RESEARCH CORPORATION OF THAILAND

in collaboration with

DEPARTMENT OF AGRICULTURE, MINISTRY OF AGRICULTURE
DEPARTMENT OF COMMUNITY DEVELOPMENT, MINISTRY OF INTERIOR
OFFICE OF ACCELERATED RURAL DEVELOPMENT, OFFICE OF THE PRIME MINISTER
DEPARTMENT OF FOREIGN TRADE, MINISTRY OF ECONOMIC AFFAIRS
DEPARTMENT OF LAND DEVELOPMENT, MINISTRY OF NATIONAL DEVELOPMENT
KASETSART UNIVERSITY, OFFICE OF THE PRIME MINISTER
DEPARTMENT OF VOCATIONAL EDUCATION, MINISTRY OF EDUCATION
ROYAL FOREST DEPARTMENT, MINISTRY OF AGRICULTURE
UNITED NATIONS ASIAN INSTITUTE FOR ECONOMIC DEVELOPMENT AND PLANNING
UNITED STATES OPERATIONS MISSION TO THAILAND
THAI JUTE ASSOCIATION

COOPERATIVE RESEARCH PROGRAMME NO. 1
PRODUCTION, PROCESSING, AND UTILIZATION OF
KENAF AND ALLIED FIBRES

RESEARCH PROJECT NO. 1/10
ECONOMIC STUDIES OF KENAF

REPORT NO. 3
COOPERATIVE MARKETING OF KENAF IN THAILAND - A CASE FOR VERTICAL INTEGRATION

BY
M.C. AGARWAL

ASRCT, BANGKOK 1971
not for publication

APPLIED SCIENTIFIC RESEARCH CORPORATION OF THAILAND

in collaboration with

DEPARTMENT OF AGRICULTURE, MINISTRY OF AGRICULTURE
DEPARTMENT OF COMMUNITY DEVELOPMENT, MINISTRY OF INTERIOR
OFFICE OF ACCELERATED RURAL DEVELOPMENT, OFFICE OF THE PRIME MINISTER
DEPARTMENT OF FOREIGN TRADE, MINISTRY OF ECONOMIC AFFAIRS
DEPARTMENT OF LAND DEVELOPMENT, MINISTRY OF NATIONAL DEVELOPMENT
KASETSART UNIVERSITY, OFFICE OF THE PRIME MINISTER
DEPARTMENT OF VOCATIONAL EDUCATION, MINISTRY OF EDUCATION
ROYAL FOREST DEPARTMENT, MINISTRY OF AGRICULTURE
UNITED NATIONS ASIAN INSTITUTE FOR ECONOMIC DEVELOPMENT AND PLANNING
UNITED STATES OPERATIONS MISSION TO THAILAND
THAI JUTE ASSOCIATION

COOPERATIVE RESEARCH PROGRAMME NO. 1
PRODUCTION, PROCESSING, AND UTILIZATION OF
KENAF AND ALLIED FIBRES

RESEARCH PROJECT NO. 1/10
ECONOMIC STUDIES OF KENAF

REPORT NO. 3
COOPERATIVE MARKETING OF KENAF IN THAILAND - A CASE FOR VERTICAL INTEGRATION

BY
M.C. AGARWAL

ASRCT, BANGKOK 1971
not for publication

CONTENTS

F O R E W O R D

This report is the second in a study which is a joint undertaking of the United Nations Asian Institute for Economic Development and Planning and the Applied Scientific Research Corporation of Thailand. The former provided professional assistance while the latter met financial obligations and also helped with data processing. The study forms part of Cooperative Research Programme No. 1, a joint research venture between ASRCT and other agencies of the Government of Thailand including the Department of Agriculture and the Royal Forest Department (Ministry of Agriculture), the Department of Community Development (Ministry of Interior), the Department of Foreign Trade (Ministry of Economic Affairs), the Department of Vocational Education (Ministry of Education), the Office of Accelerated Rural Development (Office of the Prime Minister), and Kasetsart University, with collaboration from the United Nations Asian Institute for Economic Development and Planning, the United States Operations Mission to Thailand, and the Thai Jute Association.

COOPERATING MARKETING OF KENAF IN THAILAND - A CASE FOR VERTICAL INTERGRATION

By M.C. Agarwal*

I. INTRODUCTION

Kenaf is an important export fibre of Thailand. In 1966, fibres (cotton, kapok, bombax, ramie, silk, kenaf and jute) accounted for 7.7% of the total estimated value of agricultural, forestry and fishery production.+ In the fibres group, kenaf contributed 75% to the total value which was 2,218 million baht‡. In that year, kenaf earned foreign exchange worth 1,613 million baht or 11.4% of total exports. With the objective of agricultural diversification and increase in the foreign exchange earnings through exports, the Royal Government of Thailand has given due importance to the development of kenaf in the planned economic development of the country. As with most primary agricultural products, kenaf production suffers from uncertainty created by wide price fluctuations in the international markets and also there is generally a declining price trend. This natural fibre also suffers from competition with synthetic products.

A kenaf grower can help to meet the national expectation of increased production by producing higher grade fibre and a larger quantity of kenaf fibre per rai of land. The farmer should have economic incentives to do so. The net income from kenaf must be higher than that from other farm products which compete for the limited resources of the farmer. There are, however, few proven substitute crops for kenaf in the north-eastern region, which is the home of kenaf production, processing and manufacturing.§ In the event of a fall in expected prices, the farmers withdraw large areas of land from kenaf cultivation and leave the land idle for the whole year. They could be induced to produce

---

*United Nations Asian Institute for Economic Development and Planning.

+Ministry of Agriculture (1968).—"Agricultural Statistics of Thailand 1966." p.17. (The latest available statistics.)(Bangkok.)

‡20.80 baht = U.S.$1.

§"Kenaf baling industry in Thailand - An economic analysis" by M.C. Agarwal. Rep. no. 2 on Res. Proj. no. 1/10. ASRCT unpublished report, 1970.

more kenaf for export if they were guaranteed a minimum price and if the farmers' share in consumers' price (f.o.b. Bangkok price in this case) could be increased from the present low level by eliminating marketing waste. Reduction in costs of production and marketing would help to achieve the goal.

In the existing marketing system, producers sell most of their mixed kenaf fibre to the nearest dealers at farm houses. In most cases the farmers have prior commitments to sell kenaf to these dealers. These dealers prefer to buy loose, mixed fibre and fix the prices accordingly. This system leaves little incentive for the producer to improve the quality of the fibre or even to take the risk of adopting new farm practices which might help to increase the yield per rai or reduce the cost of production per unit of product, but might not help in obtaining fair prices from the dealers.

This study is based on the assumption that a vertically integrated farmers' cooperative organization will help to achieve the national objective of increasing exports earnings from kenaf by providing economic incentives to farmers at production, processing, and marketing levels. Although all the fifteen Changwats (provinces) of the north-eastern region produce kenaf in varying quantities and collectively account for more than 95% of Thailand's kenaf production, yet there is only one cooperative society in the country which undertakes to provide production loans, grading and marketing facilities to its members. This, the Agricultural Products Marketing Cooperative, Ltd., is located at Amphoe Chatturat, Changwat Chaiyaphum.

The main objectives in undertaking this study are:

(1) To assess past performance of the Cooperative Society in the last five years;

(2) To assess the economic and financial feasibility of a vertically integrated cooperative organization which will process graded fibre into standard export bales;

(3) If the above is found feasible, to estimate additional physical, financial and manpower requirements should the Cooperative decide to integrate marketing activity vertically by adding full-fledged baling facilities.

To meet the first objective, data were extracted from the records of the Cooperative for the past five years on relevant organizational and operational aspects. Some data were also collected through personal interviews with the Committee of Management and officers of the Cooperative. Translation of data and replies from Thai into English created hurdles in the work.

To study the financial, physical, and manpower feasibility of a vertically integrated marketing organization, the findings of an earlier research study (Agarwal 1970 cited earlier) were utilized in developing a suitable model. This study strongly suggested that, from the point of view of providing baling services alone, it is profitable to set up a baling centre. These data have been further utilized in estimating net financial gain to the Cooperative if it should set up a baling centre and also in estimating additional physical, financial, and manpower requirements.

To assess kenaf growers' (Cooperative members and others) support to the proposed cooperative baling centre, a farm survey was conducted in April 1969. The growers' views on the present activities of the Cooperative and their support to the proposed baling centre through their participation were evaluated in personal interviews of the randomly selected growers. The research methodology adopted in farm survey is discussed in Appendix I. The statistical data, especially the tabulated data presented in the following pages, refer to Amphoe Chatturat, Changwat Chaiyaphum, unless otherwise stated.

The scope of this study has been extended by considering the possibility that the proposed baling centre is developed into a regional cooperative training and demonstration centre especially for development of cooperative organization and management in the north-eastern region of Thailand.

II. THE AGRICULTURAL PRODUCTS MARKETING COOPERATIVE LTD., AMPHOE CHATTURAT

Amphoe Chatturat

The Agricultural Products Marketing Cooperative, Ltd., has its headquarters at Ban Lahan, Amphoe Chatturat, Changwat Chaiyaphum which contributed between 12-15% to total area planted under kenaf in Thailand during 1965/66 and 1966/67. The Cooperative is located by an all-weather road which connects Bangkok with Chaiyaphum.* In 1968, the Amphoe had a total area of 1,204 km^2 and a population of 72,566. Of all the eleven amphoes in the Changwat, Amphoe Chatturat had largest area planted with kenaf in 1966/67, 98,900 rais or 24.9% of the Changwat area and in 1967/68, 129,100 rais also 24.9% of the Changwat area. In 1968/69, area planted with kenaf in Amphoe Chatturat dropped to 38,800 rais,+ a reduction of 70% over 1967/68. The Amphoe produced 29.7 thousand tonnes of kenaf fibre in 1966/67 which contributed 34% to Changwat production. Amphoe production in 1967/68 was about 29.2 thousand tonnes comprising about 25% of the Changwat production. Aggregate production data for 1968/69 for the Amphoe and the Changwat were not available at the time of field survey. Other upland crops cultivated in the amphoe in order of decending magnitude of the planted area were sugar cane (310 rais), green peas (139 rais), cotton (135 rais) and less than 100 rais each of native corn, ground nut, and native banana. Next to paddy, which is planted in lowland, kenaf is, therefore, the most important agricultural product in the economy of the Amphoe. Statistics on area planted with other upland crops, indicate that there are few upland crops which are cultivated in any significant amounts in the Amphoe. There are five private kenaf baling centres in Amphoe Chatturat and seven in Amphoe Muang (Chaiyaphum).

Organization and management

The Cooperative at Amphoe Chatturat is the only farmers' cooperative organization in Thailand which undertakes partial assembling,

---

*By road: Bangkok to Chatturat 331 kilometres
Chatturat to Chaiyaphum 38 kilometres.

+2.5 rais = 1 acre.

grading, and marketing of members' kenaf. The Cooperative was registered under the Cooperative Act in 1958 with the following objective:*

The objective of this Cooperative is to assist members in improving their economic status by

(1) Collecting and marketing all products of members with a view to getting better price;

(2) Acting as an agent in selling or buying on members' advice;

(3) Providing necessary tools for cultivating purposes and also securing other materials that members need;

(4) Buying outside products, changing them and selling them off again so as to help the economy of the Cooperative;

(5) Giving advice regarding plant improvement, cultivation and production to members;

(6) Explaining clearly about the purpose of the Cooperative and trade;

(7) Encouraging saving, self-help, and cooperation among members;

(8) Promoting the work of the Cooperative;

(9) Operating various kinds of work concerning rights in holding, building, buying and selling, exchanging, transferring or receiving, lease or rent, hire-purchasing, mortgage, etc., for the benefit of the Cooperative;

(10) Undertaking other necessary activities relevant to the above mentioned objectives.

It is clear from the nature of these activities that the Cooperative was registered to undertake a great variety of functions. However, the Society has restricted its activities to granting production and commodity loans and assembling, grading and marketing kenaf fibre. The two activities are interdependent because, usually, only those members who borrow money for kenaf production sell their kenaf through the Cooperative. The non-borrowing members are also required under the by-laws to

---

* A translation from The Agricultural Products Marketing Cooperative, Ltd., By-laws (original in Thai language).

sell all their kenaf through the Cooperative, but they seldom do so.

The liability of the members is limited to the amount equivalent to the value of shares held by them. In 1958, there were only 781 members but the membership increased to 1,539 on 31 March 1968. One family has one member and one vote irrespective of the number of shares held. There are 110 villages in the Amphoe but the membership is confined to 55 villages only. The membership is, however, open to those farmers who grow at least five rais of kenaf.

There is an annual meeting of the General Body which determines the policy of the Cooperative and elects a Committee of Management with nine members. This Committee meets about once every month to discuss membership applications, day to day management, applications for loans, annual financial accounts, etc. About 50% of the members attend General Body meetings while almost every member attends Committee of Management meetings. In comparison with similar cooperative institutions in other developing countries, these members seem to have more interest in the affairs of their Cooperative. Most members of the Committee of Management hold other offices in village, Tambon or Amphoe government or other institutions.

Loan operations of the Cooperative

The Cooperative grants loan to members provided they plant at least five rais of kenaf and can get three personal sureties to guarantee loan repayment. The Cooperative grants kenaf production loans upto one year and commodity loans for two months against kenaf brought to the Cooperative. Although there is no theoretical limit to the amount of the loans which can be granted to applicants, the Cooperative has developed a working formula that if a member's kenaf production is estimated 4,000 baht, he is given a loan upto about 2,000 baht. Table 1 indicates that the proportion of members applying for loan increased at a faster rate than the increase in membership during the last quinquennium (1964/65 to 1968/69). There were more applicants than the number of loans actually sanctioned each year. The average amount per person of the loans sanctioned varied between 1,324 baht and 1,838 baht. It is apparent that the loan activity of the Cooperative is much guided by kenaf prices. In the crop years 1964/65 to 1966/67 when kenaf prices were high, there

TABLE 1
LOAN OPERATIONS OF THE COOPERATIVE, 1964/65 TO 1968/69

	1964/65	1965/66	1966/67	1967/68	1968/69
Total members, no.	1,313	1,313	1,541	1,539	1,524
Loan applications, no.	383	467	605	793	-
Loan granted, no.	322	409	589	783	-
Amount loaned, baht	463,000	701,775	1,083,025	1,037,050	-
Average loan per person, baht	1,438	1,716	1,838	1,324	-
Principal repaid, baht	371,447	684,775	703,470	688,122	136,580
Principal recovery, %	80.2	97.6	65.0	66.4	
Principal in arrears, baht	91,553	52,725	377,630	348,918	-
Interest paid in time, baht	49,053	75,876	73,700	107,136	40,403
Interest recovery, %	81.7	92.3	61.9	71.9	
Interest in arrears, baht	10,986	6,317	45,315	41,871	-

Note: The Cooperative did not advance loan in 1968/69.
The year ends on March 31.

was an increase in the number of loan applications, in the number of loans, and the total amount of money lent. Recovery of the principal varied between 98 and 66%. One cannot rule out the possibility that part of the principal repaid during one year could be an arrear from the previous year. The rate of recovery was highest in 1965/66, which corresponded with the high kenaf prices obtained during the months of September to December, 1965. The rate of recovery, however, dropped by nearly one-third in later years due to the comparatively low prices obtained during those months. On the whole, the loan operations of the Cooperative remained reasonably satisfactory. To meet increasing demands for production credit, the Cooperative borrowed on long-term basis 900 thousand baht in 1964/65 and another 200 thousand baht in 1966/67 from USOM and the Royal Government of Thailand, respectively. Nevertheless, it did not advance any loan in 1968/69 due to the very low kenaf prices prevailing during the months February to May, 1968 (see Appendix II.) It will be seen from Table 1 and Appendix II that, in its lending operations, the Cooperative was mainly guided by prices prevailing in the pre-planting months (February to April) and their (prices) expectation during post-harvest period (September to December). The rate of recovery of loans depended, however, upon the level of prices prevailing in the post-harvest period.

Assembling and grading kenaf fibre

This is the most important service which the Cooperative provides to its members. Table 2 shows the quantities of fibre sold according to grade.

TABLE 2
QUANTITY OF KENAF SOLD BY THE COOPERATIVE, 1964/65 TO 1967/68

	1964/65	1965/66	1966/67	1967/68
Quantity supplied by members (kg)	270,000	454,382	771,848	426,780
Ratio of each grade (%)				
A[1/]	12.0	18.1	25.8	17.6
B	46.7	48.2	39.1	58.6
C	39.3	24.7	26.3	12.2
Cuttings	-	2.5	2.5	4.1
Tangles	-	2.4	2.2	3.5
Loss in handling	2.00	4.0	4.0	4.0
	100	100	100	100

[1/] For grade specifications of kenaf fibre refer to Appendix I, Agarwal 1970 cited earlier.

Note: Members did not sell through the Cooperative in 1968/69.

Table 2 reveals that the quantity of fibre sold by members through the Cooperative more than doubled between 1964/65 and 1966/67. During the calendar year 1966, the international prices were at the highest level. During the two crop years 1965/66 and 1966/67, the percentage of A grade fibre was also at its highest level. This gain in grade A fibre was achieved by a decrease in production of grade B. The members must have been more careful in harvesting and retting at the right stage to produce higher grade fibre in the expectation of higher prices. Generally, grade B fibre was produced in much higher proportion than grade A or C fibre. Loss in handling loose mixed fibre upto the loosely packed bale stage was about 4%. This analysis indicates that the Cooperative has the facility to handle at least 772 tonnes of fibre. The average price received by the Cooperative for various grades of fibre was as follows. This price was received in the market place.

TABLE 3
AVERAGE PRICE RECEIVED BY THE COOPERATIVE ACCORDING TO GRADE
(Price in baht per kilogramme)

Grade	1964/65	1965/66	1966/67	1967/68
A	2.45	3.76	3.84	2.28
B	2.30	3.35	3.48	1.86
C	2.10	3.02	2.90	1.32
Cuttings	-	2.40	2.52	1.00
Tangles	-	-	2.35	0.74
(Average)[1/]	2.89	3.17	3.18	1.77

[1/] Adapted from price statistics given in Appendix II. These are monthly wholesale prices for high grade kenaf averaged over twelve months.

Except for grade C, the average annual prices received were highest in 1966/67 and conform to the direction of average wholesale prices of high grade kenaf (see Appendix II). The Cooperative was able to sell even the tangled fibre, the lowest grade fibre, in 1966/67 at a good price of 2.35 baht per kilogramme, while the grade A fibre was sold for only 2.28 baht in 1967/68. The prices gradually rose to the 1966/67 level, but fell suddenly in 1967/68, thus causing great hardships to the kenaf producer.

Table 4 gives some measure of the economics of kenaf handling in terms of income and expenses of the Cooperative from this activity.

TABLE 4
INCOME AND EXPENSES FROM KENAF SALES
(in baht)

	1964/65	1965/66	1966/67	1967/68
Income from kenaf sales	662,135	910,114	1,416,909	792,300
Expenses:				
grading and loose baling	13,000	17,962	29,954	11,430
transport to market	22,161	100,711	62,195	54,616
labour	-	-	60,261	80,013
other	-	-	1,822	2,612
Total expenses	35,161	118,673	154,232	148,671
Net income	626,974	791,441	1,262,677	643,629
Expenses per kilogramme	0.13	0.26	0.20	0.35
Average sale price per kilogramme	2.45	2.00	1.84	1.86
Average net income per kilogramme	2.32	1.74	1.64	1.51

The statistics in Table 4 are based on the total quantities of mixed fibre which the Cooperative obtained from members. The average sale price was worked out in terms of mixed loose fibre. This is a price relevant to farmers because it is comparable to the price received by non-members from dealers. It is not based on the quantity of graded fibre sold to dealers which was obviously less than the total quantity of mixed fibre. This difference is mainly due to the quantity of fibre which was lost in processing and packing. Though in the year 1964/65 such loss was only two per cent, it was four per cent in the remaining years. This explains the high average sale price received for mixed fibre in 1964/65. The Cooperative received the highest price during 1965/66. The costs of processing and marketing were, however, highest during 1967/68. This was mainly due to relatively higher rates of wages paid in that year. The maximum income from sales was about 1.42 million baht during 1966/67, and the Cooperative also spent maximum amount 154 thousand baht in the same year on processing and marketing. It can be seen from Table 1 that the amount of loans advanced by the Cooperative was also the maximum, 1.08 million baht in 1966/67.

Financial management and background

An analysis of the 'profit and loss account' showed that, during the five years under study, the Cooperative made a profit ranging between 23,222 baht and 188,372 baht in the years 1964/65, 1965/66 and 1967/68. There were losses of 9,246 baht in 1966/67 and 27,898 baht in 1968/69.

The Profit and Loss Account of the Cooperative for the year ended 31 March 1969 is reproduced below:

Gross loss		24,655.54	Interest earned on production loans		40,403.06
Administrative expenses		32,176.40	Interest from banks		29,666.40
Payment for Coop. league		1,000.00	Building rent		12,514.00
Interest paid on revolving fund		44,450.75	Entrance fees		360.00
Depreciation			Share transfer fees		360.00
Building	190.02		Other revenues		1,781.00
Furnitures	1,159.96		Net loss drawn from reserve fund		27,898.21
Assets on hire purchase	9,350.00	10,699.98			
	baht	112,982.67		baht	112,982.67

One reason for loss is the larger amount of interest paid by the Cooperative (44,451.00 baht) on borrowed funds than the amount of interest (40,403.00 baht) received from members on production loans. Most of this interest was arrears from previous years, as the Cooperative did not advance loans during 1968/69. The Cooperative had, however, to pay interest on borrowed funds (revolving loan fund) in order to retain these funds in their hands. Another reason for loss was the non-cooperation of the members in selling their fibre through the Cooperative. The Cooperative made sizable profits on sales in previous years, namely 32,190 baht in 1964/65, 64,452 baht in 1965/66, 40,023 baht in 1966/67 and 59,373 baht in 1967/68. To maintain sound financial performance of the Cooperative, it is necessary that the activities of production loans and marketing members' produce are undertaken on an increasing scale. These are the main sources of income to the Cooperative.

III. PRODUCTION AND PROCESSING OF KENAF

Farm size in this study refers to the total land area cultivated* by one farm family under various crops during the agriculture year 1968/69, that is, from 1 April 1968, to 31 March 1969. Kenaf is planted during April/May and harvested during September/October. On an average, a member of the Cooperative planted an area of 24.3 rais under different crops during 1968/69. As an operational unit 24.3 rais, that is, 9.72 acres, will be considered a high average by Asian standards. From farm income point of view, however, this is a sub-standard size because of the unfavourable weather, water, soil conditions, and low level of farm technology found in the north-eastern region of Thailand. It can be seen from Table 5 that the cooperators in the year 1968/69 planted only 46% of their owned area. The balance of the owned area (about 31,400 rais) was left idle. The total planted area was less than the total owned area, only 54% of the owned area. This clearly reflects the high level of land ownership, but at the same time a very low intensity of land utilization. Those who operated smaller farms, on an average, cultivated a higher portion of their owned land; 71% utilization in the 12.5 to

*Throughout this study the words cultivated, planted, or operated have been used interchangeably. Few rais were double cropped.

TABLE 5
EXTENT OF IDLE LAND IN 1968/69
(Area in rai)

Farm size (rai)	Number of farms	Owned area		Planted area	Per cent of Col. (4) to (3)	Per cent of Col. (5) to (3)
		Total	Planted			
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2.5 to less than 12.5	248	2,046	1,449	4,779	70.8	233.6
12.5 to less than 22.5	186	3,328	1,596	2,278	48.0	68.5
22.5 to less than 32.5	207	5,643	2,708	2,976	48.0	52.7
32.5 to less than 42.5	124	4,506	2,594	2,594	57.6	57.6
42.5 and above	517	42,622	18,427	18,531	43.2	43.5
Total	1,282	58,145	26,774	31,158	46.1	53.6
(Per cent)						

less than 12.5 rais' group, while only 43% of owned land planted in the '42.5 rais and above' group. Field enquiries revealed that much of the idle land is culturable and should await technological innovation to allow profitable land-use.

The composition of the area planted (Table 6) presents an interesting picture of the operated farm land. Of the total operated land, 86% was owned and only four per cent rented. About 10% was operated on some kind of kinship basis, that is, father's, father-in-law's, brother's or mother's land was cultivated. Such land tenure types are possible because there exist large areas of uncultivated owned land with most farm-families, which allow near relatives to cultivate idle land free of charge. In smaller farm-size groups, 'kinship operation' played an important role because nearly 60% of land was operated on this basis. From the data presented in Table 6, it appears that only 71% of the planted area was owned in the '2.5 to less than 12.5 rais' group. It is, however, clear from Table 5 that cooperators in this group also left 31% of their owned land idle. The owned land left idle is hard to bring under cultivation with the quality and quantity of resources that are available to a small (size) farmer. He must, however, supplement his income by operating additional land on a 'kinship' basis. Such arrangement does not normally demand the operator (farmer) to pay for the use of land. In the '42.5 and over rais' group, on the other hand, nearly

TABLE 6
COMPOSITION OF AREA PLANTED IN 1968/69
(Area in rai)

Farm size (rai)	Composition of the planted area							Per cent
	Owned	Rented in	Crop share	Other	Irrigated	Upland	Total	
2.5 to less than 12.5	1,449	422	62	2,846	21	1,372	4,779	15.3
(percent)	(30.3)	(8.8)	(1.3)	(59.6)	(0.4)	(28.7)	(100)	
12.5 to less than 22.5	1,596	579	-	103	-	914	2,278	7.3
(per cent)	(70.1)	(25.4)	-	(4.5)	-	(40.1)	(100)	
22.5 to less than 32.5	2,708	103	-	165	413	1,199	2,976	9.6
(per cent)	(91.0)	(3.5)	-	(5.5)	(13.9)	(40.3)	(100)	
32.5 to less than 42.5	2,594	-	-	-	-	1,571	2,594	8.3
(per cent)	(100)	-	-	-	-	(60.6)	(100)	
42.5 and above	18,427	103	-	-	-	8,909	18,530	59.5
(per cent)	(99.4)	(0.6)	-	-	-	(48.1)	(100)	
Total	26,774	1,207	62	3,114	434	13,965	31,157	100
(Per cent)	(85.9)	(3.9)	(0.2)	(10.0)	(1.4)	(44.8)	(100)	

all the operated land was owned, although only 43% of owned land was cultivated. Crop sharing is nearly non-existent as a practice of land tenure.

The survey indicates that less than one-and-half per cent of the planted area had any kind of irrigation facility. The kenaf grower must depend upon the vagaries of the monsoon for good harvests. The agricultural land has an undulating terrain of 'low' and 'up' land. The low land can store rain water for a longer period and is generally more fertile. This land is invariably reserved for cultivating low-land paddy. In a few cases, two crops (double cropping) were planted, one after the other, in one year on low-land. The share of up-land in the planted area was nearly half in 1968/69. This ratio was higher in 1966/67 and 1967/68 when large areas of upland were reclaimed for cultivation of kenaf. The 1966/67 was the year of boom for kenaf production and export as a result of very favourable international markets; whereas, large areas of upland were abandoned in 1968/69 when prospects for kenaf prices were low.

The members planted 150, 190 and 69 thousand rais with kenaf during 1966/67, 1967/68 and 1968/69, respectively. This implies that an estimated area of about 121,000 rais could not be planted in 1968/69 due

to the drop in kenaf prices. There is hardly any proven substitute crop that the members could have cultivated on this abandoned area.

Table 7 shows that the area planted with kenaf per farm dropped from 14.8 rais in 1967/68 to 5.4 rais in 1968/69. Kenaf production per farm was the highest 2,480 kg in 1966/67 and dropped to 1,090 kg in 1968/69. The production per rai in 1968/69 was, however, higher than that of 1967/68. About 200 kg per rai was the average production of retted kenaf fibre in 1968/69.

TABLE 7
AREA PLANTED AND PRODUCTION OF KENAF, 1966/67 TO 1968/69

	1966/67	1967/68	1968/69
Area planted with kenaf per farm (rai)	11.8	14.8	5.4
Production of kenaf per farm (10 kg)	248	242	109
Production of kenaf per rai (10 kg)	21	16	20

The use of improved varieties of seed supplied by the Agricultural Department could raise the level of production of Thai kenaf. The survey revealed (Table 8) that 84% of the cooperators used their own seed, while 16% bought from merchants. No farmer bought seed from any government organization. The Cooperative Society could provide a very useful service to its members by securing an improved variety of kenaf seed from the Department of Agriculture and distributing it to members. The Cooperative could also make some marginal profit by supplying improved seeds to its members. The present practice of using home-grown seed year after year, perhaps without proper selection, leads to lower yield of kenaf fibre per rai. In the group '22.5 to less than 32.5 rais', all the cooperators used home-grown seed, while only 55% used in the '12.5 to less than 22.5 rais' group.

Given favourable international markets, the net farm income could be raised with the use of fertilizers and manures in crops using improved varieties of seeds and planting materials. The cooperators planted paddy, kenaf, water melon, peas, beans, peanuts (ground nuts) and a few varieties

TABLE 8
SOURCES OF KENAF SEED (1968/69)

Farm size (rai)	Number of farmers reporting		
	Own farm	Merchant	Total in the group
2.5 to less than 12.5	227	21	248
(per cent to total)	(91.7)	(8.3)	(100)
12.5 to less than 22.5	103	83	186
(per cent to total)	(55.4)	(44.4)	(100)
22.5 to less than 32.5	207	-	207
(per cent to total)	(100)	-	(100)
32.5 to less than 42.5	103	21	124
(per cent to total)	(83.3)	(16.7)	(100)
42.5 and above	434	83	517
(per cent to total)	(84.0)	(16.0)	(100)
Total	1,074	208	1,282
(Per cent)	(83.9)	(16.1)	(100)

of vegetables. It will be seen from Table 9 that less than four per cent of the total planted area was fertilized and/or manured in 1968/69. The larger size farms used more fertilizer. The product/fertilizer price ratios in case of rice and kenaf the two major crops, discouraged use of fertilizer at the present level of farm technology. Provided there is a proven economic advantage in fertilizer application, the Cooperative could also supply fertilizer to members at competitive rates. The Co-operative has not yet considered taking up the supply of improved farm inputs to members as part of its regular functions.

TABLE 9
USE OF FERTILIZER AND MANURE (1968/69)

Farm size (rai)	Total area (rai)				Per cent of Col. (3) to Col. (2)	Per cent of Col. (4) to Col. (2)	Per cent of Col. (5) to Col. (2)
	Planted	Manured	Fer-tilized	Manured and fer-tilized			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2.5 to less than 12.5	4,779	21	826	-	0.4	17.3	-
12.5 to less than 22.5	2,278	-	-	-	-	-	-
22.5 to less than 32.5	2,976	186	-	-	6.3	-	-
32.5 to less than 42.5	2,594	21	10	10	0.8	0.4	0.4
42.5 and above	18,531	35	21	-	0.2	0.1	-
Total	31,158	283	858	10			
(Per cent)					(0.8)	(2.7)	(0.3)

Soil fertility experiments conducted in Changwat Chaiyaphum on local kenaf varieties in 1968 revealed that a N: $P_2 O_5$: $K_2 O$ fertilizer applied in the ratio of 25:0:0 gave the highest additional return of 293 baht for each 100 baht spent on the treatment. The yield per hectare was, however, highest with 50:75:50 treatment but the return per 100 baht spent on treatment was only 263 baht. These experiments indicate the potential gain which is possible through right type of fertilization in kenaf.*

The survey of retting facilities available to the cooperators indicated (Table 10) that there is a close relationship between the distance of the retting facility and the quality of kenaf retted. Only about five per cent of the retted fibre was reported as good quality. All good fibre was produced on farms which had retting facilities within five kilometres of the farm. The largest quantity of good quality fibre (61.3%) was produced on farms which had retting facility within one kilometre. Out of a total of 1,282 cooperators in the Amphoe, only 62 or less than five per cent produced good quality fibre. Two-thirds of the (62) farms had retting facilities within one kilometre. Although about 76% of all kenaf was retted within five kilometres, yet the good quality fibre was only about five per cent. This suggests that besides nearness of the retting facility, other factors, such as nature of facility (river, pond, etc.) and quantity of water in relation to quantity of kenaf also affect the quality of retted kenaf.

TABLE 10
DISTANCE OF FACILITY AND QUALITY OF RETTED KENAF (1968/69)

Distance of retting water (km)	Quantity retted in 10 kg					
	Total	Per cent	Good quality	Per cent	Per cent of Col. (4) to Col. (2)	Number of farmers reporting good quality
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Up to 1	88,302	64.6	3,927	61.3	4.5	41
2 - 5	15,358	11.2	2,480	38.7	16.2	21
6 - 9	16,433	12.0	-	-	-	-
10 - 15	16,536	12.1	-	-	-	-
Total	136,629	100	6,407	100	4.7	62

*FAO, UNDP/SF (1969).—Soil fertility research project in Thailand. Technical Report No. 2 p. 54. (Bangkok.)

An analysis of different sizes of farms in relation to the distance of retting facility (Table 11) indicates that, on the whole, the larger farms have better retting facilities. In the group '42.5 rais and above', about 60% of the members reported retting facility within five kilometres, whereas the percentage for smaller farms was lower with the exception of the '2.5 to less than 12.5 rais' group where 75% of the farmers had retting facilities within 5 kilometres. Only the largest farms '32.5 rais and above' had to use retting facilities as far away as 10 to 15 kilometres. On the whole, about 44% of the farmers had retting facilities within one kilometre and another 16% within between two and five kilometres. No farmer travelled more than 15 kilometres to rett his kenaf.

TABLE 11
DISTANCE OF RETTING FACILITY (1968/69)

Farm size (rai)	Number of reports on distance of facility in km				
	Up to 1	2 - 5	6 - 9	10 - 15	Total in the group
2.5 to less than 12.5	124	62	-	-	248
(per cent to total)	(50.0)	(2.5)	-	-	(100)
12.5 to less than 22.5	62	41	21	-	186
(per cent to total)	(33.3)	(22.0)	(11.3)	-	(100)
22.5 to less than 32.5	41	62	-	-	207
(per cent to total)	(19.8)	(30.0)	-	-	(100)
32.5 to less than 42.5	41	21	-	21	124
(per cent to total)	(33.1)	(16.9)	-	(16.9)	(100)
42.5 and above	289	21	41	21	517
(per cent to total)	(55.9)	(4.1)	(7.9)	(4.1)	(100)
Total	557	207	62	42	1,282
(Per cent)	(43.5)	(16.1)	(4.8)	(3.2)	(100)

No estimates could be made of the quantities of kenaf retted in different types of retting facility by farmers in various farm size groups. The difficulty is that many farmers used more than one type of facility and could not give independent estimates. It will be seen from Table 12 that, in every farm size group, the farmers used more than one type of retting facility. It is not, however, possible on the basis of this analysis to estimate the number of farmers who used more than one type of retting facility. On an average, nearly one-fourth of the cooperators had their own pond and another one-fourth retted in a lake or a community

TABLE 12
TYPE OF RETTING FACILITY AVAILABLE (1968/69)

Farm size (rai)	Number of farmers reporting retting in				
	Own pond	Neighbour's pond	Lake or community pond	River	Total in the group
2.5 to less than 12.5	62	-	41	62	248
(per cent to total)	(25.0)	-	(16.5)	(25.0)	(100)
12.5 to less than 22.5	41	-	41	62	186
(per cent to total)	(22.0)	-	(22.0)	(33.3)	(100)
22.5 to less than 32.5	21	62	41	21	207
(per cent to total	(10.1)	(29.9)	(19.8)	(10.1)	(100)
32.5 to less than 42.5	41	-	62	21	124
(per cent to total)	(33.1)	-	(50.0)	(16.9)	(100)
42.5 and above	165	21	145	83	517
(per cent to total)	(31.9)	(4.1)	(28.0)	(15.9)	(100)
Total	331	83	330	249	1,282
(Per cent)	(25.8)	(6.5)	(25.8)	(19.3)	(100)

facility. About one-fifth used the running water of a river. With the current facilities, the farmers reported production of only five per cent good quality fibre. It is evident that the current retting facilities are inadequate for producing high quality kenaf fibre. Provision of improved retting facilities will be administratively and financially difficult for the Cooperative to undertake, but there is a great potential for the Government to divert its attention to this kind of development effort. Some scattered attempts to provide retting facilities have been made by Government and private organizations, but the impact so far has been insignificant. According to one estimate,* the construction cost of an improved type "B" 6-tank retting centre with soil cement lining is 24,800 baht if farmers provide self-help labour. The full cost is, however, 34,000 baht. It is estimated that, in each six-month season, the stalks from 120 rais of kenaf can be retted in a six-tank centre. One such centre occupies an area of 25 by 6 metres.

*"Improved kenaf retting tanks for North-east Thailand" by Erwin J. Shelton, USOM/Thailand, Bangkok, 1969.

The data analysed in this chapter bring to light some important characteristics of a kenaf farmer who is also a member of the Cooperative Society. Farmers left large areas of owned farm land uncultivated in 1968/69. The area of owned land was much larger than the total area cultivated under all crops. Of the total area planted in 1968/69, 45% was upland and little was under irrigation. Although about 86% of total planted area was owned, the ownership ratio was lower on smaller farms. Members cultivating 42.5 rais or more shared 60% of the total planted area. Cultivation on 'kinship' basis was fairly common (10% of planted area) among the kenaf growers. The International kenaf prices caused serious contraction in the area planted with kenaf. Between 1967/68 and 1968/69, nearly 63% or 121,000 rais were withdrawn from kenaf cultivation and left idle in the absence of economically substitutable crops. One can imagine the extent of loss in cash earnings to the kenaf growers during these two succeeding years. Nearly 84% of the members used their own kenaf seed. No one could obtain improved seed. Hardly four per cent of area planted with all types of crops was manured and/or fertilized. Nearly 60% of the members had some kind of facility to rett fibre within five kilometres of their farms. Only about 26% had their own ponds for retting. The proportion of members owning ponds was higher in larger size farm groups. Members reported only about five per cent of the retted fibre as being of 'good' quality. Less than five per cent of the members produced good quality fibre. All the good quality fibre was produced by those who had retting facility upto five kilometres. However, not all fibres retted within five kilometres were considered to be of good quality.

IV. MARKETING KENAF AT FARM LEVEL

Under the by-law of the Agricultural Products Marketing Cooperative, Ltd., all members must market their kenaf through the Cooperative. This chapter presents an analysis of survey data regarding the quantity of kenaf fibre marketed by the cooperators per farm and per rai, through various marketing channels and at various places.

It will be seen from Table 13 that, from the point of quantity of kenaf marketed, 1968/69 was a poor agricultural year. The maximum quantity was sold in the year 1966/67 when world market prices were at

TABLE 13
QUALITY OF KENAF SOLD DURING THE PERIOD 1966/67 TO 1968/69
(Quantity in 10 kg)

Farm size (rai)	Quantity sold (total)			Quantity sold (mixed)		
	1968-69	1967-68	1966-67	1968-69	1967-68	1966-67
2.5 to less than 12.5	15,709	32,266	80,737	15,709	32,266	80,737
(per cent of mixed)				(100)	(100)	(100)
12.5 to less than 22.5	16,019	26,726	35,470	16,019	26,726	35,470
(per cent of mixed)				(100)	(100)	(100)
22.5 to less than 32.5	18,107	36,152	37,413	18,107	36,152	37,413
(per cent of mixed)				(100)	(100)	(100)
32.5 to less than 42.5	19,326	28,938	39,273	19,326	28,938	39,273
(per cent of mixed)				(100)	(100)	(100)
42.5 and above	76,810	166,910	147,026	76,810	165,877	142,892
(per cent of mixed)				(100)	(99.4)	(97.2)
Total	145,972	290,992	339,919	145,971	289,959	335,785
(Per cent)				(100)	(99.6)	(98.8)

their highest and the minimum in 1968/69 when the prices were at about their lowest. It is evident from the table that, in 1966/67 and 1968/69, the cooperators in the '2.5 to less than 12.5 rais' group sold 23.8 and 10.8% of the total sales while, during the same period, the cooperators in the '42.5 rais and above' group sold 43.3 and 52.6% respectively. It is clear, therefore, that the operators of small farms did better in the year of high prices by selling proportionately more kenaf than did the operators of large size farms. The major portion of sales in 1968/69 was contributed by the large farms when the international kenaf prices were low. If production per rai did not change very much during the period 1966/67 and 1968/69, it can be safely concluded that the operators of small farms withdrew relatively larger areas out of kenaf cultivation than the operators of large farms. This higher degree of inflexibility was perhaps caused by high overhead costs involved in larger size farms, which makes quick shifts in cropping pattern rather difficult.

Another interesting aspect of farm sales is the fact that nearly all kenaf in all the three agricultural years was sold as loose mixed fibre. After retting, a batch can have different grades of kenaf fibre, but the cooperators did not care to grade their produce. Only in the large farm size group '42.5 rais and above', was a negligible proportion

of kenaf fibre graded in some manner. However negligible the proportion of graded kenaf, it is very interesting to note that the largest proportion was graded in the year 1966/67. This leads to the conclusion that, given the incentive of higher prices, the farmers, at least the bulk producers, pay greater attention to the quality of fibre produced. Some agricultural economists working in the north-eastern region believe that the present marketing institutions do not pass the benefit of grade premiums onto the producer. This is especially true for farmers who have relatively small quantities as marketable surplus. Farmers with large quantities to sell can have direct contact with kenaf balers or wholesale dealers and thus manage to get better prices for higher grades.*

It will be observed from Table 14 that, on the small farms of '2.5 to less than 12.5 rais', the sales per farm dropped at the fastest rate during the period 1966/67 to 1968/69. The rate was slowest at the largest farms. On an average, sales per farm were 2,450 kg in 1966/67 against 1,140 kg in 1968/69. The table further shows that sales per rai of area planted with kenaf were also higher in 1966/67 (220 kg) against that of 1968/69 (200 kg). Sales per rai were lowest (160 kg) in 1967/68. Sales per farm, on an average, were higher when the average kenaf prices were also higher.

TABLE 14
QUANTITY OF KENAF SOLD PER FARM AND PER RAI
(Quantity in 10 kg)

Farm size (rai)	Quantity sold per farm			Quantity sold per rai		
	68-69	67-68	66-67	68-69	67-68	66-67
2.5 to less than 12.5	63	130	226	19	16	28
12.5 to less than 22.5	86	144	191	22	21	30
22.5 to less than 32.5	87	175	181	23	29	23
32.5 to less than 42.5	156	233	317	24	35	23
42.5 and above	149	323	284	17	13	17
Overall average	114	227	265	20	16	22

*The following will illustrate price differentials between grades of kenaf fibre:

Grade	1969 f.o.b. £ (Bangkok)	1966 c.i.f. £ (London)	Remarks
A	79.15.0	97.05.0	Price quoted are average
B	72. 0.0	90.15.0	monthly prices for March and
C	62.05.0	77.10.0	April in £ per long tonne.

The village dealer forms the most important link in the marketing of kenaf, even for those farmers who are members of the Cooperative (Table 15). In the year 1968/69, nearly three-fourths of the kenaf fibre was sold to the village dealer; and about nine per cent to the Amphoe dealer. In some cases, the Amphoe dealer and the village dealer was the same person when the farmer lived in the Amphoe village. Surprisingly, farmer in the small size group, '2.5 to less than 12.5 rais' sold only 53% to village dealers. They sold as much as 39% to 'others'. 'Others' includes relatives, friends, nearby jute mills or agents who could not be identified as village or Amphoe dealers. Although there were five baling centres in Amphoe Chatturat, little more than 2% of kenaf fibre was directly sold to balers. This indicates that the middleman plays an important role between the kenaf producer and the baler. It was hypothesized earlier in this chapter that operators of large farms can manage to get better prices for their fibre because they manage to sell direct to kenaf balers or wholesalers. Table 15 confirms that only operators in the '42.5 rais and above' group sold to balers. The co-operators did not sell to Changwat dealers or to the Cooperative Society. This analysis indicates that the members of the Cooperative Society find it more convenient to sell their kenaf to the next door village dealer. Under such circumstances, the Cooperative faces tough competition from

TABLE 15
MARKETING CHANNELS AND QUANTITIES SOLD IN 1968/69
(Quantity in 10 kg)

Farm size (rai)	Quantity sold to				Total
	Village dealer	Amphoe dealer	Baler	Others	
2.5 to less than 12.5	7,028	1,034	-	5,168	13,230
(per cent to total)	(53.1)	(7.8)	-	(39.1)	(100)
12.5 to less than 22.5	15,813	1,757	-	-	17,570
(per cent to total)	(90.0)	(10.0)	-	-	(100)
22.5 to less than 32.5	8,805	-	-	-	8,805
(per cent to total)	(100)	-	-	-	(100)
32.5 to less than 42.5	13,746	4,134	-	-	17,880
(per cent to total	(76.9)	(23.1)	-	-	(100)
42.5 and above	46,094	4,134	2,811	14,469	67,508
(per cent to total)	(68.3)	(6.1)	(4.2)	(21.4)	(100)
Total	91,486	11,059	2,811	19,637	124,993
(Per cent)	(73.2)	(8.7)	(2.3)	(15.7)	(100)

private village dealers. Cooperators' views on selling to the Cooperative will be discussed later in this study. Of course, the very low level of kenaf production in the year 1968/69 could be one important reason for selling to the nearby dealer and not to the Cooperative Society. The fact that the Cooperative did not grant loans in 1968/69 due to declining prices also explains why the members did not sell to the Cooperative.

A partial answer to the situation observed in previous paragraph is found in Table 16. The cooperators sold 77% of the fibre at their residences. It was noted earlier in Table 15 that village dealers bought about 73% of farmers' produce. It is clear, therefore, that most of the dealers went to individual farm houses to purchase kenaf and provided transport from farms to assembling centre. Even those members who cultivated large areas sold at least three-fourths of their fibre at their residences, mostly to village dealers. Nearness of the buyer played an important role in the selection of the marketing channel. This was perhaps an important factor which went against selling fibre to the Cooperative. It came out in the discussion with the Management Committee that the Cooperative had no transport facility to collect kenaf from members' residences. The management is convinced that the scale of operation would be significantly enlarged if the Cooperative had funds to own a motor truck to collect fibre from farms/residences.

TABLE 16
QUANTITY OF KENAF "SOLD AT" (PLACES) 1968/69
(Quantity in 10 kg)

Farm size (rai)	Sold at				Total	Per cent
	Home	Village	Amphoe	Others		
2.5 to less than 12.5	7,028	-	1,034	5,167	13,229	10.6
(per cent to total)	(53.1)	-	(7.8)	(39.1)	(100)	
12.5 to less than 22.5	16,639	620	310		17,569	14.1
(per cent to total)	(94.7)	(3.5)	(1.8)		(100)	
22.5 to less than 32.5	8,805	-	-		8,805	7.0
(per cent to total)	(100)	-	-		(100)	
32.5 to less than 42.5	13,746	-	4,134		17,880	14.3
(per cent to total)	(76.9)	-	(23.1)		(100)	
42.5 and above	50,228	-	9,012	8,268	67,508	54.0
(per cent to total)	(74.5)		(13.3)	(12.2)	(100)	
Total	96,446	620	14,490	13,435	124,991	100
(Per cent)	(77.2)	(0.5)	(11.6)	(10.8)	(100)	

Nearly 12% of the fibre was sold at Amphoe towns and 11% at various other places. It is most likely that 9% of the fibre sold to Amphoe dealers (Table 15) was sold at Amphoe towns. More than half of the total fibre sales originated on the largest farms. The smallest farms contributed about 11% to total sales. On these farms, relatively small portions were sold at home or farm.

It can be concluded from the analysis presented in this chapter that the members did not grade their fibre before selling. In 1966/67 when prices were very high, only members with the largest size farms graded about three per cent of the total quantity sold. Nearly three-fourths of the fibre was sold to village dealers in 1968/69. Only 2.3% was sold direct to balers. Members did not sell to the Cooperative. Even in the presence of the credit and marketing cooperative, private dealers took away the lion's share of the market. More than half of the quantity sold was supplied by the operators of the largest farms. The smallest farms only contributed about 11%. Operators of small farms withdrew relatively larger areas out of kenaf cultivation than the operators of large farms as a result of low kenaf prices.

V. AGRICULTURAL CREDIT TO MEMBERS OF THE COOPERATIVE SOCIETY

This chapter presents an analysis of the amounts borrowed, rates of interest paid, and sources of agricultural credit available to the cooperators. One would normally assume that Cooperative loans would have played a significant role in meeting the credit needs of the kenaf growers, especially those of the cooperators.

It will be seen from Table 17 that, out of 1,282 cooperators, only 455 or 36% reported that they borrowed money during 1968/69. The Co-operatives were the most important source of credit, as they financed 50% of the borrowers and met 36% of the total credit needs. Next in importance were friends and relatives who financed about 34% of the credit needs and about 18% of the borrowers. Although about 23% borrowed from merchants, this source provided only about nine per cent of total credit needs. The Agriculture and Cooperative Bank and 'other' sources lent to a very small proportion of borrowers and supplied about ten and twelve per cent of credit needs respectively. The Agriculture and

TABLE 17
SOURCE OF FARM CREDIT AND PURPOSE OF LOAN (1968/69)

Source of credit	Number of members borrowed	Amount borrowed for (in baht)				
		Farm	Family	Both	Total	Per cent
Friends and relatives	83	-	248,031	109,547	357,578	33.8
(per cent to total)	-	-	(69.4)	(30.6)	(100)	-
Merchants	103	57,874	12,403	20,669	90,946	8.6
(per cent to total)	-	(63.6)	(13.6)	(22.7)	(100)	-
Cooperatives	227	92,392	24,803	265,566	382,761	36.1
(per cent to total)	-	(24.2)	(6.5)	(69.3)	(100)	-
Agri. and Coop. Bank	21	-	-	103,346	103,346	9.8
(per cent to total)	-	-	-	(100)	(100)	-
Other	21	124,015	-	-	124,015	11.7
(per cent to total)	-	(100)	-	-	(100)	-
Total	455	274,281	285,237	499,129	1,058,646	100
(Per cent)	-	(25.9)	(27.0)	(47.1)	(100)	(100)

Cooperative Bank played a minor role as a supplier of credit to the members of the Cooperatives. This Bank prefers to advance loans directly to farmers, preferably to those who are not members of a cooperative credit society. It is interesting to note that merchants, who normally play a dominant role in supplying farm credit in developing economies, remained relatively unimportant. This was mainly due to the presence of the cooperative organizations. The average amount borrowed by cooperators from friends and relatives, merchants, Cooperatives, the Agriculture and Cooperative Bank and 'other' sources was 4,308, 883, 1,682, 4,921 and 5,905 baht respectively.

Viewing the matter from another angle, the cooperatives took care of only 36% credit needs of the farmers. The farmers had to depend heavily on outside sources to meet the remaining 64%. If the outside sources also advanced credit on the understanding that the farmer would repay the loan by selling kenaf (the only important cash crop) to them or through them, then the cooperatives had minor control over the sale of kenaf and consequently a role in providing credit at reasonable terms and in helping farmers to secure reasonable price for kenaf. It was noted from Table 15 that no farmer sold fibre to the cooperatives during 1968/69. The lending funds of the cooperatives need to be expanded to cover a larger proportion of the farm credit needs. Every year, the

Cooperative has more applicants requesting loans than the Cooperative can manage to satisfy with the limited funds. It will be correct to assume that the other kenaf growers in north-eastern Thailand, where there are no similar cooperatives, are in a worse situation as they must depend entirely upon outside (non-cooperative) sources to meet their credit needs. Unless the farmers can come out of the clutches of private money lenders in the rural areas, there is little hope that various government and semi-government programmes of socio-economic development undertaken in the north-eastern region will achieve the goal of development planning. Institutional changes are indispensable for raising the income of kenaf producers. Both the production and the consumption loans are important for raising farm income at least in the initial stages of agricultural development. It will be seen that a little more than 25% was borrowed specifically for each production and consumption. Nearly 47% was for the combined purpose of farm and family. It is clear, therefore, that a large portion of borrowed funds - at least half - was spent to meet household current expenditure. There is hardly any system of supervised credit in force in the area to ensure that the production credit is used to raise farm productivity. Nearly 64% of the merchants' credit was meant for farm production, while the cooperatives advanced only 24% for that purpose. It appears that the money lenders preferred to lend largely for production purposes so that recovery would be easier or for some other reason. All the money borrowed from friends and relatives was for the family or for the family and the farm; no loan was made for production only. In the absence of farm and home plans, it is impossible either to assess credit needs objectively or to ensure that borrowed funds are used for the right purpose.

Table 18 shows the amounts of money borrowed by the cooperators at various rates of interest from each source. More than half (53%) of the amount was borrowed at the rate of one per cent interest per month. About 29% was interest-free and 16% was borrowed at the monthly rate of five per cent or more. The cooperatives, including the Agriculture and Cooperative Bank, supplied 56% of the one per cent credit, while the rest was shared between friends and relatives and the 'other' sources of credit. The cooperatives also supplied 53% of the interest-free credit, while the rest was shared between merchants and friends and

TABLE 18
MONEY BORROWED AT DIFFERENT INTEREST RATES (1968/69)
(in baht)

Source of credit	Monthly rate of interest rates (1968-69)							
	0	1	2	3	4	5	More than 5	Total
Friends and relatives	124,016	124,016	-	-	-	6,201	103,346	357,579
(per cent to total)	(34.7)	(34.7)	-	-	-	(1.7)	(28.9)	(100)
Merchant	20,669	-	-	12,402	-	33,072	24,803	90,946
(per cent to total)	(22.7)	-	-	(13.6)	-	(36.4)	(27.3)	(100)
Cooperatives	165,354	217,407	-	-	-	-	-	382,761
(per cent to total)	(43.2)	(56.8)	-	-	-	-	-	(100)
Agri. and Coop. Bank	-	103,346	-	-	-	-	-	103,346
(per cent to total)	-	(100)	-	-	-	-	-	(100)
Other	-	124,016	-	-	-	-	-	124,016
(per cent to total)		(100)	-	-	-	-	-	(100)
Total	310,039	568,785	-	12,402	-	39,273	128,149	1,058,648
(Per cent)	(29.3)	(53.4)	-	(1.2)	-	(3.7)	(12.1)	(100)

relatives. The highest interest-rate was demanded by merchants and friends and relatives; the former accounted for 35% of the highest interest-rate loans.

It appears that 'friends and relatives' are an important source of credit both for inexpensive as well as very expensive credit. Of the total amount lent by friends and relatives, 35% was interest-free, another 35 at one per cent (or 12% per annum) and the remainder (30%) was lent at five per cent or more (or more than 60% per annum). Merchants supplied most of their credit at high rates of interest. They supplied 23% interest-free, 14% at three per cent per month (or 36% per annum) and about 63% at the high rate of five per cent a month or more. At five per cent per month, the merchants charged interest at the annual rate of 60%. With the prevailing low rates of return in Thai agriculture it should be impossible for the kenaf growers to repay such high-interest loans. This results into chronic indebtedness and its consequences.

In an ad hoc survey like this it is difficult to guarantee reliability of the data collected on such personal matters as the source of credit, amount, terms, and arrears of loans. Table 19 shows the arrears of loans according to source of credit. Out of 455 borrowers, 310 or 68% reported arrears. They failed to repay the principal and interest

TABLE 19
ARREARS OF LOAN ACCORDING TO SOURCE OF CREDIT (1968/69)

Source of credit	Number of farmers reporting			Amount in baht		
	Borrowers	Arrears	Per cent of Col. (3) to Col. (2)	Borrowers	Arrears	Per cent of Col. (6) to Col. (7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Friends and relatives	83	62	75	357,578	211,868	59.3
Merchant	103	41	40	90,946	40,307	44.3
Cooperatives	227	186	82	382,761	285,246	74.5
Agri. and Coop. Bank	21	-	-	103,346	-	-
Other	21	21	100	124,015	124,015	100
Total	455	310		1,058,646	661,435	
(Per cent)			(68.2)			(62.5)

according to terms and conditions of the loan. Of the total amount borrowed in 1968/69, 63% was in arreas. Both in terms of the number of borrowers and the amount, the level of arrears was very high. After 'others' the rate of arrears was the highest for cooperatives both in terms of borrowers and the amount borrowed. Although the cooperatives advanced 100% of credit at the cheapest rate of one per cent per month or even interest-free; yet, for whatever reason, they miserably failed in collecting the principal and the interest on their loans from the cooperators. The next source of credit with a high rate of arrears was the 'friends and relatives' with 75 and 59% arrears in terms of borrowers and amount respectively. 'Friends and relatives' advanced nearly 110 thousand baht at the rate of 5% or more. The amount of arrears was 212 thousand baht. Even if one assumes that all of the high-interest credit was in arrears, there was nearly an equal amount (102 thousand baht) in arrears from the low-interest loans. Both in terms of the borrowers and the amount, the merchants had the lowest rates of arrears, which were 40 and 44% respectively. Assuming that most of the arrears might have occurred in the high-interest credit, the merchants advanced 50 thousand baht at the rate of 5% or more but the amount of arrears was only 40 thousand baht. It can be concluded that the merchants succeeded in recovering not only one hundred per cent of the low-rate credit but also part of the high-interest credit. They proved to be more skilled bankers than the cooperative organizations. It emerges from this analysis that

the private bankers can afford to advance high-interest credit to farmers because they know how to recover principal and interest from them.

It is clear from the analysis presented in this chapter that, in the presence of cooperative credit organizations, the merchants played a relatively less important part in the supply of credit. The cooperatives, including the Bank for Agriculture and cooperatives, supplied nearly 46% of borrowed funds. Nearly half (47%) of the amount was borrowed for the combined purpose of the farm and the family and only about 26% was borrowed in the name of farm or production loans. The cooperative credit organizations supplied bulk of low-interest credit, while merchants and the 'friends and relatives' shared the high-interest credit. Nearly 29% of the total was loaned interest-free. The rates of arrears were very high in terms of number of borrowers (68%) and the amount (63%). The cooperatives which advanced most of the credit at one per cent or interest-free had the highest rates of arrears also. The merchants who provided most of credit at high rates of interest had low rates of arrears. Merchants provided most of their credit (63%) for farm or production purpose. The cooperatives provided only 24% for this specific purpose. It would appear that most of the merchant-credit is in the form of loans taken on the promise that the merchant will have the first claim on the sale proceeds of the agricultural produce.

The Cooperative should reconsider its policy of not granting production loans when prices are low in the light of heavy overhead interest costs it has to pay in order to keep the money it has borrowed for revolving loan fund. Perhaps, the loans should be granted on stricter security when kenaf prices are expected to be low.

VI. MODEL FOR A VERTICALLY INTEGRATED COOPERATIVE ORGANIZATION

It is proposed to discuss the economic advantages that might accrue to the Agricultural Products Marketing Cooperative, Ltd., if it were to integrate its marketing activities vertically. Vertical integration in the context of the Cooperative Society will mean combining activities such as collection of mixed kenaf from farmers, assembling and pooling mixed kenaf, sorting it into different grades according to specifications, cutting, inspection, hackling, boxing, weighing, mechanically pressing,

roping, labelling, marking and storing or transporting to exporters in Bangkok to sell at mutually acceptable prices. The present practice of the Cooperative Society is limited to assembling and pooling mixed kenaf, sorting it into different grades, cutting, hackling, roping into loose bales, and transporting to wholesale merchants at Bangkok. The Cooperative Society charges between 6 to 8 satang per kilogramme for grading, loose packing and handling raw fibre. It has no facility for pressing graded fibre into exportable bales.

A research project entitled 'Kenaf baling industry in Thailand - An economic analysis' (Agarwal 1970 cited earlier, p. 43-57) was completed in February 1970. According to its findings, a capital investment of 859,400 baht is called for in setting up a one-press baling centre in the north-eastern region of Thailand. A summary of capital investment and income is reproduced below:

Summary of capital investment and income

Item	Baht	Per cent
Capital investment costs		
Press and foundation	125,000	14.55
Electric motor and fittings	14,500	1.69
Buildings and furniture	517,500	60.24
Land	92,400	10.76
Truck	109,000	12.69
Licence fee	1,000	0.12
Total	859,400	100.00
Operation and maintenance costs (annual)		
Labour	202,730	64.25
Management	18,900	5.99
Perishable items	6,000	1.90
Other operating expenses	88,174	27.87
Total	315,804	100.00
Income (annual) from custom baling	600,000	

For a detailed explanation of the above and the assumptions made thereunder, reference may be made to chapter VI, "Costs and returns from a one-press baling centre" (Agarwal 1970 cited earlier, p. 31-40) in the above mentioned research report. A one-press centre will provide services to grade and press 13,440 bales weighing 2,400 metric tons during seven work-months at eight bales per hour in an eight-hour work-day. The rates for custom baling were 250 baht per tonne(150 baht grading + 100 baht pressing and packing). Therefore, gross income from custom baling 2,400 tonnes in a season was 600,000 baht. This gives an internal rate of return of 31.62% which means that, in a little more than three years (seasons), the entire investment will be recovered from the baling centre. On an average, there will be a net annual cash flow (receipts - expenditure) of about 284 thousand baht.

A cooperative society would find it profitable to set up a one-press baling centre and earn 284 thousand baht annually for ten years with an initial working capital of 1.02 million baht*. The profits of the society would form net addition to income of the kenaf growers in the north-eastern region. In the context of regional socio-economic development, nothing could be more rewarding than providing financial and technical support to kenaf growers in setting up cooperative baling centres. With a number of private baling centres operating in the region, it should not be difficult for a cooperative society to hire competent management at the salaries proposed under the item 'Costs of management and operation'. The realization of 31.62% return depends, however, on the assumption that a society will be able to secure enough raw material and bale 2,400 metric tons of fibre in a year. Data collected from the Chatturat Co-operative Society show that, during the four years, 1964/65 to 1967/68, the quantity of kenaf sold by the Society varied between 713 and 1,255 tonnes. It is clear that, to achieve the estimated returns from baling operations, this Society will have to more than double its present scale of operations by opening its baling operations to non-members. Further analysis to test the sensitivity of the rate of return to a fall in baling capacity revealed that a 37.5% fall, that is, baling only 1,500 tonnes

---

*Initial capital or working capital includes the total fixed capital plus half of the annual operation and maintenance costs in the first year of operation.

per season, would reduce the rate of return to 15.22% (Agarwal 1970 cited earlier, p. 64) with input prices and custom baling rates remaining unchanged.

The Cooperative Society would have financial gain to the additional estimated income from custom baling, as added net returns of seven satang per kilogramme could be achieved if the Society were to process its own mixed fibre into exportable bales before transporting it to Bangkok. The cost of transporting loosely packed bales by road is 17 satang per kilogramme; while, for mechanically pressed bales, it is only 10 satang. The Society would save 70,000 baht on 1,000 tonnes, a very significant amount to forego for a cooperative society with moderate financial resources. In the light of the financial, material and managerial facilities now available to the Chatturat Cooperative Society, a more realistic analysis of the economic and financial effects of vertical integration is given below.

Based on the results of the previous research study, "Kenaf baling industry in Thailand - An economic analysis", it is proposed to expand the existing sorting-cum-grading establishment of the Cooperative to a fully equipped kenaf baling centre. Results of field investigations show that all the capital investment items in a baling centre give satisfactory service for ten years if kept under good maintenance and care. The centre normally operates for seven work-months with a work-day of eight hours. It produces 13,440 bales of standard size weighing 2,400 tonnes during one season.

Fixed investments*

Mechanical press: A light duty, locally made, mechanically operated press with 6" shaft can press on an average eight bales per hour. Cost per press varies between 85,000 and 120,000 baht depending upon the reputation of the manufacturer and also upon the location of the factory. With reasonable care and maintenance, a press can be economically operated for a period of ten years. The fixing of the press and the foundation

*All prices refer to March/April 1969.

together cost 5,000 baht. A properly maintained press has a good resale value, that is, between 30 and 20% of the value of a new press.

A 40 H.P., 30 Kw Japanese electric motor costing about 9,500 baht is required to operate the press. The cost of electric installation and materials including the switchboard is 5,000 baht.

Buildings: For efficient management and smooth running of the one-press baling centre, the buildings required are described below:-

(a) Baling room: A baling room for housing the press and electric motor, 20 long x 12 wide x 6 high metres. Corrugated iron sheets (C.G.I.) and wooden pillars are used for walls and roof. The floor has about a 10 cm thick concrete covering. The estimated cost of the baling house is 60,000 baht, at 250 baht per m^2.

(b) Sorting and cutting shed: A shed for opening bundles, spreading mixed fibre, sorting, cutting root and top ends and hackling; 40 long x 25 wide x 5 high metres with an earth floor. No walls are needed; the corrugated iron sheet roof is supported by wooden pillars. The estimated cost is 100,000 baht, at 100 baht per m^2.
(The Cooperative Society has such a shed. This shed can be renovated at a cost of 40,000 baht to last for ten years).

(c) Godown for mixed fibre: To store raw material. Corrugated iron sheets are used for wall and roof, with proper arrangement for ventilation. The floor is covered by wooden planks which are about 6 inches above the floor level. The size is 32 long x 30 wide x 5 high metres. The estimated cost is 216,000 baht, at 225 baht per m^2, and capacity about 500 tonnes.
(The Cooperative Society has a godown of similar description. With minor improvements costing about 20,000 baht, this godown can serve for ten years).

(d) Godown for bales: To store about 400 tonnes of kenaf. The material used is corrugated iron sheet for walls and roof and iron pillars and structure. The floor is covered by wooden planks which are about 6 inches above the floor level.

The size is 25 long x 15 wide x 5 high metres. The estimated cost is 84,375 baht, at 225 baht per m^2, with proper ventilation.

(e) Office-cum-residence: 12 long x 8 wide x 6 high metres. The roof is of corrugated cement sheet and walls of flat cement sheet and other structures are made of wood. The ground floor is concrete and used for the office. The upper floor provides two rooms for the manager's residence. The cost of building and furniture is 15,000 and 10,000 baht respectively.

(f) Land: A ground plan for the location of buildings is shown on next page. This plan has been prepared to satisfy insurance requirements and at the same time to accommodate buildings in the smallest area of land. On the basis of this plan, an area of 4.67 rais (1.87 acres) will be required to set up the baling centre. Price of land in the rural areas of the region varies between 10,000 and 30,000 baht per rai for building purposes. An area of 4.67 rais at 20,000 baht per rai will cost 93,400 baht. The Cooperative Society owns an area of four rais. It can buy a neighbouring vacant plot which is about one rai in area for 30,000 baht. The land prices in urban as well as rural areas are slowly rising. It is most likely that at the end of the economic life of the centre (ten years), the value of land will have risen by 30 to 40% if the present growth rates continue into the future. In net salvage value computation, it has been assumed that there will be 25% appreciation in land value at the end of ten years.

One six-wheeler truck, (load capacity four tonnes loose or six tonnes baled fibre) to collect mixed fibre from farms and dealers. The truck would also be used for transporting bales to customers. The farmers and dealers experience great difficulty in transporting fibre to markets where they can sell at higher prices. Farmers have to sell at their houses or to the village dealer to avoid transportation difficulties. It is common practice with private baling centres to collect the fibre from the farmers. Although not specifically mentioned, the

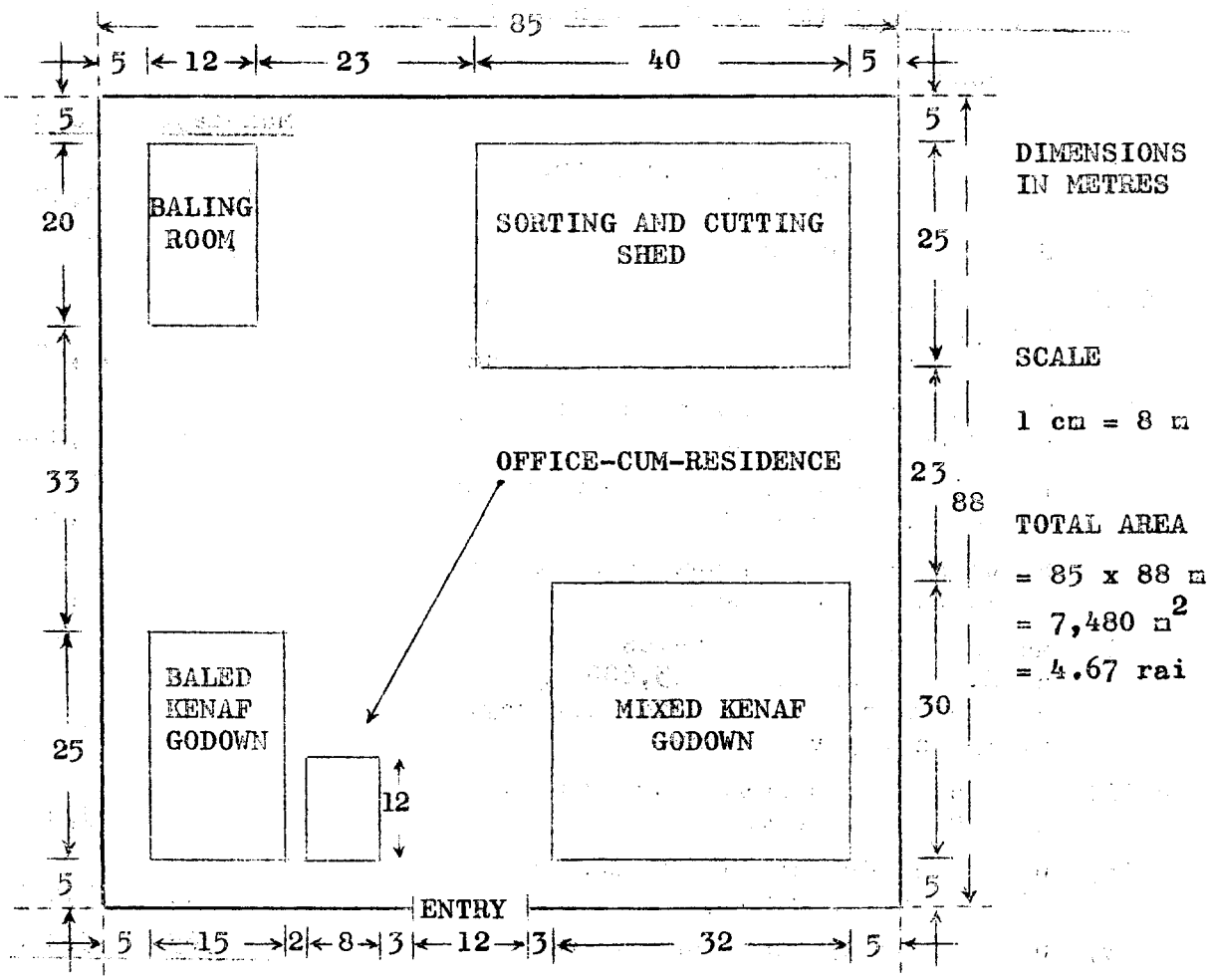

Figure 1. One-press kenaf baling centre for the north-east region of Thailand - ground plan for layout of buildings.

cost of transport is covered from the price paid to the farmer, or from baling charges. In real terms, therefore, the operation and maintenance of the truck would at least be free if not a source of additional income. The cost of a Japanese six-wheeler truck is 109,000 baht.

A licence for establishing a factory under the Factory Act 1969 costs 1,000 baht for the first year.

Operating expenses (for 2,400 tonnes of baled fibre)

a) Labour cost

		Man-days	Baht
i)	Unloading loose kenaf from truck, net weight 5,000 kg	1,000	10,000
ii)	Stowing in godown	1,000	10,000
iii)	Spreading, sorting, cutting, hackling and putting into wooden boxes at 1 bale per man and 10 baht per man per day	13,440	134,400
iv)	Weighing and marking at 2 persons per day, at 10 baht per person	420	4,200
v)	Pressing and tieing at 4 persons per day, at 10 baht per person	840	8,400
vi)	Stowing bales to godown and piling at 10 baht per person	1,344	13,440
vii)	Making ropes to tie bales at 2.5 kg per bale = 33,600 kg at 100 kg rope per person per day, at 15 baht per man-day	336	5,040
viii)	One machine operator for 12 months at 800 baht per month	365	9,600
ix)	One truck driver for 12 months at 600 baht per month	365	7,200
x)	One boy at 250 baht per month	365	3,000
	Total	19,475	205,280
	Less three months' salary of driver and boy	180	4,200
	Net total	19,295	202,730

b) Cost of management

		Baht	Baht
i)	One manager at 1,500 baht per month for 12 months	18,000	
ii)	One clerk-cum-cashier at 600 baht per month for 12 months	7,200	
	Total	25,200	
	Less three months' salary of manager and clerk	6,300	
	Net total	18,900	18,900

Operating expenses - continued

c) Perishable items

			Baht	Baht
i)	Cutting knives	50	1,000	
ii)	Hackling boards	30	3,000	
iii)	Cutting logs	30	1,000	
iv)	Wooden boxes	60	1,000	
		Total	6,000	6,000

d) Other operating costs

i)	Electricity at 20 baht per hour for 7 months at 8 hours per day	33,600	
ii)	Insurance* for one year against fire		
	baling house at 8%	16,720	
	godown for mixed fibre at 6%	11,000	
	godown for bales at 3%	6,000	
iii)	Cost of renewal of registration for operation under the Factory Act 1969	500	
iv)	Cost of maintenance+		
	press at 10% of 120,000 baht	12,000	
	electric motor at 5% of 10,000 baht	500	
	building at 1% of 485,375 baht	4,854	
	truck	3,000	
	Total	20,354	88,174
Total operating and maintenance costs (annual)		315,804	
Net salvage value at the end of 10 years			
	press at 20%	24,000	
	electric motor at 10%	950	
	building at 15%	72,856	
	truck at 10%	10,900	
	land at 125%	116,750	
	Total	225,406	225,406

*The insurance companies, however, hesitate to give insurance to upcountry baling centres due to losses incurred in the past.

+The cost of operation of truck (fuel, lubrication, service, etc.) for twelve months will be recovered in transportation charges collected.

Income from custom baling (annual)

The average charges in the region are:

- grading at 15 stg. per kg = 27 baht per bale = 150 baht per tonne
- pressing at 10 stg. " " = 18 baht per bale = 100 baht per tonne

Total = 250 baht per tonne

Therefore, charges for 2,400 tonnes = 600,000 baht.

Summary of capital investment and income

Item	Baht	Per cent
Capital investment costs		
press and foundation	125,000	15.09
electric motor and fittings	14,500	1.75
buildings and furniture	485,375	58.60
land	93,400	11.28
truck	109,000	13.16
licence fee	1,000	0.12
Total	828,275	100.00
Operation and maintenance costs (annual)		
labour	202,730	64.25
management	18,900	5.99
perishable items	6,000	1.90
other operating expenses	88,174	27.87
Total	315,304	100.00
Income (annual)	600,000	

Rate of return on capital investment

An x per cent internal rate of return means that the baling centre, over its life, will have generated enough surplus over its current costs (1) to replace the original investment and (2) in addition, to have earned an x per cent return, compounded. This financial measure provides a scientific basis for the entrepreneur in deciding the relative profitability or otherwise of his prospective capital investment in a kenaf

baling centre. A summary of the capital investment costs, annual operating and maintenance costs, and annual earnings from custom baling has already been given. A fixed investment of 828,000 baht is required for setting up a baling centre. The most expensive item is buildings and furniture which accounts for about 59% of the cost. The mechanical press costs only 15% and land takes up about 11%. For smooth running of the centre, an amount of 315,804 baht is required to meet annual operation and maintenance costs. Operation of a baling centre is highly labour-intensive, because labour cost takes away nearly 64% of the total operation and maintenance cost. Management costs only about 6%. Based on these estimates, the establishment of a baling centre at the present site of the Cooperative Society would need a working capital of about one million baht.*

Table 20 shows that, at the end of the economic life of the project (ten years), the total receipts, disbursements (operation and maintenance costs) and the net cash flows will amount to 6.23, 3.99 and 2.24 million baht, respectively. These values are nearly evenly distributed over the entire life of the centre. Table 21 shows present worth calculations and a prospective rate of return of 35.52% on fixed capital investment. This implies that, in a little less than three years, the entire fixed capital (after deducting all the operating expenses) can be recovered from the baling centre if it operated at normal capacity and collectes the usual baling charges, that is, 250 baht per tonne of baled fibre. The investment is considered very attractive for a vertically integrated cooperative marketing organization handling agricultural raw material.

The Cooperative Society will be able to double its working capital in six years, provided it is able to process annually about 2,400 tonnes of fibre and the cost and revenue structures will conform to the assumption made in this study. The Society would be in an advantageous position to ensure larger quantities of raw material from its over 1,500 members if it could provide efficient service. In the year 1966/67

---

*Fixed capital investment = 0.828 million baht
plus half of the annual operation and maintenance costs = 0.158 million baht
Total = 0.986 million baht

TABLE 20
ESTIMATE OF NET CASH FLOWS FROM BALING CENTRE
(in baht)

Year	Receipts	Disbursements	Net cash flows
1	-	-828,275	-828,275
2	+600,000	-315,804	+284,196
3	+600,000	-315,804	+284,196
4	+600,000	-315,804	+284,196
5	+600,000	-315,804	+284,196
6	+600,000	-315,804	+284,196
7	+600,000	-315,804	+284,196
8	+600,000	-315,804	+284,196
9	+600,000	-315,804	+284,196
10	+600,000	-315,804	+284,196
10[1/]	+225,406[1/]	-	+225,406
Total	+6,225,406	-3,986,315	+2,239,091

[1/] Receipts from net salvage value.

TABLE 21
ESTIMATE OF INTERNAL RATE OF RETURN FROM BALING CENTRE
(in baht)

Year	Net cash flow	35% factor	P.W. 35%	40% factor	P.W. 40%
0	-828,275	-	-828,275	-	-828,275
1	+284,196	0.7407	+210,504	0.7143	+203,001
2	+284,196	0.5487	+155,938	0.5102	+144,997
3	+284,196	0.4064	+115,497	0.3644	+103,561
4	+284,196	0.3011	+085,571	0.2603	+073,976
5	+284,196	0.2230	+063,376	0.1859	+052,832
6	+284,196	0.1652	+046,949	0.1328	+037,741
7	+284,196	0.1224	+034,786	0.0949	+026,970
8	+284,196	0.0906	+025,748	0.0678	+019,268
9	+284,196	0.0671	+019,070	0.0484	+013,755
10	+284,196	0.0497	+014,125	0.0346	+009,833
10	+225,406	0.0497	+011,203	0.0346	+007,799
			+157,737		-134,542

Therefore $35 < r < 40$

$$r = 35 \frac{15,737}{150,279} (5)$$

$$= 35.52$$

P.W. = present worth

r = internal rate of return

when the fibre prices in the world markets were the highest in the history of the kenaf trade in Thailand, the Society had 1,541 members and they cultivated, on an average, 7.2 rais with kenaf. Taking 200 kg per rai the national average fibre yield, the members would have produced nearly 2,300 tonnes of kenaf fibre which approaches the 2,400 tonnes planned capacity target for the baling centre. An area of 12,000 rais will need to be planted with kenaf to produce 2,400 tonnes of fibre. The area planted with kenaf in Changwat Chaiyaphum alone varied between 110 and 397 thousand rais during the period 1961 and 1966. The area planted with kenaf in Amphoe Chatturat alone varied between 39 and 129 thousand rais during 1966/67 to 1968/69.

It is not necessary, however, for the Society to confine itself to processing only the members' produce. It should be able to attract non-members and kenaf dealers who would like their fibre to be processed on custom basis. In this, the Society would have to compete with privately owned baling centres. With efficient handling and processing facilities and the solid support of the members, it should not be difficult to attract upto 1,500 tonnes or more of fibre from non-members. This assumes that the members would bring at least 1,000 tonnes of fibre to their Cooperative Society. This means that the members would have to plant at least 5,000 rais with kenaf and send all their fibre to the baling centre for processing, in which case only about 3.2 rais would need to be planted with kenaf by a member.

To secure a 35.2% rate of return on its investment, the Cooperative Society would need an additional capital investment of 509 thousand baht as follows:-

Total capital investment required			= 828,275 baht
Less a) Sorting and cutting shed	= 60,000 baht		
b) Godown for mixed fibre	= 196,000 baht		
c) Land	= 63,400 baht		
Total	= 319,400 baht		
There, additional capital required			= 508,875 baht
Total working capital required in the first year			= 508,875 baht
		plus	= 158,000 baht
		Total	= 667,875 baht

It will be concluded, therefore, that the Agricultural Products Marketing Cooperative, Ltd., would need an additional working capital of 0.670 million baht to integrate its marketing activities vertically. The rate of return analysis, presented earlier, strongly supports such an investment in the interest of economic and social uplift of the rural people in the north-east of Thailand. The profits earned by the Cooperative Society through vertical integration would ultimately be distributed among the farmers on a patronage basis. The Society already has labour, sorting, cutting and grading facilities, besides the solid experience of about ten years of fibre processing and marketing in the north-east. However, it has no experience in managing and using a mechanically operated press to bale kenaf. The survey data indicate that a reasonably efficient management can be hired at the estimated salaries to take care of the baling centre.

Although the proposed cooperative baling centre would provide baling services and not undertake buying and selling of kenaf, yet changes in kenaf prices would affect the income from custom baling. It was noted from the analysis presented in Chapter II (pages 8-10) that higher prices induced larger kenaf production as well as an increased supply of raw material to the Cooperative. There is always, however, a risk of the kenaf prices falling to low levels and thus reducing production as well as supply of fibre to baling centre - which would ultimately cut down the income from custom baling. The lowest wholesale average prices, 1.77 baht per kilogramme, were reported during 1967/68 (Table 3), yet Amphoe Chatturat still produced 29.2 thousand tonnes of kenaf in that year. There are five private baling centres in the Amphoe. Assuming that these centres could have at the most baled 20 thousand tonnes of raw fibre, there would still have been a balance of 9:2 thousand tonnes which is nearly four times the normal capacity of the proposed baling centre. It is clear, therefore, that even if the kenaf prices were at the lowest level (they have never reached upto now), the cooperative baling centre would be able to operate at normal capacity and earn the estimated rate of return on the investment. If historical statistics on production and prices of kenaf in the Amphoe were available for the last ten or more years, it would be possible to estimate the minimum price level which would permit operation of the cooperative baling

centre at normal capacity. If the baling centre were to operate at 62.5% of its normal capacity the rate of return would still be 15.22%.

In making this recommendation for vertically integrating the kenaf marketing activities of the Cooperative Society, due consideration has been given to the fact that there exists an excess kenaf baling capacity in Thailand, because the present capacity is enough to bale about 850 thousand tonnes, whereas the target for kenaf production in the second development plan is only 500 thousand tonnes. Annual production of kenaf in Thailand has, however, varied between 181 and 661 thousand tonnes during the last ten years. This situation implies that some baling centres in the country will not be able to operate at full capacity if the 500 thousand tonnes level of production continues. There is bound to be keen competition among the baling centres to attract the needed quantities of raw fibre for baling. The Cooperative Society is in an advantageous position to secure at least the members' produce. By ensuring quality service, granting production loans, and providing transport from farm to the baling centre, it can certainly hope to collect about 2,400 tonnes of raw fibre during one kenaf season. The members and the non-members alike will be interested in the baling activity of the Cooperative Society because:

(1) The kenaf producers can make a net profit of 7 satang per kilogramme if their fibre is baled in the producing area itself:

(a)	Cost of baling (pressing only)	=	10 stg. per kg
(b)	Saving in transport	=	7 " " "
(c)	Gain in price due to baling	=	10 " " "
Therefore net saving		=	7 " " "

(2) By owning baling facilities, the Cooperative Society will pass on additional profits, accruing through custom baling, to the members. Alternatively, it can offer higher prices to the members for their raw fibre or reduce baling charges thus attracting more business. It will not only help to expand business but may also result in an increase in the membership of the Cooperative.

(3) The Cooperative has already established a reputation for good and reliable quality grading and this has helped to secure premium prices for its graded product from dealers in Bangkok. It would not take much

time for it to establish its credit for quality baling both in domestic and international markets. Consequently, it would be able to sell its bales at premium prices and bring additional income to its patrons.

(4) A one-press kenaf baling centre provides employment for more than 19,000 man-days in one season. The Cooperative would give preference to members/patrons for employment at the baling centre.

Development of procedures which will ensure a high quality of baled fibre for export is vital for the future economic progress of the country, not only from the point of agricultural diversification but also for regaining the confidence of the overseas importers in the quality of Thai fibre. For equivalent end-use grades, it is understood that Thai kenaf sells at lower prices than Pakistani or Indian jute. A baling centre operated on cooperative principles has better chances of fulfilling such national expectations than a privately owned baling centre; most of privately owned baling centres are under single ownership or family ownership. A cooperative can guarantee right grade, correct weight, proper packing and prompt supply to the exporters, because the marketing activities originating from producer to the exporter will be all under its control. The chances of getting poor or lower quality grade fibre baled for export increase when the grading and pressing are done by two different firms.

Financing vertically integrated marketing activities

At the end of the year 1968/69, the Cooperative had a paid-up share capital of 184,600 baht and a reserve of 36,950 baht. It was estimated earlier in this study that the Cooperative would need an additional working capital of 670 thousand baht to add a mechanical pressing facility to its existing marketing activities. However, it does not have funds to provide this economically sound service to its members. The funds will have to come from external sources.

To strengthen the work of the Cooperative, the United States Operations Mission in Thailand advanced in early sixties a loan of 900,000 baht to it. A counterpart loan of 200,000 baht was given by the Royal Government. The Cooperative pays two per cent per annum interest on these loans. They form the revolving loan fund of the Cooperative, which charges the members 12% interest per annum for advancing production

loans of 6-10 months duration. For additional financial support whenever necessary, the Cooperative borrows from the Department of Credit and Marketing Cooperatives in the Ministry of National Development at an interest rate of four per cent per annum. To strengthen cooperative activity in the area, it is advisable that 0.670 million baht be loaned by the Government at a rate of four per cent per annum for an initial period spread over ten years. The repayment can be so scheduled that the principal and interest will be recovered in ten annual instalments.

To ensure prompt repayment, it is suggested that, after deducting overhead and operational costs from the gross returns, the repayment of the loan should receive first priority. If necessary, part of the fixed assets of the baling centre could be used as security for the Government loan. The financial records of the Cooperative would be left open for Government audit. The Government could also nominate, in consultation with the Management Committee, one responsible officer to participate in the periodical meetings of the Management Committee and the Annual General Meetings of the Cooperative Society. In the longer-term interests of the Cooperative, it is also recommended that the amount of the annual repayment instalment be modified in the event of an exceptionally good or bad kenaf year. The past record shows that the Cooperative has been very satisfactory in fulfilling obligations to its creditors. The past financial performance is an indication of the business capability of the Cooperative in managing its affairs.

A training and demonstration centre

The proposed baling centre could also be developed into a regional cooperative centre to provide training and demonstration in cooperative organization and management in general and in the production, processing and marketing of kenaf in particular. To improve the quality of kenaf fibre and to promote reliable grading and pressing, it is necessary that the kenaf producers, dealers and Government officials concerned are brought together for short-term training programmes. The proposed centre would serve as the nucleus for developing cooperative baling centre in other provinces (Changwats) of the north-east, which depend so heavily on kenaf for their cash economy. Based on the knowledge gained at this centre, the activities of private baling centres and kenaf dealers could

also be regulated. The centre could be used as a regional headquarters by various Government agencies involved in the overall development of kenaf industry in the country. For the purposes of such development, the operational staff of these agencies should move from Bangkok to the north-east, which is the hub of kenaf activity.

In the interest of reliable grading to be done at the baling centres, it is necessary that only trained graders be employed by balers. The proposed Cooperative Centre would be an ideal place for such training. Periodical training of quality control officials would be another important activity of the Cooperative Centre.

VII. PRODUCERS SUPPORT FOR THE BALING CENTRE

The analysis presented in the previous chapter indicates that it would be economically and financially advisable to integrate the marketing activities of the Cooperative Society by establishing a mechanical press. The success of the project would, however, depend to a great extent on the cooperation of kenaf producers - Cooperative members and non-members alike, who would provide raw material to the baling centre. Even if the kenaf production level will be high enough to permit normal capacity operation of most baling centres, the required quantities supplied to the Cooperative would depend upon the advantages or disadvantages which the producers think they would derive from their dealings with it. To assess their views on this subject, some randomly selected members and non-members in the Amphoe were interviewed during the farm survey operations. Their replies to relevant questions were tabulated and the results of the analysis are presented in the following pages.

Farmers' expectations in becoming members of the Cooperative Society

The expectations of the farmers in becoming members of the Cooperative have been cross tabulated (Table 22) according to the area planted with kenaf by the individual farmers. Out of a total of 1,282 members, nearly 89% expected to borrow money; 26% expected to get better prices for fibre by selling through the Cooperative. Other expectations, although expressed by smaller numbers, were confidence in the Cooperative's handling of their affairs, expectation that the Cooperative would

TABLE 22
FARMERS' EXPECTATIONS IN BECOMING MEMBERS OF THE COOPERATIVE SOCIETY

Area planted with kenaf (rai)	Number of farmers reporting						
	No answer	Credit	Better price	Confi-dence in Coop.	Exten-sive advice	Other	Total in the group
Less than 2.5	21	661	207	62	62	62	703
(per cent to total)	(2.9)	(94.0)	(29.4)	(8.8)	(8.8)	-	-
2.5 to less than 12.5	-	351	62	21	62	83	434
(per cent to total)	-	(81.0)	(14.3)	(4.8)	(14.3)	-	-
12.5 to less than 22.5	-	62	21	41	-	21	62
(per cent to total)	-	(100)	(33.9)	(66.1)	-	-	-
22.5 to less than 32.5	-	41	41	41	-	-	62
(per cent to total)	-	(66.1)	(66.1)	(66.1)	-	-	62
32.5 to less than 42.5	-	21	-	21	-	-	21
(per cent to total)	-	(100)	-	(100)	-	-	-
Total	21	1,137	331	186	124	165	1,282
(Per cent)	(0.2)	(88.7)	(25.8)	(1.5)	(1.0)	-	(100)

provide extension services on improved farming practices, such as supplying improved seed, fertilizer, insecticide, etc., and give advice on cultural practices related to field cultivation and fibre retting and collective strength in handling their product and bargaining for price.

Many members expressed multiple expectations, that is, they said that they joined the Cooperative with more than one expectation. Based on the population estimates, there were only 703 members who planted less than 2.5 rais with kenaf in the year 1968/69. The total replies received from them were, however, 1,075. It will be seen from the table that 94% of the (703) members in the "Less than 2.5 rais" group joined in the hope of getting loans.

Credit expertation was the highest priority for all except in the "22.5 to less than 32.5 rais" group in which only 66% of the members joined for credit. Comparing between various area groups, the "22.5 to less than 32.5 rais" group emphasized importance of 'better price' and "confidence in Cooperative" in their expectations, that is, 66% for each. For the continued success of the Cooperative, it would seem necessary that the provision of adequate credit to its members should receive first priority in its policies. Although grading and marketing of kenaf are equally important, yet provision of credit has attracted more members.

Members' satisfaction with the Cooperative

Before expanding the activities of the Cooperative to provide baling service, it is also necessary to find out if the members feel satisfied with the working of this institution. For this study, members' satisfaction was measured in terms of (1) the extent to which a member sold all of his kenaf through the Cooperative, (2) obtained adequate credit, (3) was satisfied with the quality and facility of grading and (4) was satisfied with the prices of kenaf received through the Cooperative. Table 23 indicates that more than half the total members reported satisfaction with grading as well as with the prices the Cooperative obtained for them. About one-third (33.9%) obtained adequate credit while only one-fifth sold all kenaf through their Cooperative. This latter fact is disturbing. It indicates that the Cooperative did not get the full patronage of its members in terms of kenaf sales. Also, the majority of the members, that is, 65%, failed to get adequate credit.

No member who planted 12.5 rais or more with kenaf sold all his produce through the Cooperative. This implies that producers of small quantities of kenaf have greater confidence in the ability of the Cooperative to sell their produce. All planters of very large areas, '32.5 to less than 42.5', reported an adequate supply of Cooperative

TABLE 23
MEMBERS SATISFACTION WITH THE COOPERATION SOCIETY

Area planted with kenaf (rai)	Number of members reporting				Total in the group
	All kenaf sold to Coop.	Adequate credit	Satis-factory grading	Satis-factory price	
Less than 2.5	227	124	310	351	703
(per cent to total)	(32.3)	(17.6)	(44.1)	(49.9)	(100)
2.5 to less than 12.5	41	269	310	269	434
(per cent to total)	(9.4)	(62.0)	(71.4)	(62.0)	(100)
12.5 to less than 22.5	-	-	-	41	62
(per cent to total)	-	-	-	(66.1)	(100)
22.5 to less than 32.5	-	21	41	-	62
(per cent to total)	-	(33.9)	(66.1)	-	(100)
32.5 to less than 42.5	-	21	21	21	21
(per cent to total)	-	(100)	(100)	(100)	(100)
Total	268	435	682	682	1,282
(Per cent)	(20.9)	(33.9)	(53.2)	(53.2)	(100)

credit while a very small proportion, about 18% of the smallest area planters, 'less than 2.5 rais', reported adequate credit. Although none of the members of the '32.5 to less than 42.5 rais' group sold all their kenaf to the Cooperative, yet all of them reported satisfaction with the grading done by the Society. In the smallest area group, where more members sold all their kenaf through the Cooperative, only 44% reported satisfaction with the grading. A similar conclusion holds good in regard to satisfaction from prices received through the Cooperative.

In can be concluded that, although on the whole more than half of the members reported satisfaction with the Cooperative's grading and the prices received, the proportion of satisfied members was larger in the group that planted larger areas with kenaf. Although only one-third of the total members reported satisfaction with the adequacy of credit, there were proportionately more satisfied numbers in the larger planted area groups than in the smaller planted area groups. There is need to expand credit and further improve grading and marketing.

Difficulties in selling kenaf through the Cooperative Society

It was noted in the previous section that only one-fifth of the members sold all their raw fibre through the Society. It will be useful to identify the difficulties which members faced in marketing their fibre through the Cooperative. Table 24 shows the number of members in each area group classified by number reporting various kinds of difficulties. On the whole, about 5% complained of delay in payment of the total sale proceeds of their kenaf. Nearly 40% thought that they received lower prices by selling through the Cooperative. This is the single most important problem expressed by members. About eleven per cent did not like the Cooperative's deducting the unpaid portion of the loan from the first sale proceed payment made to the members.* Nearly one-fourth of the members also indicated other difficulties, such as ease in selling to others and for high transport charges of the Cooperative. Nearly five per cent did not give any answer. Nearly one-third of the members experienced no difficulty in selling through the Cooperative.

*It was mentioned earlier in this report that the Cooperative pays 75% of the estimated local value of a member's produce as soon as the fibre is graded. The balance is paid after the graded fibre is sold in Bangkok.

TABLE 24
DIFFICULTIES IN SELLING KENAF THROUGH THE COOPERATIVE SOCIETY

Area planted with kenaf (rai)	Number of members reporting						
	Total number of members	Loan deduction from sale	Delayed payment	Low price	Other	No answer	No difficulty
Less than 2.5	703	82	41	331	207	-	186
(per cent to total)	(100)	(11.8)	(58.3)	(47.1)	(29.4)	-	(26.4)
2.5 to less than 12.5	434	62	-	145	83	41	165
(per cent to total)	(100)	(14.3)	-	(33.4)	(19.1)	(9.4)	(38.0)
12.5 to less than 22.5	62	-	21	21	21	21	-
(per cent to total)	(100)	-	(33.9)	(33.9)	(33.9)	(33.9)	-
22.5 to less than 32.5	62	-	-	21	-	-	41
(per cent to total)	(100)	-	-	(33.9)	-	-	(66.1)
32.5 to less than 42.5	21	-	-	-	-	-	21
(per cent to total)	(100)	-	-	-	-	-	(100)
Total	1,282	145	62	518	311	62	413
(Per cent)	(100)	(11.3)	(4.8)	(40.3)	(24.2)	(4.8)	(32.2)

Only those members who planted smaller areas with kenaf complained of loan deduction from sale as a difficulty in selling through the Co-operative. None of the members who planted 12.5 rais or more with kenaf envisaged this difficulty. More than half of the members in the 'less than 2.5 rais' group considered delayed payment a difficulty, while none in the larger area groups, '2.5 rais and above' complained about it. At least one-third in each of the size groups of upto 32.5 rais complained of lower prices. It will be inferred from the table that members with smaller areas planted with kenaf had more and varied difficulties in marketing through the Cooperative than those who planted larger areas.

It is clear from the last column of the table that the proportion of members indicating 'no difficulty' was higher in the larger area groups. The fact that a great majority of the members of the Cooperative are in the smaller area groups emphasizes the importance of those groups as voters on important policy issues of the Society. However, those members who planted larger areas can supply larger quantities of raw material for baling. The Cooperative will need to satisfy its members that it is in a good position to secure better prices for them than they can get by selling individually. The daily information about prices received by the Cooperative for different grades of fibre at Bangkok

should be posted on the bulletin boards of the Society. The prices received by non-members in local market should be posted side by side, to bring out the difference in the two sets of prices.

Not many members have complained of loan deduction from sale. It is, however, in the interest of the Society as well as of its members to deduct a loan element from the sale proceeds. Moreover, the loan is given on the understanding that the member will repay it from his sales proceeds. The other serious difficulty expressed by the members was the high cost of transport from the farm to the Society. The members felt this, because most private dealers buy fibre at the farm and transport it at their own cost to market. The members have a psychological feeling that they pay a heavy transport cost if they sell through the Society. The Cooperative does not own a vehicle, but hires one for the purpose. It will have to compete with private dealers in providing transport facilities to its clients. The cost of transport per unit of product will be lower if the Cooperative owns a motor truck.

Prospects for increase in membership

If the Cooperative decides to set up a baling plant, it should ensure steady and adequate supplies of raw material for processing. One method of expanding supplies will be to attract more kenaf growers to be members of the Society. To find out kenaf growers' (non-members) views on this subject, growers were randomly selected from two categories: those who lived in (1) villages which had some members (Group B) and (2) villages which had no members (Group C). The selected growers gave their views on the types of service which they thought the Cooperative should provide and thus make them willing to join. Table 25 presents data on the types of service which the kenaf growers would like the Cooperative to provide. Based on the sample, there were 5,657 kenaf growers in Group B and 6,600 in Group C in the Amphoe (district). Due to multiple choice, however, the total number of replies in Group B was 7,595 and Group C 9,130.

One important observation on the table is that as many as 39% of all replies resulted in 'no answer'. These growers either did not know about the Cooperative and its activities or had little interest in joining the Cooperative or perhaps the question may not have been clearly

TABLE 25
SERVICES THE COOPERATIVE SHOULD PROVIDE SO THAT THE NON-MEMBERS WILL JOIN

Group	Number of non-members reporting								
	Total	No answer	Credit	Lower interest	Trans-port	Grading	Supply of inputs	Ex-tension advice	Other
Group B	7,595	2,712	2,635	1,240	232	232	77	232	232
(per cent to total)	(100)	(35.7)	(34.7)	(16.3)	(3.1)	(3.1)	(1.0)	(3.1)	(3.1)
Group C	9,130	3,850	2,200	1,870	220	220	330	220	220
(per cent to total)	(100)	(42.2)	(24.1)	(20.5)	(2.4)	(2.4)	(3.6)	(2.4)	(2.4)
Total	16,725	6,562	4,835	3,110	452	452	407	452	452
(Per cent)	(100)	(39.4)	(28.9)	(18.6)	(2.7)	(2.7)	(2.4)	(2.7)	(2.7)

understood. Of the remaining replies, 29% were interested in a supply of credit and 19% in a supply of credit at low interest rates. Other services such as transport, grading, supply of farm inputs, agricultural extension advice had low priorities. Growers in Group B placed relatively higher emphasis on credit, transport, grading, and extension advice as compared to growers in Group C. The ratio of 'no answer' replies is higher in Group C because most growers in these villages had not heard of the Cooperative and knew little about it.

The advantages of Cooperative baling

One measure of the members' interest in the Cooperative baling would be their views on the possible advantages which they think they would derive if their Society were to own a baling plant. The replies have been classified in Table 26 according to the area planted with kenaf. Due to the multiple choice answers, again the total number of replies is more than the number of members in a particular group. One interesting observation is that about 44% of the members had 'no answer' to give. Again, either they were not sure that there would be any advantage in cooperative baling or that they did not understand the question or hesitated to commit themselves. Nearly 65% thought that the Cooperative would be able to handle larger quantities of fibre if it provided baling facilities. Perhaps, they would then be willing to sell larger quantities through the Cooperative. Nearly 51% were of the opinion that the Cooperative would secure higher prices for members;

TABLE 26
ADVANTAGES IN COOPERATIVE BALING

Area planted with kenaf (rai)	Number of cooperative members reporting							
	Coop. higher price	Lower trans-port cost	Storage faci-lity	Relia-ble grading	Other	Increas-ed sale of kenaf	No answer	Total in the group
Less than 2.5	372	83	62	21	41	434	289	703
2.5 to less than 12.5	227	21	-	41	41	310	186	434
12.5 to less than 22.5	41	21	-	-	-	62	21	62
22.5 to less than 32.5	-	-	-	21	-	21	41	62
32.5 to less than 42.5	-	-	21	-	-	-	21	21
Total	641	124	83	83	83	827	558	1,282
(Per cent)	(51.4)	(9.7)	(6.5)	(6.5)	(6.5)	(64.5)	(43.5)	(100)

nearly one-tenth thought that baling would lead to a reduction in transport cost. Provision of storage facilities, reliable grading and other advantages were also mentioned. It would appear that a majority of the members thought there would be an additional advantage if the Cooperative were to set up a baling plant. The vertically integrated operation has good chances of securing larger quantities of raw material, because as many as 65% of the members thought that the baling would increase the volume of cooperative sales.

Members' willingness to buy more shares

Another measure of the members' interest in the Cooperative baling would be their willingness to raise their share capital in the Cooperative. The assumption is that, unless a member is convinced of definite economic gain through Cooperative baling, he will not risk more money in raising his share contribution. The members were asked if they would be willing to buy more shares in the Cooperative and, if so, upto what extent. Table 27 shows that about 48% of the members gave no answer, about 3% were not interested in buying more shares. Only about 48% of the members showed definite interest in buying more shares. About 23% were willing to buy an additional share upto 100 baht and another five per cent were willing to buy shares worth more than 400 baht. The authorized value of one share is 100 baht. This table indicates that, in case of pressing need, the Society can hope to raise its share capital.

TABLE 27
MEMBERS' WILLINGNESS TO BUY MORE SHARES

Area planted with kenaf (rai)	Number of members reporting						
	No answer	Unwillingness to buy	Up to 100 baht	101 baht to 200	301 baht to 400	more than 400 baht	Total in the group
Less than 2.5	372	21	103	41	21	62	703
2.5 to less than 12.5	165	-	165	-	-	-	434
12.5 to less than 22.5	21	21	-	-	-	-	62
22.5 to less than 32.5	62	-	-	-	-	-	62
32.5 to less than 42.5	-	-	21	-	-	-	21
Total	620	42	289	41	21	62	1,282
(Per cent)	(48.4)	(3.2)	(22.5)	(3.2)	(1.6)	(4.8)	(100)

There is a fairly reasonable chance that the baling activity will receive favourable support from the members. It is interesting to note that support for raising share capital to more than 100 baht came only from those members who planted the smallest area, 'less than 2.5 rais'. None of the members who planted 2.5 rais or more showed interest in raising his share capital by more than 100 baht. The planters of larger areas seemed to have little interest in investing more money in the Society's baling activity.

The main findings of the data presented in this chapter can now be summarized. It is clear that as many as nine-tenths of the present members joined the Cooperative in the hope of obtaining credit. However, only about one-third were satisfied with the adequacy of the credit received. The majority of unsatisfied members were those who planted small areas with kenaf. Although only about one-fourth of the members joined the Cooperative in the hope of obtaining better prices, yet more than half were satisfied with the grading done and the prices which the Cooperative obtained for them. Although the by-laws of the Society require that members should sell their kenaf through the Society, yet only about one-fifth of the members sold all their kenaf through it. These were mostly planters of small kenaf areas. The planters of larger kenaf areas were comparatively better satisfied with the activities of the Cooperative.

Nearly one-third of the members expressed no difficulty in selling fibre through the Cooperative. However, 40% complained of receiving low prices. About one-fourth thought that they paid high transport costs and it was easier and more straight-forward to sell to others.

Two-thirds of the members thought that the Society would be able to get larger quantities of raw material as a result of baling. Nearly half of them were of the opinion that the Society would obtain higher prices as a result of baling. There is, thus, a strong indication that the members will bring larger quantities of raw material if the Cooperative introduces baling facilities. Nearly half the members showed definite interest in buying additional shares of the Cooperative if more capital were needed for setting up a baling plant. Interest in buying additional shares was largely shown by those who planted small areas with kenaf. It appears that the need for Cooperative baling is felt more urgently by such people.

It can be concluded that the Cooperative would be able to get wider support from kenaf producers in the area if it could expand its loan fund to cover a larger number of applicants, provide credit at lower rates of interest than the growers get from other sources, improve and expand grading facilities, provide transport to collect fibre from farms or homes and give agricultural extension services including a supply of improved farm inputs. The survey clearly indicates that many kenaf growers in the district (Amphoe) have not even heard about the Cooperative. A membership campaign will be necessary to educate non-members on the activities of the Society.

VIII. CONCLUDING REMARKS

The emergence of the green revolution especially the production of rice at self-sufficiency or export level in the major rice importing countries of Asia and the Far East, and Thailand's increasing trade gap have drawn the serious attention of the Government to the need to diversify agricultural production with special emphasis on those products which have an export potential. Kenaf has, during the last decade, taken an important place as a foreign exchange earner through exports. Nearly three-fourths of the produce must be exported as the domestic consumption

is still rather limited. Expansion in production and improvement in fibre quality depend to a great extent on the economic incentives that the kenaf growers foresee in production, processing and marketing of kenaf fibre. Kenaf is a cash crop all of which must be sold. Thus it is unlike food crops, of which a major portion is often consumed on the farm itself or can be consumed at a later date if the market price is too unfavourable. An institution such as a multipurpose cooperative society would go a long way in increasing production, processing and marketing efficiency and thus help to meet the national requirements of increase in kenaf production and improvement in fibre quality.

The Agricultural Products Marketing Cooperative, Ltd., is the only multipurpose cooperative society in Thailand which provides production and commodity loans to kenaf growers in the neighbourhood and helps in grading and marketing their kenaf. The analysis of its performance during the last five years (1964/65 to 1968/69) has revealed that both in loan operations and kenaf marketing the Cooperative has rendered satisfactory service to its members. This is indicated by the increase in membership, the amount of loans sanctioned, the quantity of kenaf graded and sold and pending applications for membership. The Society has also gradually built up share capital, a reserve fund and a revolving loan fund. The incidence of arrears in loans is lower than is usually found in similar organizations. The Management Committee has been very cautious and managed the affairs with great capability. The Cooperative has built up reputation for reliable grading of fibre and its produce commands a premium price from exporters at Bangkok.

Most of the achievements of the Cooperative, however, are directly related to the slow but steady trend in the rise of kenaf prices in international markets during the period 1960/61 to 1966/67. 1965/66 and 1966/67 were the two years when average prices were the highest in the country. Following this, the farmers in the Amphoe planted 129 thousand rais with kenaf in 1967/68 season which suddenly dropped to about 39 thousand rais in 1968/69 when the price expectation was very low. This phenomenon illustrates farmers' response to prices of an export cash crop. Not only did the Cooperative handle the largest quantity of fibre during 1966/67 but its proportion of higher grade fibre was also the highest. The high price level had a positive effect on the production

of higher quality fibre as well as on total production. The number of loan applications, loans granted, average amount of loan granted per person and recovery rate also increased with the price level. The maximum amount loaned was 1,083 million baht in 1966/67. Loan operations of the Cooperative were guided by the level of prices prevailing in pre-planting months but the rate of recovery depended upon prices obtained during post-harvest months. The quantity of fibre supplied by members reached a maximum of 772 tonnes in 1966/67. The proportion of Grade A fibre was also the highest in that year. High prices led to not only increase in production but also to improvement in quality of fibre.

During 1968/69 when the area planted with kenaf dropped to less than one-third, the Cooperative members on an average planted 24.3 rais (9.72 acre) under different crops. This is a high average for an operational production unit by Asian standards; yet the standard of living of the kenaf producers (in the north-eastern region) is said to be the lowest in Thailand. The members planted only 46% of the owned area. About ten per cent of land was operated on 'Kinship' basis. The great potential for development of agricultural production is hidden in the region. The utilization of owned land was the highest on the smallest farms and the lowest on the largest farms. The analysis reveals high level of land ownership but very low intensity of land utilization. The great potential can only be realized if a team of agricultural technologists can succeed in discovering an agricultural enterprise which is not only physically and economically feasible but also adaptable to social and cultural environment of the region. The need for a problem oriented research on a team basis cannot be overemphasized as a condition in the economic and social development of the area. The fact that 86% of the total planted area was owned is a favourable condition for implementing an agricultural development programme, because the benefits of development will accrue to land owner farmers and not to the landlords as is the case in many countries where the tenancy rate is very high. Operation of land on some kind of 'kinship' was fairly significant, as ten per cent of the total area was planted on this basis. This is an indication of ownership of more land area by many farm families than the area they can manage and operate with the available resources. The

problem, it appears, is not of shortage but of plenty of land. One possible explanation for such extensive land holdings is the very low fertility, poor supplementary resources especially capital, and virtually non-available irrigation facilities in the area. Invariably, lowland areas are planted with paddy, almost all of which is at subsistence level. The expansion or contraction, naturally takes place in the upland area planted with kenaf. In 1968/69 only about 45% of the total planted area was upland.

Not only was the production of kenaf highest in 1966/67 but also the yield per rai, 210 kilogrammes. In the absence of any arrangement for supply of improved kenaf seed, nearly 84% of the members used their own seed while the remainder bought from merchants. The use of manures and fertilizers was negligible. Less than four per cent of the total planted area was manured and/or fertilized. The proportion of area fertilized was the highest (18%) on the smallest farms. Distance-wise, the retting facilities were reasonably adequate for the 1968/69 kenaf crop. Nearly two-thirds of the fibre was retted within one kilometre of the farm. The distance of retting facilities does influence the quality of fibre. Not a kilogramme of good fibre was obtained when the retting facility was six kilometres or more away. Out of a total of 1,283 members, only 62 reported good quality fibre. Only about five per cent of the retted fibre was reported of 'good' quality. Two-thirds of the 62 had a retting facility within one kilometre. All the good quality fibre was produced with a retting facility within five kilometres, yet it was only about one-fifth of the total fibre retted within five kilometres. It is clear from this analysis, therefore, that, besides nearness of the retting facilities, other factors, such as, the nature of the facility (river, pond), the quantity of fibre in relation to the quantity of water and number of rettings also affect the quality of retted kenaf. Nearly 60% of the members had a retting facility within five kilometres, About three per cent had to go as far as 12-15 kilometres. Broadly speaking, the farmers with larger farms had to go farther for retting. All members who planted less than 12.5 rais had retting facilities within five kilometres. On large farms, '42.5 rais and above', only 60% had a facility within five kilometres. Only about one-fourth of the members had their own pond for retting. Another one-fourth retted in a lake or community pond. Nearly one-fifth retted

in river. The proportion of members owning retting ponds was higher in larger size farm groups. To improve the quality of retted fibre, it is necessary for improved retting tanks to be constructed in each major kenaf-producing area in numbers to match the area planted with kenaf. These tanks could be so located that the users would not have to travel more than five kilometres to reach them - the nearer the better. The available retting facilities would be rather limited in a good kenaf season.

An analysis of the quantities sold by the cooperators during the years 1966/67, 1967/68 and 1968/69 revealed that, in all these years, nearly all members sold their entire produce as mixed loose fibre, that is, without grading. The only exception was the '42.5 rais and above' group in which about a half per cent of fibre was graded in 1967/68 and about three per cent in 1966/67. It is clear, therefore, that in the event of high fibre prices, only producers of large quantities attempted to grade some negligible proportions of their produce. The rising price level did encourage farmers to grade their produce. As a result of sharp decline in kenaf prices, the operators of small farms withdrew relatively larger areas out of kenaf cultivation than did the operators of large farms. On an average, kenaf sales per farm dropped from 2,450 kg in 1966/67 to 1,140 kg in 1968/69. Nearly three-fourths of kenaf fibre was sold to village dealers by the cooperators. This confirms that the private dealers continue to occupy a dominant place in the marketing of kenaf fibre. Although there were five private baling centres in Amphoe Chatturat, yet only about two per cent was sold to them. Only members with the largest farms sold about four per cent of their sales to balers. It is clear that the Cooperative faces tough competition from the village dealers. One reason why members sold three-fourths to village dealers is that they managed to sell as much as 73% at the farm houses. It is common practice with village dealers to buy fibre at farm houses and transport it to an assembling centre or their shops. The farmers find it difficult to transport their small weekly or monthly harvests to market places. In the absence of good transport, nearness of buyer to the farm was an important consideration in the choice of the marketing channel. More than half the total quantity sold originated on the largest size farms. The smallest size farms contributed only about 11%.

The Cooperative did not grant loans during the year 1968/69 because of the expected decline in fibre prices. The cooperators had to depend upon other sources for production (farm) as well as consumption (family) loans. Other cooperative organizations met 36% of the credit while 34% was supplied by friends and relatives. Merchants, usually a major source of agricultural credit, supplied only nine per cent. Only about one-fourth of the credit was specifically taken for production (farm) purposes. Nearly 47% was borrowed for the combined purpose of production and consumption. Cooperatives granted only 24% of their credit for production; while the merchants granted 64%. Nearly 70% of 'friends and relatives' credit was granted for consumption or family needs. The cooperators obtained nearly 83% of the total credit at an annual interest rate of 12% or less. They borrowed about 12% at the high interest rates of 60% per annum or more. With the prevailing low rates of return in Thai agriculture, it would be impossible for the kenaf farmers to repay such high interest loans. On the whole, the cost of credit was not so high as could be expected. The cooperative organizations supplied 100% of their credit at 12% per annum or less. All of the high interest rate credit was supplied by friends and relatives or by the merchants. The total amount borrowed by the members in 1968/69 was 1.059 million baht. It was noted earlier that in 1966/67 the Cooperative loaned 1.083 million baht slightly more than the total money the members borrowed from all sources in 1968/69. The credit needs of kenaf growers were directly related to the expected price level during the post harvest months.

Only about 35% of the members reported that they borrowed money during 1968/69. Nearly 69% of the borrowers reported arrears. Sixty-three per cent of borrowed funds were in arrears. Both in terms of number of borrowers and the amount, the rates of arrears were highest for cooperative credit, and lowest for merchant credit. This was in spite of the fact that all cooperative credit was given at very low rates of interest but much of it for family consumption while nearly 77% of merchant credit was given at higher interest rates of 36% per annum or more, but 63% for farm purposes. The merchants must have some kind of built-in supervision or compulsion which ensures high loan recovery against that of the cooperatives. Provision of agricultural credit at

reasonable interest rates must insure that such credit has first claim on repayment. Alternatively, the institutional credit should be able to meet the total credit needs of the members who should be prohibited from borrowing from other sources. This approach is necessary if the farmers are to be taken out of the clutches of private money-lenders and thus freed from chronic indebtedness. Development of suitable production, credit and marketing institutions is indispensable for raising the income levels of kenaf producers.

One approach towards institutional development, as examined in this study, is to integrate existing activities of the Cooperative vertically by setting up a kenaf baling centre. It emerges from the analysis presented in Chapter VI, 'Model for a vertically integrated Cooperative organization' that, with an additional working capital of 0.670 million baht, the Cooperative could set up a baling centre which would provide an internal rate of 35.2% on a total fixed capital investment of 0.828 million baht. By most standards, the rate of return is high enough to justify additional investment. Of the fixed capital, nearly 59% would be taken by buildings while the mechanical press would account for 15%. Besides such attractive return, the Cooperative baling activity would save members seven satang per kilogramme (or 70,000 baht for 1,000 tonnes of baled fibre) on the cost of transport from Amphoe Chatturat to Bangkok. There would be further saving in the labour costs of loading and unloading. This would help the Cooperative to attract more fibre and also to expand membership. The scheme would ultimately ensure the maximum quantity of fibre (2,400 tonnes) required to obtain a return of 35.2%. On the basis of its past reputation for reliable grading, the Cooperative would succeed in securing premium prices in the Bangkok market, which is not very easy for private baling centres to do. If one assumes that all kenaf produced in Amphoe Chatturat in the year 1966/67, that is, 29.7 thousand tonnes, would have been baled in Amphoe Chatturat had facilities been available, since the five baling centres can have baled not more than 20 thousand tonnes, there must have been a balance of nearly nine thousand tonnes that went out of the Amphoe. This indicates that there would be enough raw material available for the proposed cooperative baling centre which is intended to bale only 2,400 tonnes in one season. Goodwill and the fact that the chances of malpractices in weighing,

grading, financial management, etc., are less in a cooperative organization, should put the Cooperative in an advantageous position as opposed to private balers. Moreover, a one-press baling centre working at full capacity provides full time employment for more than 19,000 man-days in one season, that is, continuous employment to 90 workers for 210 work-days.

Past experience of the Cooperative shows that the production and supply of mixed fibre increases with the expected increase in kenaf prices. In a year of very low prices therefore the baling centre may have to operate under-capacity and this would cut down returns. The rate of return analysis shows that the return would fall to 15.22% if the capacity dropped to 62.5%. The lowest average wholesale prices were reported in 1967/68. Even these prices called in a supply of 29.2 thousand tonnes of mixed kenaf fibre in the Amphoe. At this level of supply, the Cooperative baling centre would have if it could manage, a quantity of at least nine thousand tonnes available for baling against only a 2,400 tonnes required for normal capacity operation. The possible low prices, therefore, do not seem to present serious threat to profitable operation of the baling centre.

A big hurdle in setting up a cooperative baling centre is the lack of finance. Considerable finances will be required to meet the increased demand for production loans and to set up the baling centre. At the end of the year 1968/69, the Cooperative had a paid-up share capital of 184,600 baht/- and a reserve of 36,950 baht/-. It also had 479.6 thousand baht in hand or in the bank, besides a revolving loan fund of 1.1 million baht on which it pays two per cent interest to the Government. In 1966/67 the Society advanced 1.083 baht as loans to members and handled the maximum quantity of fibre, that is, 772 tonnes. Given favourable international prices and continuing goodwill, the Cooperative would be able to double the quantity of fibre handled, provided its loan fund were also doubled. The analysis presented in Chapter II strongly suggests that there is a direct relation between the amount lent by the Society and the quantity of fibre supplied to it by its members. The Government, through the Department of Credit and Marketing Cooperatives or the Bank for Agriculture and Agriculture Cooperatives, can help to build up the Society's loan fund by providing a loan of one million baht.

The past performance of the Society supports the wisdom of granting such a loan because the Society has been very cautious in selecting applicants for loans and in fixing the amount lent to each applicant. The rate of loan recovery has been high and satisfactory. The Government may loan half-a-million baht in the first instance and, if the demand for loans and market conditions for fibre justify a larger amount, the balance could be lent at a later date.

To strengthen the baling activities of the Cooperative, additional finance of 0.670 million baht is required. The economic analysis indicates that investment in the baling centre would be advisable on the basis of an expected return of 35.2%. The importance of such a project in the economic and social development of the north-eastern region, which produces about 95% of Thailand's kenaf, cannot be overemphasized. The Ministry of National Development, which is responsible for the development of agricultural credit and marketing cooperatives, should seriously consider helping those cooperatives which are founded on strict business principles and hold promise for the economic uplift of rural communities. The Agricultural Products Marketing Cooperative, Ltd., can put a very convincing plea for additional financial support for setting up a kenaf baling centre. The loan and baling activities should be considered together, as the success of baling will, to a great extent, depend upon the quantity of raw material supplied by the members and this is ultimately tied up with the amounts which the Cooperative can advance to fulfil agricultural credit needs. To sum up the immediate need the Cooperative is to find 1.17 million baht, 0.67 million baht for baling centre and 0.50 million baht for its loan fund.

In the context of regional economic development in Thailand, the baling centre could be expanded into a regional cooperative centre to provide training and demonstration in cooperative principles, organization and management in general but in production, processing and marketing of kenaf in particular. This centre, if found successful, could be the nucleus for developing similar cooperative baling centre in other Changwats of the region. Quality control of baled fibre has become a serious problem in the expansion of fibre exports, partly because insufficient attention given by the balers or dealers to the selection of suitable (technically qualified) graders. During the months of peak

supply of fibre, the ordinary workers are given the task of sorting and final grading. This situation will be improved if the proposed cooperative training centre introduces 2-3 week training programmes for potential graders and award certificates to those who successfully complete the training. It will then be necessary to ensure that the baling centres or dealers employ only certified graders. The training of quality control inspectors is equally important, for ensuring correct weight and grade of fibre packed in each bale. The proposed regional cooperative training centre will be an ideal place for on-the-spot training of inspection staff in methods of grading, grade identification, process of baling and prescribed procedure of inspection.

A UNIDO Mission has observed that, "the small capacity of the average baling house is one of the chief causes of irregularity of quality in parcels sent for export. Some of the balers appear to have little knowledge of fibre quality and some are probably in the baling business because it enables them to deal in fibre, often as speculators."* To improve enforcement of the quality control the Mission has suggested, among other things, two forms of action: punitive and advisory. "Punitive action would involve, ultimately, the withdrawal of a licence to operate as a baler. Advisory action should aim at assisting those balers who need some advice and guidance in sorting, grading, cutting, etc., and should aim at raising the overall standard of grading."+ It has further been recommended that the Government of Thailand should approach the United Nations for assistance in obtaining the services of an expert in the preparation and grading of fibre.

The replies given by non-members indicated that at least 60% were definitely interested in joining the Cooperative, under certain conditions. A majority of the remaining 40% did not give any opinion because they did not know about the Cooperative and its activities. A supply of agricultural credit at reasonable rates of interest could attract nearly 48% of the kenaf growers to membership. The remaining growers

---

*"Report on the Kenaf Industry in Thailand", United Nations Industrial Development Organization, UNIDO/TCD/6 July, 1970, p. 12.

+Ibid, p. 23.

would prefer the Cooperative to provide services, such as transport, grading, supply of farm inputs and agricultural extension advice. The members, on the other hand, saw definite advantage if their Society were to own a baling centre. Nearly two-thirds thought that vertical intergration would increase the volume of fibre supplies. Nearly half thought that they would get higher price and one-tenth thought that there would be reduction in transport costs. Provision of storage facilities, reliable grading, and other advantages were also mentioned by some members. Nearly half the members showed definite interest in buying additional shares if more capital were needed for setting up a baling centre, especially those who planted small areas with kenaf.

It can be concluded that the Cooperative can rightly expect wider support from members and non-members in the successful operation of a baling centre, if it can expand the size of its loan fund, provide credit at lower rates of interest than those of private money lenders, provide transport to collect fibre from farm houses, improve and expand grading facilities and give agricultural extension service including a supply of improved farm inputs. The survey clearly indicates that many kenaf growers in the Amphoe have not even heard of the Cooperative. A membership campaign will be necessary to educate non-members regarding its activities. A properly organized and managed cooperative baling centre would help to reduce production, processing and marketing costs and increase the chances of securing higher prices. The large national losses which have occurred in the past as a result of the withdrawal of large areas from kenaf cultivation and leaving them idle would be minimized to an appreciable extent.

IX. ACKNOWLEDGEMENTS

This study forms part of a research project, "A feasibility study for setting up a farmers' organization for marketing kenaf in the north-eastern region of Thailand". This project was a joint undertaking of the United Nations Asian Institute for Economic Development and Planning and the Applied Scientific Research Corporation of the Government of Thailand. The former provided professional guidance and the latter financial assistance and computation facilities. The author is grateful

to Messrs. Frank G. Nicholls and Norman L. Wake of the Applied Scientific Research Corporation for their continued encouragement and support provided throughout the conduct of this research project. The Data Processing Section at the ECAFE Statistics Division kindly provided substantial assistance in data processing, especially tabulation.

The author was responsible for planning, designing, implementing and overall supervision of the survey operations. It would have been nearly impossible to plan and implement a farm survey in Chaiyaphum without the active assistance of the Ministry of National Development of the Royal Government of Thailand. The author's heartiest thanks are due to many officers of the Ministry especially, Col. Surindr Cholprasert, Deputy Under-Secretary, and Mr. Pradit Machima, Chief, Research and Publication Section, who spared no effort in providing help at various stages of the farm survey operations.

It is not possible to thank adequately the large number of kenaf growers, dealers, merchants, balers, exporters, baling plant manufacturers and private and government individuals and organizations who spent many hours of their valuable time in supplying needed information or in discussion relevant aspects of this study. The author remains indebted to them.

The views and opinions and any error in this report are the responsibility of the author alone.

APPENDIX I

RESEARCH METHODOLOGY

Area: Farm survey data for this project were collected in Amphoe (district) Chatturat in Changwat (province) Chaiyaphum located in the north-east region of Thailand. This Amphoe was selected because the only producers' cooperative society for marketing kenaf in Thailand is located there and it is one of the major kenaf producing areas in the country. The Amphoe has been subdivided into eleven Tambons for administrative reasons. In March, 1969, it had an estimated population of 73,295 with the male population comprising about 48%.

Sources of information: Data were collected through personal interviews by especially trained investigators from original sources: kenaf farmers, village, Tambon, Amphoe and Changwat dealers and traders, balers, wholesalers, exporters, baling plant manufacturers and many government, semi-government and private organizations. Farmer level data were confined to Amphoe Chatturat, while data from remaining sources of information were collected also in Bua Yai, Khorat, Khon Khaen, Bangkok and Thon Buri. Pretested questionnaires were used for collecting the data.

Period of data collection: Preliminary thinking on this project started in July 1968, when the Applied Scientific Research Corporation of the Government of Thailand and the United Nations Asian Institute for Economic Development and Planning formally agreed to jointly undertake it. The farm survey to collect data from kenaf growers was conducted during the first three weeks of April 1969, when the farmers had marketed the 1968/69 kenaf crop and were relatively free to meet field investigators. Data from the rest of the sources of information were collected between January and September 1969. Most of the farm data refer to the crop year 1968/69, while some data were also collected for the years 1966/67 and 1967/68.

Sample design: It has been mentioned earlier that farm data were confined to kenaf growers in Amphoe Chatturat, random sampling techniques were successfully applied in the selection of growers but did not work satisfactorily in the selection of dealers, balers and exporters who

had to be selected on the basis of cooperation and reliability of the data obtained. It was possible to judge data reliability and thus to improve quality by cross-examination of the interviewers.

A two-stage random sample design was applied in the selection of growers. There are 110 villages in the district, which were divided into two groups:

i) villages having kenaf growers, some of whom were members of the Agricultural Products Marketing Cooperative, Ltd.,

ii) villages having kenaf growers, none of whom was a member of the Cooperative Society (also 55 villages).

For the first group of villages, a list of members of the Cooperative in each village was prepared. Two or three of the villages were clustered into a block in such a way that each block had about 30-40 cooperative members and as far as possible located in the same Tambon. Thirty-one such blocks were formed comprising 55 villages. Ten of these blocks were selected at random with equal probability without replacement.

Group A. In each block of type (i) above, 15% of the Cooperative members were randomly selected without replacement with equal probability. Sixty-two members were thus selected for interview.

Group B. In each of the selected blocks of type (i) also, four per cent of the kenaf growers who were not members of the Cooperative were randomly selected for interview. The number thus selected was 73.

Group C. Out of the second group of villages of type (ii) which had no cooperative members, five villages were randomly selected with equal probability without replacement. In each of the selected villages, 10% of the kenaf growers were selected at random. The number thus selected was 60. The total sample size (n) was as follows:

An additional number of farmers was randomly selected in each group to permit replacements:

Group A 62 n_a
Group B 73 n_b
Group C 60 n_c
Total = 195 = n, the overall sample size.

Estimation procedure for district (Amphoe) estimates:

$$\text{Inflation factor for Group A} = \frac{100}{15} \times \frac{31}{10} = 20.67$$

$$\text{Inflation factor for Group B} = \frac{100}{4} \times \frac{31}{10} = 77.5$$

$$\text{Inflation factor for Group C} = \frac{100}{10} \times \frac{55}{5} = 110$$

Estimates of number of farmers in the Coop. group (A) = 1,282
" " " " " in the district group (B) = 5,657
" " " " " in the district group (C) = 6,600

Reasons for selecting the above sample design:

It was obviously impracticable to adopt a simple random sampling design and select a random sample of kenaf growers from among all the kenaf growers in the district. In the first place, it would have involved making a list of all the kenaf growers in all the 110 villages, which would be a time-consuming affairs. Moreover, a sample taken from such a list would disregard the importance of the different type of kenaf growers.

A two-stage sample design is, therefore, the obvious one to adopt in such cases. The first sampling stage should be villages and the second the growers. This type of design was improved by stratification, as 55 of the villages had some growers who were members of the Cooperative and 55 villages had none. In assessing the economic feasibility of vertical integration, the views of the growers in the first 55 villages were obviously more important. Moreover, in these villages, not all growers were members of the Cooperative, but their opinions helped in examining the prospects for further expansion. Thus it was natural to make three strata: (a) members of the Cooperative in 55 villages where it had members, (b) non-members of the Cooperative in the same 55 villages, (c) growers in the remaining 55 villages containing no members of the Cooperative. Strata (a), (b), and (c) represent a decreasing order of importance; so, obviously, to get a representative sample, the highest sampling fraction was needed for (a), the next for (b) and the least for (c).

Strata (a) and (b) were formed from the same 58 villages, which were divided into blocks of 31 by grouping adjacent villages so that first stage sampling units did not become too small. The exact sampling fractions adopted was a matter of choice, guided by experience and the resources available.

Reliability of population estimates as calculated from the sample:

The sample selected in accordance with the design adopted gives varying weightage to different types of growers, who are distributed in different strata in the Amphoe. Estimates derived from such a sample are expected to be more accurate than those based on simple random sampling, since the variations between strata are eliminated from the estimate of standard error. Population estimates from the sample are obtained by the usual process of multiplication by the reciprocals of sampling fractions separately for each stratum.

The author had the privilege of discussing this sample design with Mr. V.D. Thawani (Bangkok) and Mr. N.S. Choudhry (Kuala Lumpur), both FAO agricultural statisticians. Their valuable advice is gratefully acknowledged.

APPENDIX II

AVERAGE WHOLESALE PRICES OF KENAF (HIGHGRADE)
(Baht per metric ton)
1964-1969

Period	1964	1965	1966	1967	1968	1969
January	2,538	2,996	3,384	2,875	2,230*	3,750
February	2,745	2,944	3,260	2,929	1,900	3,730
March	2,748	2,560	3,723	2,505	1,690	3,530
April	2,708	2,731	3,809	2,005	1,910	3,330
May	2,669	3,005	3,958	1,829	1,950	3,190
June	2,598	3,121	3,958	1,670	2,070	3,010
July	2,474	3,317	3,958	1,625	2,470	2,950
August	3,067	3,250	-	1,625	2,830	2,730
September	3,528	3,305	2,947	1,726	2,860	2,620
October	3,198	2,946	2,638	1,750	3,110	2,430
November	2,907	2,871	2,758	1,653	3,640	2,450
December	3,017	3,187	2,675	1,502	3,650	2,760
(Average)	2,850	3,019	3,370	1,975	2,526	3,040

*Baled kenaf (A Grade) from January 1968.

Source: Bank of Thailand, Monthly Bulletins, 1965 to 1970, Bangkok.