- Jointly with the Department of Agriculture and the Applied Scientific Research Corporation of Thailand, provided technical assistance to other agencies.

Thai Jute Association:

- Distributed jute seed through upcountry baling plants;
- Donated 2,000 kg. of jute seed to the Self-Help Resettlement Areas of the Department of Public Welfare;
- Provided a list of the growers who received seed through the baling plants;
- Guaranteed the jute purchase price at ฿1.00/kg. above that for kenaf.

Siam Gunny Company:

- Provided a ฿400,000 fund to set up a 500 rai Daisee seed multiplication farm near Nakornrachsima;
- Provided price and marketing guarantees.

Self-Help Resettlement Areas of the Department of Public Welfare:

- Promoted the planting of jute on a total of 8,000 rai in four resettlement areas utilizing the 2,000 kg. of seed donated by the Thai Jute Association as follows:

Ubolrathana, Khon Kaen	2,500 rai
Lampang, Kalasin	1,500 rai
Kuchinarai, Kalasin	1,500 rai
Lam Dom Not, Ubon	2,500 rai
- Assured the producers of a minimum price guaranteed by the Northeast Jute Mill Co., Ltd., and the Thai Jute Association.

3.2. The 1972 Jute Promotion Program Results

The most successful aspect of the 1972 jute promotion program was the production of an estimated 8,000 to 9,000 tons of fiber by

the farmers in Changwats Udorn Thani and Nong Khai to whom seed was distributed by the Thai Jute Association through baling plants in those Changwats. The area escaped the early season drought which affected most of the Northeast as well as benefiting from a generally more timely start of the rains. Stalk growth was satisfactory, the average retted fiber yield is said to have reached 300 kg./rai (as compared to 200 kg./rai for kenaf), and fiber quality was good due to the adequacy of the available retting water. The agreed mark-up of ฿1.00/kg. above the prevailing kenaf price was paid by the merchants and that although kenaf prices rose to ฿4.50/kg. for "Mixed Grade" and even higher at certain times during the harvesting season. It should be noted that the growers in Udorn and Nong Khai received little or no technical advice from official sources and simply followed their usual kenaf production practices, except for minor modifications based on their jute experience of the previous year.

The supervised 1972 jute promotion programs were not as successful, largely but not entirely due to the severe drought which affected the Northeast south of Udorn during the first half of the growing season. Since, as pointed out in Section 2 above, both jute species are early-maturing, even a late start of the rains adversely affects stalk development as the plants then do not have a sufficiently long growth period.

As far as the Self-Help Resettlement Areas of the Department of Public Welfare are concerned, only a total area of 6,000 rai was actually planted to jute, since it was found that 1 kg. of seed was required for the planting of 2 to 3 rai rather than for 5 rai as had been assumed. Some 4,500 rai of the plantings were lost due to the drought; the remaining 1,500 rai were harvested mostly in September and, at least at Ubolratana, an average yield of 300 kg. of retted fiber per rai was achieved in spite of the unfavorable climatic conditions.

As mentioned previously, the project was co-sponsored by the Kenaf Development Committee, the Department of Agricultural Extension, the Department of Agriculture, the Thai Jute Association and the Department of Public Welfare, with the latter's Land Re-settlement Division acting as co-ordinator. The Chief, Kenaf Project, of the Department of Agriculture - who has also assumed overall technical responsibility for the jute program - and his assistants demonstrated jute planting practices to the farmers; for some reason, the seed (dibbled in rows) was not covered with soil which resulted in very poor or no germination. During a second planting, the seed was lightly covered and germination was good. Due to the lateness of the planting, and the scarcity of rain, the stalks reached on average height of only 1.60 m. but it was stated that, nevertheless, fiber yields averaged 300 kg./rai.

The jute fiber produced at Ubolratana was purchased by merchants from Nampong and Tha Fra who usually sent their trucks to collect the crop although the farmers occasionally also hired trucks jointly for the transport of their fiber to buying stations. At the beginning of October, the price paid for good quality "Mixed Grade" jute was $\text{฿}3.75/\text{kg}$. compared to the $\text{฿}3.00/\text{kg}$. price for the same quality kenaf prevailing at that time which resulted in the following revenue comparison for the grower:

Jute = 300 kg./rai at $\text{฿}3.75$	=	$\text{฿}1,125$
Kenaf = 200 kg./rai at $\text{฿}3.00$	=	$\text{฿} 600$

As a result, the Chief of the Ubolratana Resettlement Area plans to promote the planting of 2,000 rai to jute in 1972, although he considers that jute is more difficult to produce than kenaf since it requires more thorough land preparation, more intensive weeding and thinning and more timely and careful retting. He ascribes the - somewhat unexpected - higher jute fiber yields as compared to kenaf on the generally not very fertile soils of the

Resettlement Area to the superiority of the jute variety used.

The Daisee seed multiplication program of the Siam Gunny Company near Nakornratchasima also suffered from serious setbacks. Originally, a seed production of 50 kg./rai was anticipated from the 500 rai planting area or a total of 25 tons. The first planting was done in May. The seed was mixed at the rate of 1:5 by volume with fine sand and then dibbled in rows but not covered with earth; this method of leaving the seed exposed, apart from being unorthodox, proved unsuitable since the seed was either blown away by the wind, killed by exposure to the sun during the drought, or washed away by the first heavy rain. A second planting later in May using the same system but with the seed rate increased to 0.3 kg./rai gave slightly improved but still unsatisfactory results. Better germination was achieved through the planting of the seed in "hills" without the admixture of sand, but this resulted in severe crowding of the seedlings which also occurred, although to a somewhat lesser extent, when the unmixed seed was dibbled in rows. The above results were predictable if experience in the traditional jute producing countries had been taken into account. No thinning was practiced in any of the plantings since it was stated that the drought already caused an excessively sparse plant population. However, the plantings were weeded twice after the start of the rains in June and fertilizer (12-24-12) was applied as a top dressing at the rate of 20 kg./rai. Some 120 rai failed altogether and were replanted with apical cuttings in September. In spite of the unsatisfactory manner in which planting, thinning and intercultivation was carried out and of the setback caused by the drought, approximately 15 tons of seed were harvested from the area in October and November. An adjacent 100 rai seed production plot planted to JRO 632 yielded a very low 2 to 3 tons of seed.

The Department of Agriculture carried out a 428 rai jute seed multiplication program at 18 locations, including 88 rai planted to JRO 632, 190 rai to Daisee and 150 rai to Tossa. An average seed yield of 50 kg./rai is anticipated for a total production of 21.4 tons.

3.3. Research

The Department of Agriculture's None Soong Experiment Station has been carrying out tests on a fairly wide range of local and introduced jute varieties for the last three years. The 1971 variety tests showed the following results:

<u>Variety</u>	<u>Fresh Stalk Weight (kg./rai)</u>	<u>Dry Retted Fiber Weight (kg./rai)</u>
A. <u>C. olitorius</u>		
JRO 632 (India)	8,770	552
Daisee (India)	9,042	342
Chinsura Green (India)	6,770	318
B. <u>C. capsularis</u>		
Ayuthya (local)	6,297	392
Harmahela (Taiwan)	7,200	328
Y-6-466 (Taiwan)	9,045	293
Syhi (Taiwan)	9,917	269
Local Thai	5,975	242
Taiwan Red	5,845	182

These results demonstrate, within their limitations, the superiority of JRO amongst the C. olitorius varieties in Thailand as in India, whereas the local Ayuthia C. capsularis variety substantially outyields both the other local and Taiwanese varieties. are none of the recent improved Indian or Bangladesh improved ave been included in the test.

4. A Jute Development Program for Thailand

4.1. Jute Fiber Production Prospects in the Northeast

In view of the already available skills in kenaf production and processing in the Northeast, skills which are quite similar to those required for jute fiber production, that region must be the obvious choice for the establishment of the industry.

The fact that the initial attempts at jute production in Changwats Udorn and Nong Khai were successful, that jute has a shorter growth period than kenaf, that better yields have been obtained than with the presently available kenaf varieties, and that jute can be sold at a better price in both the domestic and export markets, has persuaded some authorities to advocate the complete substitution of jute for kenaf in Thailand. Several factors militate against such a proposal.

Jute is substantially more demanding than kenaf as far as soil and climatic conditions are concerned and will not produce economically attractive yields under the poorer conditions under which kenaf still thrives, the latter being one of the principal reasons why kenaf is the major upland cash crop in the Northeast. Hence, only selected areas of the region will be found suitable for jute production and specifically those where the rainy season starts earlier and the rains are more reliable - as in Udorn and Nong Khai but also elsewhere - and where better upland soils are available.

The special knowledge required for the consistent high yield production of good quality jute, particularly where it differs from kenaf production, is by no means as yet available to the growers nor have the optimum varieties so far been established. These deficiencies must first be remedied through the carrying out of an intensive jute research and extension program.

Jute prices are presently high and there is a good demand for the fiber on the world market, but this situation can not be expected to continue indefinitely once Bangladesh jute again becomes freely available. Thai true jute will then have to compete directly with jute exports from that country which can be expected to strongly defend its predominant world market position against any large-scale competition, including the use of the well-established bonus voucher system - a price subsidy program in disguise - and possible temporary undercutting of prices.

Although the complete substitution of jute for kenaf - which occupies a special position in the world packaging fiber market which it can be expected to maintain for years to come - is neither practicable nor to be favored, jute production definitely has its place in the economy of the Northeast. Undoubtedly, the price of jute will continue to remain substantially higher than that of kenaf, probably in the range of $\text{Lst.}40$ per tons, and so will yields per rai until improved kenaf varieties have been selected. At the presently obtainable average yields of 300 kg./rai for jute and 200 kg./rai for kenaf and at the prevailing price mark-up of $\text{B}1.00/\text{kg.}$ for jute over kenaf, the revenue to the (successful) jute farmer is twice as great as that to the kenaf farmer at the $\text{B}3.00/\text{kg.}$ "Mixed Grade" price level for kenaf ($\text{B}1,200$ vs. $\text{B}600/\text{rai}$) and 125 percent higher at the $\text{B}2.00/\text{kg.}$ level ($\text{B}900$ vs. $\text{B}400/\text{rai}$). There is, therefore, every reason to promote jute production in the Northeast where feasible. At this time and prior to the completion of a detailed survey of potential jute production areas in the Northeast, it is estimated that a maximum of 20 percent of the present kenaf production areas totalling some 2 million rai or about 400,000 rai will be found suitable for jute production; at an average retted fiber yield of 300 kg./rai, some 120,000 tons yearly could be produced on that area of which around 20,000 tons

would probably be absorbed by the domestic mills leaving an annual export availability of 100,000 tons. It is submitted that this quantity could be absorbed by the world market without difficulty and without generating protectionist measures on the part of Bangladesh.

4.2. Jute Development Program Requirements

The principal restraints on the implementation of an effective Jute Development Program and the measures required to overcome or remove these restraints are very similar to those discussed in relation to kenaf in Chapter III above and refer specifically to the requirements for an intensive research and extension program, selected seed production and distribution, the provision of retting facilities, the availability of farm credit, and the imposition of an effective grading and quality control program. Most of these problems require identical solutions to those enumerated in the case of kenaf.

An exception are the specifics of the required research and extension programs. In spite of the basic similarity of jute and kenaf production and processing, there are important differences between the optimum land preparation, planting and inter-cultural operations, including weeding, thinning and fertilization, as well as between recommended planting and harvesting periods, and pest and disease control and seed production methods. Most important, it is essential to implement intensive variety trials prior to the initiation of a farm level jute promotion program. The experience of the last two or three years has shown that the necessary knowledge and experience is simply not available in Thailand and it is strongly recommended that the services of an expatriate jute agronomist and research specialist be secured to provide such expertise. It might be advisable to co-ordinate the provision of such services

with those which are proposed for the overall and specific Kenaf Development Programs.

One important potential phase of a Jute Program in the Northeast would be its partial incorporation into irrigated crop development projects. Since most jute varieties are early maturing and should preferably be planted well before the start of the rainy season - as early as February/March in some instances - and since these varieties are harvested in June/July, supplemental irrigation would make it feasible to plant a follow-up rice crop on the same land, a possibility which should be investigated at an early date.

CHAPTER IX - THE THAI KENAF MILL INDUSTRY

The advisor's scope of work under his present assignment does not make reference to an assessment of the actual situation of the Thai Kenaf Mill Industry nor to recommendations with regard to its improvement or an evaluation of its potential. However, since the industry annually absorbs some 30 percent or more of Thailand's kenaf fiber production and thus exercises a decisive influence on the marketing of the crop, a brief review of its capacity and operating efficiency is included in this report to provide a basis for estimating the industry's future demand for Thai kenaf fiber.

The estimated sacking and hessian cloth production of the 10 kenaf mills operating in Thailand is shown in Table 28. The production estimates for each mill are based on the loomage available in that mill and on an assumed operating efficiency of 75 percent. Table 29 summarizes the sacking and hessian production estimates for the 10 mills. It will be seen that, at 75 percent efficiency, the mills would have an annual capacity of 130,000 tons plus approximately 8,000 tons of yarn and twine output or an overall finished goods production of some 138,000 tons.

From the summary in Table 29, the annual Heavy Cee bag and hessian cloth production is estimated at various mill efficiency levels in Table 30 where 80 percent is the normal efficiency of a well run mill. Although the table converts all sacking cloth production into the number of Heavy Cee bags, weighing 1.13 kg. each, which can be manufactured from that cloth, in actual fact smaller bags are also produced from the same cloth weight as are A-Twills, B-Twills and other constructions.

Also from Table 29, an estimate can be made of the annual kenaf fiber consumption of the 10 mills at various efficiency levels, assuming an average overall fiber wastage of 10 percent and including the approximately 8,000 tons of yarn twine production per year, as follows:

Table 28

Estimated Sacking and Hessian Cloth Production in the Thai Kenaf Mills

Notes:

1. Production Estimates Based on Loomage
2. Average Efficiency Based on 75% in all Mills
3. Weight of Sacking H.C. (Heavy Cee) Cloth = 16.2 ozs./yd.
4. Weight of Hessian 10 ozs. 40" Cloth = 10.0 ozs./yd.
5. Production of Onemack Sacking Looms = $\frac{200 \times 60 \times 75}{8.5 \times 36 \times 100}$
= 29.411 yds./hour
= 29.778 lbs./hour
6. Production of Onemack Hessian Looms = $\frac{200 \times 60 \times 75}{10 \times 36 \times 100}$
= 25.000 yds./hour
= 15.625 lbs./hour
7. Production of Flat Sacking Looms = $\frac{160 \times 60 \times 75}{9 \times 36 \times 100}$
= 22.222 yds./hour
= 22.500 lbs./hour
8. Production of Flat Hessian Looms = $\frac{154 \times 60 \times 75}{10 \times 36 \times 100}$
= 12.031 lbs./hour
9. Production of S4A Sacking Looms = $\frac{260 \times 60 \times 75}{8.5 \times 36 \times 100}$
= 38.235 yds./hour
= 38.712 lbs./hour

Mill "A"

Total Loomage = 152 (96 Onemack Sacking + 56 Onemack Hessian Looms)	
Production of Onemack Sacking Looms	= 29.778 lbs./hr.
Production of Onemack Hessian Looms	= 15.625 lbs./hr.
Hence, Onemack Sacking Production	= 29.778 x 96
	= 2,858.668 lbs./hr.
Onemack Hessian Production	= 15.625 x 56
	= 875.000 lbs./hr.
Mill Operating Schedule, Per Year	= 22.5 hours x 312 days
Hence, Annual Production, Sacking	= 8.958.924 Tons
Annual Production, Hessian	= <u>2,742.187 Tons</u>
Total Annual Production	= <u>11,701.111 Tons</u>
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Table 28 (Cont'd)

Mill "B"

Total Loomage = 240 (40 Onemack Sacking + 200 Flat Hessian Looms)
Production of Onemack Sacking Looms = 29.778 lbs./hr.
Production of Flat Hessian Looms = 12.031 lbs./hr.
Hence, Onemack Sacking Loom Production = 29.778 x 40
= 1,191.12 lbs./hr.
Flat Hessian Loom Production = 12.031 x 200
= 2,406.20 lbs./hr.
Mill Operating Schedule, Per Year = 16 hours x 312 days
Hence, Annual Production, Sacking = 2,654.496 Tons
Annual Production, Hessian = 5,362.388 Tons
Total Annual Production = 8,016.884 Tons
=====

Mill "C"

Total Loomage = 96 Onemack Sacking Looms
Production of Onemack Sacking Looms = 29.778 lbs./hr.
Hence, Onemack Sacking Loom Production = 29.778 x 96
= 2,858.688 lbs./hr.
Mill Operating Schedule, Per Year = 16 hours x 312 days
Hence, Total Annual Production, Sacking = 6,370.790 Tons
=====

Mill "D"

Total Loomage = 243 (61 Onemack Sacking + 182 Flat Sacking Looms)
Production of Onemack Sacking Looms = 29.778 lbs./hr.
Production of Flat Sacking Looms = 22.500 lbs./hr.
Hence, Onemack Sacking Loom Production = 29.778 x 61
= 1,816.458 lbs./hr.
Flat Sacking Loom Production = 22.500 x 182
= 4,095.000 lbs./hr.
Mill Operating Schedule, Per Year = 22.5 hours x 312 days
Hence, Total Annual Production, Sacking = 18,526.090 Tons
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Table 28 (Cont'd)

Mill "E"

Total Loomage = 256 (168 Onemack Sacking + 56 S4A Sacking + 32 Onemack Hessian Looms)	
Production of Onemack Sacking Looms	= 29.778 lbs./hr.
Production of S4A Sacking Looms	= 38.712 lbs./hr.
Production of Onemack Hessian Looms	= 15.625 lbs./hr.
Hence, Onemack Sacking Loom Production	= 29.778 x 168
	= 5,002.70 lbs./hr.
S4A Sacking Loom Production	= 38.712 x 56
	= 2,167.87 lbs./hr.
Onemack Hessian Loom Production	= 15,625 x 32
	= 500.000 lbs./hr.
Mill Operating Schedule, Per Year	= 22.5 hours x 312 days
Hence, Annual Production, Sacking	= 22,468.920 Tons
Annual Production, Hessian	= <u>1,566.960 Tons</u>
Total Annual Production	= <u>24,035.880 Tons</u>
	=====

Mill "F"

Total Loomage = 206 (130 Onemack Sacking + 40 Onemack Hessian + 36 Flat Hessian Looms)	
Production of Onemack Sacking Looms	= 29.778 lbs./hr.
Production of Onemack Hessian Looms	= 15.625 lbs./hr.
Production of Flat Hessian Looms	= 12.031 lbs./hr.
Hence, Onemack Sacking Loom Production	= 29.778 x 130
	= 3,871.14 lbs./hr.
Onemack Hessian Loom Production	= 15.625 x 40
	= 625.000 lbs./hr.
Flat Hessian Loom Production	= 12.031 x 36
	= 433.116 lbs./hr.
Mill Operating Schedule, Per Year	= 22.5 hours x 312 days
Hence, Annual Production, Sacking	= 12,131.876 Tons
Annual Production, Hessian	= <u>3,368.973 Tons</u>
Total Annual Production	= <u>15,500.849 Tons</u>
	=====

Table 28 (Cont'd)

Mill "G"

Total Loomage = 192 (132 Onemack Sacking + 60 Flat Sacking Looms)	
Production of Onemack Sacking Looms	= 29.778 lbs./hr.
Production of Flat Sacking Looms	= 22.500 lbs./hr.
Hence, Onemack Sacking Loom Production.	= 29.778 x 132
	= 3,930.696 lbs./hr.
Flat Sacking Loom Production	= 22.500 x 60
	= 1,350.000 lbs./hr.
Mill Operating Schedule, Per Year	= 16 hours x 312 days
Hence, Total Annual Production, Sacking	= 11,768.410 Tons
	=====

Mill "H"

Total Loomage = 82 Flat Sacking Looms	
Production of Flat Sacking Looms	= 22.500 lbs./hr.
Hence, Flat Sacking Loom Production	= 22.500 x 82
	= 1,845.000 lbs./hr.
Mill Operating Schedule, Per Year	= 8 hours x 312 days
Hence, Total Annual Production, Sacking	= 2,055.857 Tons
	=====

Mill "I"

Total Loomage = 220 (170 Onemack Sacking + 50 Onemack Hessian Looms)	
Production of Onemack Sacking Looms	= 29.778 lbs./hr.
Production of Onemack Hessian Looms	= 15.625 lbs./hr.
Hence, Onemack Sacking Loom Production	= 29.778 x 170
	= 5,062.260 lbs./hr.
Onemack Hessian Loom Production	= 15.625 x 50
	= 781.250 lbs./hr.
Mill Operating Schedule, Per Year	= 22.5 hours x 312 days
Hence, Annual Production, Sacking	= 15,864.760 Tons
Annual Production, Hessian	= 2,448.380 Tons
Total Annual Production	= 18,313.140 Tons
	=====

Table 28 (Cont'd)

Mill "J"

Total Loomage = 226 (40 Onemack Sacking + 90 Flat Sacking + 96 Flat Hessian Looms)	
Production of Onemack Sacking Looms	= 29.778 lbs./hr.
Production of Flat Sacking Looms	= 22.500 lbs./hr.
Production of Flat Hessian Looms	= 12.031 lbs./hr.
Hence, Onemack Sacking Loom Production	= 29.778 x 40
	= 1,191.120 lbs./hr.
Flat Sacking Loom Production	= 22.500 x 90
	= 2,025.000 lbs./hr.
Flat Hessian Loom Production	= 12.031 x 96
	= 1,154.976 lbs./hr.
Mill Operating Schedule, Per Year	= 22.5 hours x 312 days
Hence, Annual Production, Sacking	= 10,079.090 Tons
Annual Production, Hessian	= 3,619.612 Tons
Total Annual Production	= <u>13,698.702 Tons</u>
	=====

Table 29

Summary of Estimated Sacking and Hessian Cloth Production in the Thai Kenaf Mills
(Tons/Year)

Type of Cloth	Mill "A" (3)	Mill "B" (2)	Mill "C" (2)	Mill "D" (3)	Mill "E" (3)	Mill "F" (3)	Mill "G" (2)	Mill "H" (1)	Mill "I" (3)	Mill "J" (3)	Total
Sacking	8,958.924	2,654.496	6,370.790	18,526.090	22,468.920	12,131.876	11,768.410	2,055.857	15,864.760	10,079.090	110,879.213
Hessian	2,742.187	5,362.388	-	-	1,566.960	3,368.973	-	-	2,448.380	3,619.612	19,108.500
Total	11,701.111	8,016.884	6,370.790	18,526.090	24,035.880	15,500.849	11,768.410	2,055.857	18,313.140	13,698.702	129,987.713 (4)

- Notes:
- (1) Mill working on a one-shift basis
 - (2) Mill working on a two-shift basis
 - (3) Mill working on a three-shift basis
 - (4) Plus an estimated 8,000 tons of yarn and twine

Table 30

Estimated Annual Bag and Hessian Production of the
Thai Kenaf Mills at Various Assumed Efficiencies

Efficiency	No. of Heavy Cee Bags Per Year	No. of Yards of 10 ozs. 40" Hessian Per Year
60%	79,478,220	54,787,890
70%	92,724,590	63,913,210
75%	99,347,770	68,484,860
80%	105,970,960	73,050,520

At 60 percent	=	123,190 Tons
At 70 percent	=	142,250 Tons
At 75 percent	=	151,790 Tons
At 80 percent	=	161,320 Tons

Total domestic kenaf fiber consumption in 1972 is estimated at 130,000 tons, including some 8,000 tons of village consumption. On the assumption that these estimates are correct, it would appear that, overall, the Thai kenaf industry operates at less than 60 percent efficiency. Even reducing village consumption estimates to a very low 2,000 tons per year, the overall mill efficiency increases only to approximately 62.5 percent.

It appears, therefore, that there is ample scope for improvement as far as the efficient operation of the Thai kenaf mills is concerned; also, that the assumption of an annual kenaf fiber consumption of 130,000 tons by the mills over the next several years is a conservative estimate.

CHAPTER X - INTERNATIONAL AGENCY PROJECT ASSISTANCE

- Summary

Under this heading, the Advisor was required to define overall technical assistance needs and to explore the possibilities of securing financial support from international agencies for the implementation of the various Kenaf and Jute Development Programs discussed in this report. Accordingly, a full range of desirable advisory assistance is listed requiring the services of an eight-member consulting team so as to enable the authorities concerned to decide which, if any, of such assistance is indeed required and/or desired and to discuss its procurement with potential donor organizations. The individual team members' terms of reference are indicated in detail and cover all aspects of kenaf and jute research, processing, quality inspection, marketing and mill engineering and management, as well as advisory services to the Kenaf Development Committee.

Preliminary discussions between the National Economic Development Board, the Advisor and the World Bank indicate the latter's interest in further exploring potential Bank assistance, possibly utilizing International Development Association (IDA) interest-free loan funds, with respect to such Kenaf and Jute Development Program aspects as research, retting facility construction (particularly within Bank supported irrigation projects), the Kenaf and Jute Pioneer Project, fiber inspector training, kenaf and jute mill modernization, and multi-crop development in combination with Kenaf and Jute Improvement Programs.

CHAPTER X - INTERNATIONAL AGENCY PROJECT ASSISTANCE

The following outline on the subject of desirable international agency assistance to the various aspects of the specific and overall Kenaf and Jute Development Program phases discussed in this report has been prepared in response to that part of the "Statement of Services" to be performed by the Advisor under his contract which stipulates the development of "a precise definition of technical assistance requirements and related time frames which can be considered for implementation by other possible donors", as well as in pursuance of the request by NEDB officials for him to explore the possibilities of securing financial project assistance from international agencies.

1. Technical Assistance Services

In this section, a full range of Kenaf and Jute Development Program technical assistance services is discussed, including kenaf and jute research and seed multiplication, the Kenaf Package Project, the Kenaf Master Development Program, the Kenaf Pioneer Project, the Jute Development Program and the Bag and Hessian Mill Improvement Program, so as to enable the NEDB and other RTG agencies concerned to decide which, if any, of such services are indeed required and/or desired and to discuss their procurement with potential donor organizations.

It has been assumed, for purposes of determining advisory personnel requirements, that the Kenaf Development Committee will continue to act as the coordinating agency for the Kenaf and Jute Development Programs, that the Pioneer Kenaf Development Project will be implemented and that, as would be desirable, the Pioneer, Research and Seed Multiplication Projects will be combined at the same location and under a single management. The proposed overall advisory team would then be comprised of the following specialists:

Pioneer Project/Research Center:

- 1 Kenaf and jute grading and marketing specialist and deputy manager;
- 1 Kenaf research specialist;
- 1 Kenaf agronomist and processing specialist (to act also as senior kenaf extension specialist);
- 1 Jute research specialist and agronomist to act also as extension specialist to the Jute Development Program);

Kenaf Development Committee:

- 1 Kenaf agronomist and processing specialist (to the Kenaf Package and Master Development Programs);
- 1 Kenaf and jute grading and inspection specialist (to be assigned to the Office of Commodity Standards);
- 1 Kenaf and jute mill engineering and management specialist;
- 1 Raw kenaf and jute and finished goods marketing specialist; Kenaf Development Committee advisor and team leader;
- Supervisory backstopping services.

It is suggested that, in order to enable the advisors to effectively assist in organizing and implementing the Kenaf and Jute Research, Pioneer and Development Programs and considering the time frames within which these programs will operate, the above specialists be assigned to the project for a period of three years, with the exception of the Kenaf and Jute Grading and the Mill Engineering and Management Specialists who should be able to complete their assignments in a two-year period.

Proposed terms of reference for the individual advisors are outlined below.

1.1. Kenaf and Jute Grading and Marketing Specialist;
Deputy Manager, Pioneer Project and Research Center

In consultation with the Center's manager, the Department of Agriculture, the Department of Agricultural Extension, the Applied Scientific Research Corporation of Thailand, the Royal Irrigation Department, the Office of Commodity Standards, the Bank of Agriculture and Agricultural Corporatives, other RTG agencies and other team members, as applicable:

- (i) Advise and assist the manager of the combined Pioneer Project and Research Center in the organization and administration of the Center which is to comprise kenaf and jute research, seed multiplication and an intensive core type kenaf and jute production project based on nucleus farm operation and furnishing to local farmers a full range of input and technical assistance services, from land selection and preparation through marketing.
- (ii) Identify the Center's overall activities with respect to farmer organization, input supplies, fiber production and processing, retting facility construction and retting center location and operation, and assist with the implementation of these activities.
- (iii) Determine, organize and supervise fiber grading and baling practices and procedures.
- (iv) Determine and assist in organizing the Center's kenaf and jute research and seed multiplication activities.
- (v) Determine the type and extent of the physical facilities required for the operation of the combined Center, estimate financial requirements and assist in the supervision of their construction and/or procurement.
- (vi) Determine staff and work force requirements and costs.

- (vii) Coordinate the Center's activities with those of the Kenaf Package Project, the Kenaf Master Development Program and the Jute Development Program.
- (viii) Fiber grading and marketing and project management counterpart training.

1.2. Kenaf Research Specialist,
Pioneer Project and Research Center

In consultation with the Center's manager, the Department of Agriculture, the Department of Agricultural Extension, the Applied Scientific Research Corporation of Thailand, other RTG agencies and other team members, as applicable:

- (i) Recommend, on the basis of careful study of the present varietal distribution and performance, a kenaf seed improvement program for immediate implementation as well as a longer-term overall plan for the introduction, selection and breeding of improved varieties.
- (ii) Examine and appraise the current kenaf research efforts and submit recommendations regarding the improvement of kenaf research programs and facilities.
- (iii) Formulate a detailed program for expanded kenaf research work, with special emphasis on the selection of stem rot disease resistant varieties, including estimates on the procurement needs of research facilities and equipment, transport vehicles, improved seed and other inputs.
- (iv) Assist in the implementation of such research programs as:
 - Introduction of improved seed varieties;
 - Variety selection and breeding;
 - Time of planting trials;
 - Cultural practices trials;

- Fertilizer trials;
 - Pest and disease control trials;
 - Time of harvesting and fiber yield trials;
 - Seed harvesting, threshing, cleaning and storage;
 - Production of foundation and certified seed.
- (v) Kenaf research specialist counterpart training.

1.3. Kenaf Agronomist and Processing Specialist,
Pioneer Project and Research Center

In consultation with the Center's manager and extension staff, the Department of Agriculture, the Department of Agricultural Extension, the Applied Scientific Research Corporation of Thailand, other RTG agencies and other team members, as applicable:

- (i) Examine the statistics and other relevant data on kenaf fiber production in Thailand with regard to topography, soils, area, yields and other aspects, and identify the major restraints on fiber production efficiency and yield improvement, assuming the necessary development effort.
- (ii) Study and appraise the prevailing production technology of kenaf fiber, including land selection and preparation, cropping systems, agronomic practices, fertilizer use, plant protection, harvesting, and retting and fiber stripping methods, and suggest necessary improvements.
- (iii) Formulate a phased program for kenaf fiber production improvement, including approximate estimates of the procurement needs of farm machinery, improved seed, fertilizers and pesticides, construction material for improved retting facilities, and other recommended inputs.
- (iv) Advise and assist, both personally and through supervision of the work of the kenaf agronomist and processing specialist

team member assigned to the Kenaf Package Project and the Kenaf Master Development Program, such RTG agencies as the Royal Irrigation Department, the Office of Accelerated Rural Development, the Mobile Development Units of the Army, the Community Development Department, the Department of Public Welfare and others with:

- The introduction of row planting methods to facilitate thinning and weeding activities and to increase fiber yields;
 - The introduction of stalk ribboning methods (manual and mechanical) prior to retting in order to economize on retting facility requirements and improve uniformity of fiber quality;
 - The implementation of a program for the improvement of existing retting facilities (rivers, ponds, roadside ditches) and the construction of new retting tanks and centers;
 - The organization and supervision of kenaf grower, processing and marketing associations.
- (v) Examine and appraise current kenaf extension practices, staff availability, staff training methods and demonstration facilities and formulate recommendations for the improvement of extension efforts, the strengthening of demonstration work and the training of extension workers.
- (vi) Evolve a detailed program for input and technical assistance services and requirements under the Kenaf Pioneer Development Program, including types of inputs, staff requirements and costs, and assist with the implementation of the input and technical assistance phases of the Pioneer Project.
- (vii) Assist with the design, location and construction of Pioneer Project retting centers and the supervision of their

operation, including water control, stalk and ribbon retting, stripping, washing and drying.

- (viii) Determine the requirements of seed multiplication work at the Center, assist in organizing and implementing such seed multiplication efforts, and establish supervised farmer operated seed multiplication plots under the Pioneer Project.
- (ix) Coordinate the Pioneer/Research Center kenaf agronomy and processing work with that of the Kenaf Package Project and the Kenaf Master Development Program.
- (x) Kenaf fiber production and processing specialist counterpart training.

1.4. Jute Research Specialist and Agronomist,
Pioneer Project and Research Center

In consultation with the Center's manager, the Department of Agriculture, the Department of Agricultural Extension, the Applied Scientific Research Corporation of Thailand, other RTG agencies and other team members, as applicable:

- (i) Study the past history of jute fiber production in Thailand with regard to areas, soils, climate, yields and other aspects and identify the major restraints on fiber production efficiency and yield and quality improvement.
- (ii) Study and appraise the prevailing production technology of jute fiber, including land selection and preparation, cropping systems, agronomic practices, fertilizer use, plant protection, harvesting, and retting and fiber stripping methods, and suggest necessary improvements.
- (iii) Formulate a phased program for jute fiber production improvement, including approximate estimates of the procurement needs of farm machinery, improved seed, fertilizer, pesticides

and other recommended inputs, and assist in carrying out a survey of suitable jute production areas in the Northeast.

- (iv) Formulate required jute extension and demonstration practices, including staff requirements and training and the establishment of jute demonstration centers, and assist in the implementation of such efforts.
- (v) Examine and appraise the current jute research efforts and submit recommendations regarding the improvement of jute research programs and facilities.
- (vi) Formulate a detailed program for expanded jute research work, including estimates of procurement needs of research facilities and equipment, improved seed and other inputs.
- (vii) Design and assist in the implementation of such research programs as:
 - Introduction of improved varieties;
 - Variety selection and breeding;
 - Time of planting trials;
 - Cultural practices trials;
 - Fertilizer trials;
 - Pest and disease control trials;
 - Time of harvesting and fiber yield trials;
 - Seed harvesting, threshing, cleaning and storage;
 - Production of foundation and certified seed.
- (viii) Determine the requirements of seed multiplication work, assist in organizing and implementing such seed multiplication efforts, and establish supervised farmer operated seed multiplication plots.
- (ix) Organize and assist in supervising jute fiber processing at the Center's retting centers.
- (x) Jute fiber production and processing specialist counterpart training.

1.5. Kenaf Production and Processing Specialist,
Kenaf Package Project and Kenaf Master Development Program

In consultation with the Kenaf Package Project Sub-Committee, the Kenaf Development Committee, the Department of Agriculture, the Department of Agricultural Extension, the Applied Scientific Research Corporation of Thailand, other team members, as applicable and under the guidance of the Kenaf Agronomist and Processing Specialist stationed at the Pioneer Project and Research Center:

(i) Assist and advise with the planning and implementation of the Kenaf Package Project and the Kenaf Master Development Plan under the auspices of the Kenaf Development Committee with regard to :

- Promoted area determination and organization;
- Improved seed production;
- Extension work and extension officer training;
- Input supply determination, procurement and supply, including improved seed, fertilizer and pest and disease control material and equipment;
- Retting tank location and construction;
- Kenaf stalk ribboning;
- Kenaf stalk and ribbon retting, processing and grading;
- Fiber collection and marketing.

(ii) Kenaf production and processing specialist counterpart training.

1.6. Kenaf and Jute Grading and Inspection Specialist,
Kenaf Development Committee and Office of Commodity Standards

The activities of this specialist should be closely coordinated with the Office of Commodity Standards and be directed by the Chief of that Office in consultation with the Kenaf Development Committee, the Applied Scientific Research Corporation of Thailand, the Ministry

of Industry's Standards Section, the Thai Jute Association, the Jute Balers Association of Thailand, other team members, as applicable, and with the Raw Kenaf and Jute and Finished Goods Marketing Specialist and Team Leader with whose assignment his scope of work will partly overlap.

- (i) Examine and appraise the current situation with regard to the baling of kenaf and jute fiber, including estimates of baling facility requirements, available capacity and location of baling plants, and assess:
 - Current and improved methods of kenaf and jute baling;
 - Labor, management and control;
 - Cost and returns.
- (ii) Review and assess the present kenaf and jute grading system in Thailand, from the farmer through the village and Chang-wat traders, the upcountry balers, the bag mills and the exporters.
- (iii) Assess the quality and grading requirements of the local bag mills and the overseas consumers and propose measures to assure fulfilment of these requirements by the Thai grading system and procedures.
- (iv) Recommend the organization and assist in the implementation of a suitable grading system, from the farmer through the exporter, including all intermediate steps.
- (v) Assist the Office of Commodity Standards in the organization of an improved corps of fiber inspectors at all levels of the marketing system, but particularly at the upcountry and Bangkok baling plants and the exporters' godowns.
- (vi) Prepare, organize and implement training courses for fiber inspectors and assist in the supervision of their activities, including those of the independent inspection firms.

- (vii) Assist in the completion of an instruction film for fiber inspectors and baling plants and of instruction pamphlets and participate in the demonstration of this and similar instruction material to the parties concerned.
- (viii) Fiber grading and inspection specialist counterpart training.

1.7. Kenaf and Jute Mill Engineering and Management Specialist,
Kenaf Development Committee

In consultation with the Kenaf Development Committee, the Siam Gunny Co., the management of the Government and privately operated kenaf mills, the Ministry of Industry, the Applied Scientific Research Corporation of Thailand, and other team members, as applicable:

- (i) Examine and analyse all available data and information with respect to the history and the past and present operation of the Thai kenaf mills.
- (ii) Examine and assess the present status of the kenaf mills with respect to machinery and equipment, operational performance, capacity, quality of available raw material, fiber batch, manufacturing costs, operating personnel, management and other relevant aspects related to kenaf mill operations.
- (iii) Prepare detailed projects for individual kenaf mills (which require and desire such services) regarding their modernization and/or expansion and appraise all technical and engineering aspects of such individual mill projects, including proposed capacities; machinery and equipment requirements, plant layout, schedules of construction, and all other technical aspects relating to such modernization and/or expansion and the subsequent operation of such mills; develop a realistic program for the implementation of any kenaf mill

modernization and/or expansion projects decided upon and prepare detailed estimates of the manufacturing costs for each product line after completion of the reorganization of such mills.

- (iv) Prepare a detailed listing of machinery and equipment requirements for the modernization and/or expansion of such mills, including specifications, costs and potential suppliers, and estimate overall capital costs for each mill project.
- (v) Recommend the most suitable capacity and fiber batch for the modernization and/or expanded as well as the non-modified mills for optimum mill productivity and to meet internal and export marketing requirements.
- (vi) Identify and recommend areas of improvement necessary for the attainment of maximum mill efficiency.
- (vii) Recommend measures for the improvement of product quality.
- (viii) Examine and appraise the existing and proposed managerial and organizational structures of such mills and recommend optimum staffing requirements and organizational changes.
- (ix) Recommend arrangements for the procurement of necessary technical advice and services before, during and after modernization and/or expansion.
- (x) Recommend improvements in mill management methods and procedures.
- (xi) Recommend training programs for kenaf mill workers, supervisors, technical staff and operational personnel.
- (xii) Recommend a program for continuing research and development with respect to mill operation, raw material and product quality, and production costs.

- (xiii) Examine and appraise the past and present export market for Thai semi-finished and finished kenaf and jute goods and submit recommendations as to measures for its expansion in the light of overseas requirements and the competition from other producing countries and from the manufacture of man-made packaging materials.
- (xiv) Act as technical and managerial advisor to those mills as desire such services.
- (xv) Bag mill engineering and management specialist counterpart training.

1.8. Raw Kenaf and Jute and Finished Goods Marketing Specialist, Kenaf Development Committee Advisor and Team Leader

In consultation with the Kenaf Development Committee, the Package Project Sub-Committee, the Department of Agriculture, the Department of Agricultural Extension, the Office of Commodity Standards and other dependencies of the Ministry of Commerce, the Ministry of Industry, the Thai Jute Association, the Jute Balers Association of Thailand, the Siam Gunny Co., the Applied Scientific Research Corporation of Thailand, other RTG agencies, the Secretariat of the Consultative Committee on Jute, Kenaf and Allied Fibers of the FAO, and other team members, as applicable:

- (i) Assist and advise the Kenaf Development Committee with respect to its functions, including:
 - Establishment of a promotional policy for the production of high quality kenaf and jute to satisfy the demands of both the domestic and export market, including price stabilization and quality control measures aimed at achieving these objections;
 - Coordination of the efforts and activities of Government agencies and private entities directed towards benefitting

the kenaf and jute growers and traders through high quality fiber production, evaluation of the progress and results of these efforts and identification of the problems and obstacles limiting the successful implementation of the promotional policy and assessment of potential corrective measures;

- Consideration and evaluation of kenaf and jute development projects submitted by Government agencies and submission of proposals for their implementation to the Executive Committee of the National Economic Development Board.
 - Appointment of sub-committees and/or working groups as required.
- (ii) Review the history of kenaf and jute production and trade in Thailand.
 - (iii) Examine and assess the contribution of kenaf and jute fiber and finished goods production to the economy and foreign trade of Thailand.
 - (iv) Study and report on Government intervention, measures adopted and priorities accorded to the promotion of kenaf and jute fiber production, industrialization and internal and export marketing.
 - (v) Examine and appraise the current situation in Thailand of the production, processing, baling, industrialization and trading of kenaf and jute, with particular reference to marketing channels, baling facilities, traders and exporters.
 - (vi) Review and identify basic needs and bottlenecks in respect of the orderly marketing of kenaf and jute fiber and finished goods and recommend measures for their improvement.
 - (vii) Examine and assess production, domestic consumption, exports and price trends for Thai kenaf and jute fiber and finished goods.

- (viii) Study and report on the major trends in the world jute, kenaf and allied fiber market (world production, trade and consumption) and the competitiveness of Thai kenaf and jute and finished goods as compared to other producing countries and with regard to the production of synthetic bagging fibers, and recommend the type of kenaf and jute goods most suitable for exports in the light of their competitiveness.
- (ix) Study and propose improved arrangements for research and extension work, supply of inputs, construction of retting tanks and of storage facilities, supply of agricultural credit, and rural institutions including kenaf and jute production associations.
- (x) Assist in the planning, organization and implementation of the Kenaf Development Committee sponsored Kenaf Package Project, the Kenaf Master Development Program and the Jute Development Program.
- (xi) Coordinate and direct the activities of all kenaf and jute advisory team members.
- (xii) Kenaf and jute marketing and advisory specialist counterpart training.

Note: If and when the Kenaf Development Committee should be superceded by a Kenaf Development Board, the advisor's scope of work would be expanded to include assistance services to that Board with respect to the execution of its functions and powers.

2. Financial Project Assistance

With regard to the request by NEDB officials for the advisor to explore the possibilities of securing financial project assistance from international agencies, preliminary discussions with the Bangkok office of the International Bank for Reconstruction and Development (World Bank) indicate the following parameters for consideration.

The World Bank is considering the extension of International Development Association (IDA) loans to Thai agricultural development programs; these are loans for a period of up to 50 years, free of interest except for a 3/4 percent annual service charge, and can cover up to 50 percent of the project expenditures, including local currency costs. Within the framework of such a loan, the Bank might support a Kenaf and Jute Development Program including:

(i) Research

- Variety trials, seed selection and improvement;
- Seed multiplication and distribution;
- Improved planting and cultivation methods;
- Fertilizer requirements and application.

(ii) Fiber Processing

- Improvement of existing traditional retting facilities;
- Tractor excavation of retting ditches;
- Construction of more sophisticated retting centers at locations where permanent water supplies are available;
- Kenaf and jute development projects located within irrigated areas, particularly within irrigation projects supported by the Bank.

(iii) Pioneer and/or Demonstration Projects

Such projects to combine the following:

- Seed multiplication;

- Demonstration farms;
- Retting facilities with permanent water supplies;
- Introduction of improved processing methods, including manual and/or mechanical stalk ribboning.

Note: Such projects to extend a full range of assistance services to kenaf and jute outgrowers within the project area.

(iv) Fiber Quality Control

- Advisory services for fiber inspector training.

(v) Kenaf and Jute Mill Modernization

- Improvement of production, engineering and management practices;
- Mill reequipment.

Note: The above aimed at improving the competitiveness of the Thai mill industry in the international semi-finished and finished goods market.

(vi) Multi-Crop Development

- The combination of kenaf and jute development with that of other crops suitable for the Northeast, such as:

Groundnuts	Cotton
Corn	Soybeans
Sorghum	Cassava
Mungbeans	Sesame
Castor beans	Tobacco
Fruits	Vegetables
Rice	

(vii) Advisory Services

- Provision of overall consulting services.

Under its loan provisions, the World Bank usually makes such counterpart service requirements as:

- The appointment or delegation to the project of key personnel of the RTG agencies concerned (Ministry of Commerce, Ministry of Agriculture, etc.);
- The cooperation of credit organizations (Bank for Agriculture and Agricultural Cooperatives, private banks);
- The passage of required legislation, if any.

Initial discussions regarding the potential involvement of the World Bank in the Kenaf and Jute Development Programs dealt with in the present report have been held between officials of the National Economic Development Board and of the Bank.

ANNEX I - KENAF AND JUTE RESEARCH STATION

Reference has been made repeatedly in this report to the essential requirement of a greatly increased research effort to support the various Kenaf Development Programs discussed herein and, in fact, to permit their realization. The details of the work to be undertaken are listed in Chapter III, Section 1.1., and fall under the following major headings:

Variety selection and breeding (from both local and introduced varieties);

Seed multiplication and storage;

Agronomic practices research;

Soil fertility and fertilization research;

Pest and disease control measures;

Fiber quality improvement (laboratory research and retting facility design, construction and operation)

If, as proposed in Chapter III, Section 1.1., the research and demonstration centers are combined in one location, a considerable saving in staff and administrative expenses could be achieved as well as more efficient overall management.

The estimated budgetary requirements for the establishment and operation of the proposed Kenaf and Jute Research Station are detailed in the attached Schedules I and II, supported by Exhibits I thru' VII. Total capital costs are estimated at \$13.6 million and annual operating costs at \$2.5 million. These budgetary allocations should be made available promptly under the Kenaf Master Development Program and that in their entirety, since it is indispensable that a greatly increased kenaf and jute research program be implemented immediately.

Schedule I

Kenaf and Jute Research Station Budget Requirements

A. Capital Costs

Land, 1,000 rai @ ฿3,000	฿ 3,000,000
(Note: If no Government land available)	
Buildings (see Exhibit I)	6,210,000
Power Plant, 50 KW (฿140,000) plus distribution system (฿100,000)	240,000
Water pump, 6", diesel engine driven	50,000
Water tower and piping	300,000
Irrigation distribution canals	200,000
Agricultural Equipment (see Exhibit IV)	1,125,000
Transport (see Exhibit V)	930,000
Retting tanks and drying lines	300,000
Roads	<u>25,000</u>
	฿12,380,000
Contingency (10% appr.)	<u>1,220,000</u>
Total	<u>฿13,600,000</u> =====

Schedule II

Kenaf and Jute Research Station Budget Requirements

B. Annual Operating Costs

Salaries and wages (see Exhibit III)		₹ 1,250,000
Administrative expenditures (see Exhibit V)		186,000
Vehicle Operation and Maintenance:		
7 Cars and trucks @ ₹2.00/km. at		
15,000 km. per vehicle per year	₹210,000	
10 Motorcycles @ ₹0.50/km. at		
5,000 km. per unit per year	<u>₹ 25,000</u>	235,000
Tractor operation and maintenance:		
5 Tractors at 1,500 hours/year at ₹30/hour		225,000
Pump and power plant operation at		
₹3,000 per unit per month		72,000
Housing and building maintenance:		
2% of ₹6,210,000		125,000
Road maintenance		1,000
Agricultural supplies (estimated)		<u>200,000</u>
		₹ 2,294,000
Contingencies (10% appr.)		<u>231,000</u>
Total		<u>₹ 2,525,000</u> =====

Note: No provision for insurance as it is stated that Government property is not so covered.

Exhibit I

Buildings

Office building, equipment and furnishings	₪ 500,000
Laboratory, scientific equipment and furnishings	2,000,000
Staff housing (see Exhibit II)	3,040,000
Store, seed (300 sq.m. @ ₪400, plus seed drying platform, 800 sq.m. @ ₪50)	160,000
Store, fiber (300 sq.m. @ ₪400)	120,000
Store, POL products, spare parts and supplies (150 sq.m. @ ₪400)	60,000
Shed, equipment storage (400 sq.m. @ ₪200)	80,000
Repair shop, incl. equipment	<u>250,000</u>
	<u>₪6,210,000</u>
	=====

Exhibit II

<u>Staff Housing</u> (see Exhibit III for staff to be housed)		
4 Grade 1 houses (1 chief research officer, 3 expatriate advisors) @ \$120,000		\$ 480,000
7 Grade 2 houses (1 depty. chief research officer, 5 professional staff, 1 admin. officer) @ \$80,000		560,000
5 Grade 3 houses (5 technicians) @ \$60,000		300,000
10 Grade 4 houses (4 clerk/typists, 1 store-keeper, 5 foremen) @ \$50,000		500,000
14 Labor houses @ 5 units each (3 drivers, 5 artisans, 1 messenger, 10 tractor drivers, 51 unskilled workers) @ \$75,000		<u>1,050,000</u>
Total staff housing		<u>\$3,040,000</u> =====

Exhibit III

Staff, Salaries and Wages

<u>Position</u>	<u>No.</u>	<u>Monthly Salary (₪)</u>	<u>Yearly Salary (₪)</u>
Chief Research Officer	1	3,200	38,400
Depty. Chief Research Officer	1	2,200	26,400
Kenaf Agronomist	1	1,800	21,600
Kenaf Plant Pathologist	1	1,800	21,600
Kenaf Entomologist	1	1,800	21,600
Soil Chemist	1	1,800	21,600
Agricultural Engineer	1	1,800	21,600
Admin. Officer/Accountant	1	1,400	16,800
Clerk/Typist	4	810	38,880
Store-keeper	1	1,000	12,000
Driver	3	600	21,600
Artisan (Mechanic, Mason, Carpenter, etc.)	5	720	43,200
Messenger	1	600	7,200
Expatriate Kenaf Advisor	3	-	-
Technicians (Assistants to Professional Staff)	5	1,250	75,000
Foreman	5	810	48,600
Tractor Drivers	10	720	86,400
Worker, Unskilled	100	600	<u>720,000</u>
Total Salaries and Wages			₪1,242,480
		Say	₪1,250,000 =====

Exhibit IV

Agricultural Equipment

5 Wheel tractors, 65 HP, with implements, @ ₱135,000	₱ 675,000
1 Grader	30,000
1 Ditcher	10,000
1 Seed drill	35,000
1 Fertilizer spreader	3,000
1 Herbicide applicator	12,000
5 Trailers	100,000
1 Seed thresher	60,000
1 Seed cleaner	150,000
- Sprayers, dusters, tools	<u>50,000</u>
	<u>₱1,125,000</u>
	=====

Exhibit V

Transport

1 Truck, 5-ton, diesel	₪120,000
1 Pickup truck, 2-ton, diesel	80,000
1 Passenger car, 2,000 cc.	120,000
4 Landrover pickups, @ ₪130,000	520,000
10 Motorcycles, 100 cc., @ ₪9,000	<u>90,000</u>
	<u>₪930,000</u>
	=====

Exhibit VI

Administrative Expenditures

Postage and telecommunications	£ 6,000
Stationary and officer supplies	20,000
Scientific supplies	20,000
Staff travelling allowances (see Exhibit VII)	120,000
Entertainment allowance	<u>20,000</u>
Total	<u>£186,000</u> =====

Exhibit VII

Staff Travelling Allowances

No. of Officers	Grade	Per Diem		Subsistence	
		Daily Rate (₦)	Total (₦)	Daily Rate (₦)	Total (₦)
1	1	38	1,900	80	4,000
7	2	32	11,200	60	21,000
5	3	26	6,500	40	10,000
10	4	20	10,000	30	15,000
3	Driver	20	3,000	30	4,500
Total			32,000		54,000

Note: Average 50 days travel per officer per year.

Summary:

Per diem allowance	₦ 32,600
Subsistence allowance	54,500
Travel expenses (estimated)	<u>30,000</u>
Total	₦117,100
	Say ₦120,000
	=====

ANNEX II

WORK PLAN

Kenaf Advisory Contract to the Kenaf Development
Committee, NEDB

MEMORANDUM

To: Mr. Krit Sombatsiri, Deputy Secretary-General, NEDB
Mr. Donald C. Marsden, Chief, EDI/PE, USOM

From: Erwin J. Sholton, Agri-Business Consultants

Date: October 17, 1972

Subject: Work Plan, Kenaf Advisory Contract to the Kenaf Development
Committee, NEDB

Attached hereto please find the Work Plan for the subject kenaf advisory contract specifying the assistance services to be furnished by the NEDB, the work to be performed by the Advisor, and the respective time frames for such services and work performance.

The final determination of the consultant's time schedule to complete his assignment and the extent of his upcountry travel is deferred until November 10 for resolution by the NEDB and the Kenaf Development Committee of issues relative to the preliminary recommendations submitted by the consultant regarding the Kenaf Package Project.

Approved

Approved

Krit Sombatsiri

Donald C. Marsden

MEMORANDUM

To: Mr. Krit Sombatsiri, Deputy Secretary-General, NEDB
Mr. Staporn Kavitanon, Chief, Private Sector Planning
Unit, Economic and Social Planning Division, NEDE
Mr. Donald C. Marsden, Chief, EDI/PE, USOM

From: Erwin J. Sholton, Agri-Business Consultants

Date: November 13, 1972

Subject: Pioneer Kenaf Development Project Report for the
World Bank and the Mekong Committee

Further to the preliminary meetings between the NEDB and the World Bank in connection with the Kenaf Development Projects developed by the Kenaf Development Committee and NEDB staff, the writer was requested by the Deputy Secretary-General, NEDB, to follow up on these discussions with the Bank and the Mekong Committee in order to further explore these organizations' interest in the projects and the Bank's potential participation therein.

In the course of these discussions, both the Bank and the Mekong Committee expressed strong interest in obtaining a report on a possible "Pioneer Kenaf Development Project" which would be a concentrated input nucleus type of project favored by these agencies and which would serve as a prototype for and support the programs of the Kenaf Development Committee. At the request of NEDB officials, the writer prepared the attached report for NEDB use in response to those agencies' interest. The report will be included in the overall recommendations to the NEDB as provided for in the writer's contract for advisory services.

Approved

Krit Sombatsiri

Donald C. Marsden

Staporn Kavitanon

MEMORANDUM

To: Mr. Krit Sombatsiri, Deputy Secretary-General, NEDB
Mr. Donald C. Marsden, Chief, EDI/PE, USOM

From: Erwin J. Shelton, Agri-Business Consultants

Date: November 15, 1972

Subject: Work Plan, Kenaf Advisory Contract to the Kenaf Development Committee, NEDB

Further to the memorandum dated October 17, 1972, on the above subject, the NEDB has advised the advisor that it desires him to complete his assignment in a consecutive period with only a possible brief interruption to suit the convenience of the NEDB and if so at a time to be mutually agreed upon between the NEDB and the advisor. Hence, the advisor expects to complete his assignment by the end of January 1973.

Future necessary up country travel is now estimated would not exceed twenty-five percent of the remaining contract period.

Approved

Krit Sombatsiri

Donald C. Marsden

Work Plan - Man-Week Requirements
(from 4th Week Onwards)

	<u>Supply of Information</u>	<u>Translation</u>	<u>Report Preparation</u>	
			<u>Research</u>	<u>Drafting</u>
1. Review of Present Fiber Situation	1.5	1.0	1.0	0.5
2. Review of Present Kenaf Mill Situation	0.5	0.5	1.0	0.5
3. The Kenaf Development Committee	1.0	0.5	0.5	0.5
4. The Kenaf Development Package Project	1.0	1.0	0.5	0.5
5. Review of the Present Jute Situation	0.5	0.5	0.5	0.5
6. Kenaf Package Project Refinement	0.5	0.5	0.5	1.0
7. Kenaf Master Plan Refinement	0.5	1.0	0.5	1.0
8. Kenaf Mill Development Program	-	-	0.5	1.0
9. Jute Fiber Production Development Program	<u>0.5</u>	<u>-</u>	<u>-</u>	<u>0.5</u>
Total Man-Weeks	6.0 ===	5.0 ===	5.0 ===	6.0 ===

(11 Weeks) *

* 2 Weeks Required for Report Reproduction

KENAF ADVISORY CONTRACT
 AGRI-BUSINESS CONSULTANTS

WORK PLAN

- - - - - Information and Assistance Required
 = = = = = Preparation of Recommendations and Report

Month	1				2				3				4			
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Interpretation Services Translation Services	--	--	--	--	--	--	--	--	--	--	--	--				
Research - NEDB	--	--	--	--	--	--	--	--	--							
*Research - ABC	=	=	=	=	=	=	=	=	=							
*Report Preparation - ABC										=	=	=	=	=	=	
Report Reproduction - USOM																

* Continuing Consultations with RIG Officials

Advisory Contract to the
KENAF DEVELOPMENT COMMITTEE
of the NEDB

September 29, 1972.

WORK PLAN

I. Present Situation

1. Review of the Present Kenaf Fiber Situation

A. Scope of Work

- 1.1. Recent History
- 1.2. Production Trends, Areas and Methods
- 1.3. Fiber Processing and Grading
- 1.4. Fiber Marketing
 - 1.4.1. Internal Marketing
 - 1.4.2. Export Marketing
 - 1.4.3. Quality Control and Inspection
 - 1.4.4. Upgrading of Kenaf Fiber
 - 1.4.5. World Wide Jute and Kenaf Production
and Consumption Trends

B. Information and Assistance Required

- 1.1./1.2. Statistical Information on Fiber Production,
Production Areas, Internal Consumption, Exports,
Domestic and Export Prices (up to mid-1972);
Sources: NEDB, Thai Jute Association (TJA), Office of
Commodity Standards (OCS), Siam Gunny Co. (SGC), Bank of
Thailand (BoT), ASRCT, etc.

1.3. Fiber Processing and Grading - Nil

1.4. Fiber Marketing

1.4.1. Nil

1.4.2. Recent Marketing Practices, Costs and Prices

Sources: NEDR, OCS, TJA, BoT

1.4.3. Detailed Information on Inspection Practices

Sources: NEDB, OCS, TJA, Private Inspection Companies

1.4.4. Nil

1.4.5. Recent Statistics and Reports

Sources: OCS, TJA, FAO

General: Translation of Recent Reports and Statistics

- NEDB

C. Time Frame

1st. 6 Weeks (by Oct. 31)

2. Review of the Present Kenaf Mill Situation

A. Scope of Work

2.1. Recent History

2.2. Mill Equipment, Production, Production Costs, Management Practices, Problems

2.3. Domestic Finished Goods Demand and Prices

2.4. Export Finished Goods Demand, Prices, Problems

B. Information and Assistance Required

2.1. to 2.4. Statistical Information

Sources: NEDB, N.E.Jute Mill (NEJM), James Mackie, ASRCT, SGC - Existing Report Translation

C. Time Frame

1st. 6 Weeks (by Oct. 31)

3. The Kenaf Development Committee

A. Scope of Work

3.1. History, Organization and Membership

3.2. Functions and Methods of Operation

B. Information and Assistance Required

- Background Information

Sources: NEDB, KDC - Existing Report Translation

C. Time Frame

1st. Six Weeks (by Oct. 31)

4. The Kenaf Development Package Project

A. Scope of Work

4.1. History and Purpose

4.2. Method of Implementation

B. Information and Assistance Required

Overall Information

Sources: NEDB, BAAC, Depts. of Agriculture (DoA) and of Agricultural Extension (DAE), NEJM - Existing Report Translation

C. Time Frame

1st. Month (by Oct. 15)

5. Review of the Present Jute Fiber Situation

A. Scope of Work

5.1. History

5.2. The Jute Fiber Production Promotion Program and the Participating Agencies

B. Information and Assistance Required

- General Information

Sources: DoA, ASRCT, NEJM, TJA - Existing Report
Translation

C. Time Frame

1st. Six Weeks (by Oct. 31)

II. Recommendations

6. Kenaf Package Project Refinement

A. Scope of Work

- 6.1. Input Requirements (Seed, Fertilizer, Agricultural Equipment, Retting Facilities)
- 6.2. Technical Assistance Requirements
- 6.3. Credit Requirements and Sources
- 6.4. Fiber Marketing (incl. Price Policy)
- 6.5. Program Cost and Source of Financing
- 6.6. Package Project Expansion Potential

B. Information and Assistance Required

- Overall Information on Existing Plans

Sources: NEDB, DoA, NEJM, BAAC, DAE - Existing Report
Translation

C. Time Frame

- Supply of Existing Information - 1st. Six Weeks (by Oct. 31)
- Preparation of Recommendations - Month 2

7. Kenaf Master Plan Refinement

A. Scope of Work

- 7.1. Basic Requirements for the Achievement of the Development Program Goals
- 7.2. Research Activities
- 7.3. Seed Production and Distribution
- 7.4. Cultural Practices
- 7.5. Ribboning
- 7.6. Retting Facilities
- 7.7. Fiber Grading
- 7.8. Incentive for Fiber Quality Upgrading
- 7.9. Fiber Quality Inspection
- 7.10. Internal Marketing
- 7.11. Export Marketing
- 7.12. Executing Agency (or Agencies)
- 7.13. Manpower Requirements
- 7.14. Financial Requirements and Sources of Financing
- 7.15. Technical Assistance Requirements
- 7.16. International Agency Program Support

B. Information and Assistance Required

- General: Overall Information on and Translations of Existing Plans
Sources: NEDB, DoA, DAE, ASRCT, DLD, Public Welfare Dept., BAAC
- 7.1. Nil
 - 7.2./7.3./7.4. Sources: DoA
 - 7.5. Nil
 - 7.6. Sources: DoA
 - 7.7. Sources: OCS, Balers, NEJM
 - 7.8./7.9./7.10./7.11. Sources: NEDB, OCS, TJA, NEJM, DoA

7.12. Source: NEDB

7.13./7.14. Sources: NEDB, OCS, NEJM, DoA, DAE, BAAC

7.15. Sources: NEDB, DoA, OCS, NEJM, DAE

7.16. Sources: IBRD, USOM, Asian Development Bank, UNDP

C. Time Frame

- Supply of Existing Information - Month 1 and 2

- Preparation of Recommendations - Month 2, 3, 4

8. Kenaf Mill Development Program

A. Scope of Work

8.1. Kenaf Mill Modernization

8.2. Mill Engineering and Management

8.3. Internal and Export Finished Goods Marketing

B. Information and Assistance Required

- Overall Information on and Translation of Existing Plans

Sources: NEDB, NEJM, SGC, James Mackie, OCS, Miny. of Industry

C. Time Frame

- Supply of Existing Information - Month 1, 2, 3

- Preparation of Recommendations - Month 2, 3, 4

9. Jute Fiber Production Development Program

A. Scope of Work

9.1. Jute Development Program Justification

9.2. Research

9.3. Seed Production and Distribution

9.4. Demonstration of Jute Production and Processing Methods

9.5. Selection of Production Areas

9.6. Jute Grading

9.7. Jute Marketing

B. Information and Assistance Required

9.1. Sources: NEDB, OCS, TJA, NEJM

9.2./9.3./9.4. Nil

9.5. Sources: NEDB, DoA, DAF, OCS, TJA

9.6./9.7. Sources: OCS, NEJM

C. Time Frame

- Supply of Existing Information - Month 1, 2, 3

- Preparation of Recommendations - Month 2, 3, 4

10. Report Reproduction

- Time Frame - Month 4