STUDY REPORT
ON
REVIEW OF THA NGONE AGRICULTURAL DEVELOPMENT PROJECT IN LAOS

March 1973

Overseas Technical Cooperation Agency

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PREFACE

The Royal Government of Laos has been placing emphasis in its policy on agricultural development with an aim to develop its over-all economy; mainly by settling the chronic food shortage.

In autumn 1967, the Government called upon Japan's technical assistance for their project of agricultural development in the Tha Ngone area covering 800 ha. in the Vientiane Plain where the capital city of the Kingdom is located as the political and economic center.

To meet this urgent need of the Government, the Japanese Ministry of Foreign Affairs entrusted the execution of the project to the Overseas Technical Cooperation Agency. The Agency despatched three consecutive survey missions since January 1968, until the inter-governmental agreement was concluded in April 1970, and since then Japan's technical assistance has been continued.

In 1972, twelve families of settlers immigrated in 24 ha. reclaimed farmland of the 100 ha. Pilot Farm, and they are now engaged in irrigation farming. However, the project has been affected in its principal evaluation factors which changed noticeably by economic impact abroad, especially by rapidly increasing inflow of cheap Thai farm products into Lao market. Accordingly, the initial program of farming was necessitated a thorough review.

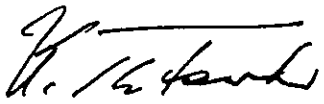
The Agency was therefore prompted to review the initial program of the Tha Ngone project, based on the detailed findings of the project in progress, and further to step forward and make necessary modifications, acceptable theoretically as well as practically.

The Agency despatched a research mission to execute the plan, headed by Mr. Shoji Kanatsu, Deputy Director of Construction Department, Kinki Agricultural Land Bureau of the Ministry of Agriculture and Forestry. The mission's study was concentrated mainly upon farming and farmers' organization.

This report is written to be used as a reference for the resident Japanese experts and those concerned with the Tha Ngone Project.

I would like to take this opportunity to express my sincere thanks to Mr. Kanatsu, leader of the mission, and his staff members as well as the officials concerned of the Ministry of Foreign Affairs and the Ministry of Agriculture and Forestry for their utmost efforts. I also appreciate the collaboration given by those concerned of the Government of the Laos, USAID, ADO, HATDOKEO.Pilot Project, the Japanese Embassy in Laos,.and Japan's Overseas Cooperation Volunteers in Laos.

July 1973



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Chapter I: Introduction

1.1 Background and Precedent Cooperation

Plentiful with resources and spacious arable land endowed in the Kingdom of Laos are only modestly utilized for productive purposes. With 90% or more of its people being engaged in farming the country is heavily dependent on food imports including rice because its agricultural productivity is kept extremely low, primarily due to an overall lack of irrigation facilities. The Royal Government of Laos is naturally keen at agricultural development, particularly in the Vientiane Plain, the hinterland of the Kingdom's capital, and thereby to restore its economic stability and to level up its people's living.

Not less than a quarter of a million people, including the citizen of Vientiane, are steaming on the Vientiane Plain to make it not only the most densely populated area in the country but also the most important zone from all of the political, social and economic aspects. Yet, the agricultural production there can hardly feed its populace, the deficit being chiefly supplemented by imports from Thailand. Nam Ngum Project (initially 5,000 ha and ultimately, 32,000 ha) and FAO-aided Pilot Farm (about 300 ha) are instrumental in fostering agricultural development of the Plain.

USAID(United States Agency for International Development) seconded the official strategy of selecting the agricultural development of the Vientiane Plain as the urgent-most project among all economic development programs elsewhere in the country.

Farmers' recognition of the merits of irrigated-farming is thus rapidly spreading on the Plain so much so many farmers are now trying to irrigate their own fields, on individual basis.

Japanese cooperation, on the other hand, dates back to the time of her participation at the Development Project of the Nam Ngum River, a tributary of the Mekong, which is flowing down through the Vientiane Plain, which was taken up by the U.N. Mekong Committee. Japanese Government made contributions towards the fund required for implementation of the Nam Ngum Development Project which aims at irrigation of some 32,000 ha of land power, flood control and navigation. The construction work of Nam Ngum Dam has been completed by the hand of the Japanese contractors, under the supervision of the Japanese consulting engineers in 1972.

It was in 1966 that the Laos-Japanese Agriculture & Livestocks Training Center was established at Tha Ngone on the Nam Ngum River, where agricultural experts and Overseas Cooperation Volunteers from Japan had been actively at work. This Center had made worthy contributions for agricultural development of the country through experimentation and demonstration of the improved methods of producing paddy, vegetables, fruits, sericulture, livestock, etc., and by training young generation of the rural population in advanced techniques of their production.

On the occasion of the then Prime Minister Mr. Sato's formal visit at the Kingdom of Laos in the autumn of 1967, Premier H.R.H. Souvanna Phouma of the host Government intimated his guest of his Government's desire to obtain Japan's assistance in its nation-building program, including that meant for development of the Vietiane Plain. The Royal Government of Laos did not waste time thereafter in selecting a few specific projects wherein Japanese cooperation was sought after. Two project-sites for agricultural development of the Vientiane Plain were suggested, the one in Phon Hong district (project-area being 2,000 ha in size), 70 km north to Vientiane City and the other in Tha Ngone district (800 ha) on the Nam Ngum River, 25 km north to the capital. The choice of the Japanese Government fell upon Tha Ngone, where a certain Japanese private consulting engineering company had already made a preliminary survey, on the ground of the three following reasons:

(1) Vicinity to the above said Laos-Japanese Agriculture & Livestocks Training Center whose experimental facilities,

experiences and installations would be of great help for agricultural development cooperation;

(2) Strategical position which would help making successful project there a model for agricultural development in the Vientiane Plain, particularly in its low-lying region along the Nam Ngum River, and

(3) International team-work among various agricultural development efforts in the neighborhood of Tha Ngone, such as the plan to establish an Agricultural Technical School by France and the similar project to open the Soil & Pest-Control Institute by USA and UK, would turn Tha Ngone a center for agricultural technology in Laos in near future.

1.1.1 Feasibility Survey

Feasibility Survey Team comprising of ten members under the leadership of Mr. Ttsuichi Fukuzawa, Senior Research Officer, Agricultural Land Bureau, Ministry of Agriculture & Forestry, was deputed to the project-area in January 1968, in replay to the Laotian Government's request. The same Team made, within the period of a month, field surveys in such as (i) hydrology, (ii) irrigation planning and land surveying, (iii) designing of various structures, (iv) pattern of cultivation and land-use, (v) soil classification and soil map preparation, and (vi) regional agricultural study, and brought about conclusions as to technical feasibility and economic justification of the development project there.

1.1.2 Detailed Designing

Prior to starting at detailed designing of the project requested by the Laotian Government in pursuance of the Feasibility Survey Team's findings, it was believed necessary to secure a certain financial source of construction fund called for implementation of the project. After studying various pertinent cases, approaches for provision of loan were made towards the Asian Development Bank

Upon receipt of unofficial remarks from the Asian Development Bank, another Team of ten members headed by the same Mr. Fukuzawa returned to the project-site in November 1968 and for two months engaged at:

(i) soil survey; (ii) hydrological check; (iii) topographic surveying around the pumping-station site; (iv) profile- & cross-section surveying of the water canals; (v) preparation of Design Report, terms and conditions as well as contract-forms needful for tender; (vi) analysis of the pattern of cultivation, and (vii) market research.

Consequently, amendments were made to the original plan which had been worked out on data assimilated in the previous Feasibility Survey and on such evised plan were prepared: (i) designing of the structures, (ii) construction plan, (iii) construction-cost estimate, and (iv) specifications. Design Report and Tender Document (documents required for tender, such as specifications, terms and conditions of contract, instructions to the contractors, drawings, etc) were also completed.

1.1.3 Agricultural Development Survey in the Vientiane Plain by Netherland Consulting Team entrusted by the Asian Development Bank

Netherland Consulting Team entrusted by the Asian Development Bank dispatched to Laos in January 1969 a team of specialists (nine Dutch, three German, one Thai, one Philippine, and one Japanese = Dr. Kazuma Nojima, the then Deputy Director of Agricultural Experiment Station, Ministry of Agriculture & Forestry)) to make priority-decision as to the order of implementing various agricultural development schemes in the Vientiane Plain. Recommendations as to giving top-priority to Tha Ngone district were submitted by the ADB Team in April 1969 on the following grounds:

The Team was understandably of the opinion that 800 ha might be too modest for the Bank's loan and it would be more advisable to make the project bigger by adjoining 1,300 ha on its south. The idea

1) Improving irrigation and drainage facilities;

2) Establishing popularly acceptable techniques in rice growing, stock raising, horticulture, and other fields;

3) Training local technical personnel; and

4) Offering guidance in farm management to farmers in the project area.

1.1.5 Discussions with the Asian Development Bank's Appraisal Mission

In September 1969, Mr. Van Tuiji, Asian Development Bank's staff engineer in charge of the Tha Ngone Project visited Japan for detailed discussions with Japanese officials concerned on the technical aspect of the Project. In November the Bank sent the Tha Ngone Project Appraisal Mission which was headed by Mr. Suma, Chief of the Bank's Agriculture Division. This nine-man group which included a Dutch irrigation engineer, a German agricultural economist, a Thai agronomist made on-the-spot studies and had a series of discussions with the Royal Lao Government officials which was also attended by Messrs. Kanatsu (OTCA) and Kawakatsu (Nippon Koei Co., Ltd.). These two engineers were the members of the Japan's survey mission for the Project.

Further discussions between the Bank and the Japanese team were made in December 1969, in Tokyo which were finally followed by the decision of the Bank's Board of Directors on the financing of the Tha Ngone Project.

The inter-governmental agreement for technical cooperation for the Project's Pilot Farm was concluded in April 1970.

was eventually dropped on the ground that the bigger project would be of no avail as the adjacent plot of 1,300 ha would not return more than 4% internal rate. According to the Team's evaluation, the plot of 2,300 ha spreading on east has a higher internal rate of return at around 8% and, therefore, it might as well be utilized for a separate development project after implementing 800 ha project.

1.1.4 Pilot Farm Project

In June 1969, the Overseas Technical Cooperation Agency (OTCA) despatched the feasibility survey mission for the Tha Ngone Pilot Farm Project to Laos.
After about a month of on-the-spot surveys, the mission decided to set up a 100 ha. Pilot Farm in the 800 ha. Project area, utilizing the existing Laos-Japanese Agriculture and Livestock Training Center as its nucleus and worked out technical cooperation programs for the following five years.

The purpose of setting up and operating this Pilot Farm was to help the farmers to achieve the proposed agricultural production and their income target by practising irrigation farming in the Project area. Although some farmers in the Vientiane Plain have been trying irrigation farming and fertilizer application with the assistance of the Royal Government and the USAID (United States Agency for International Development), most of the people are inexperienced in such modern farming practice. It was also found necessary to carry out further studies concerning the selection of promising varieties and their cultivation techniques. It was therefore planned that, in parallel with the construction work of the area, the Japanese Government would extend the technical cooperation for this Pilot Farm by sending seven experts (leader, experts in rice culture (2), farmers' organization, irrigation and livestock and liaison officer) and the J.O.C.V. Volunteers in the necessary fields of work and by providing the Farm with necessary equipment and materials.

The tasks of the Pilot Farm will be;

1. to establish operation and maintenance system of the irrigation and drainage facilities,
2. to standardize growing techniques of rice and other crops and animal raising techniques,
3. to train the Lao counter-parts and technicians and
4. to give technical guidance to the settlers.

1.2 Outline of Tha Ngone Agricultural Development Project

The project-area is spreading on an extremely flat terrain of about 1,000 ha at an elevation of 163 - 167 m, being extensively covered by a mixed vegetation of shrubs, reeds and grasses. To the north of the project-area is flowing the Nam Ngum, a tributary of the Mekong, which submerges most of the area under water during the flooding period of August and September.

The soil covering the project-area is mostly made up of the recent alluvial immature soil originating from the parent-material of fluvial deposits which was transported rather recently by the Nam Ngum and its tributaries. This soil-group can be further subgrouped into the natural levee soil and the hydromorphic soil, both being suitable for paddy cultivation because of their chemical as well as physical properties.

This project aims at developing 800 ha of land into an irrigated farmland where modern agricultural techniques would be acclimatized to the local conditions and demonstrated on behalf of the local farmers so that it could stand as a model-farm for exploitation of the virgin land extending along the Nam Ngum for an increased paddy production.

Farm program to be implemented thereupon was worked out upon careful consideration of the environmental conditions prevailing in Laotian agriculture. The "standard unit of farm operation" there was made 2 ha after comparing merits and demerits of that of 5 ha. Double cropping of paddy was accepted as a major premise for farm program and partial mechanization of farming is accordingly visualized. Irrigation of the farm would be effected by pumping up 1.2 l/sec/ha water at the maximum from the Nam Ngum which would be conducted to the field through irrigation canal.

The major facilities planned for the project implementation are summarized on Table 1, as follows:

Table 1 MAJOR FACILITIES ON THE PROJECT-AREA

Facilities			Revised plan
(i)	Area under Irrigation		820 ha
(ii)	Pumping Station		
	Head		19.0 m
			(actual 16.2 m)
	Capacity		135 KW x 3
	Maximum Output		32.4 m^3/min x 3
(iii)	Irrigation Canals		
	Main canal, length		8.5 Km
	Lateral, length		4.5 Km
(iv)	Drainage Canals		
	length		31.8 Km
(v)	Protective Embankment		8.8 Km
(vi)	Flood Gate		flapgate ϕ1200 mm x 3
(vii)	Drainage Pump		
	Head		6.0 m
	Capacity		70 KW x 2
	Mean discharge		52.0 m^3/min x 2
(viii)	Nong Samkha Barrage		
	No.1	Crest length	1,133 m
		Crest height	9.0 m
		Crest bulk	90,000 m^3
	No.2	Crest length	407 m
		Crest height	8.0 m
		Crest bulk	45,000 m^3
(ix)	Road		
	Main		24.5 Km
	Branch		32.5 Km
(x)	Power Distribution Line		10 Km
(xi)	Construction Period		32 months

1.3 Aims of the present survey

The technical cooperation of the Government of Japan for agricultural development in the Tha Ngone Project area has been carried on since 1970. During these three years, the construction work inclusive of irrigation and drainage system, and land preparation for irrigation farming have smoothly proceeded in parallel with the establishment and management of the Pilot Farm, and 12 households of settled farmers are presently engaged in irrigation farming on the newly prepared fields of 24 hectares.

In the meantime, various essential factors on evaluating the Project's feasibility have changed remarkably due to foreign economic impact. Under such circumstances, it was urgently required to review the original Tha Ngone Project plan in the light of detailed study results on the latest status of the Project and to revise the original plan so as to made it more rational and practicable.

This study report has been prepared based on the results of our field study conducted for about one month, from January to February, 1973. The terms of reference for the one-month field study are as follows:

1. To review the original cropping pattern and the representative farm budget for the Tha Ngone Project area
2. To study the establishment of farmers' organization and the related credit system
3. To prepare the implementation programme for the Tha Ngone Pilot Farm

During the field study, the Japanese Survey Team was stationed in Vientiane and often visited the Tha Ngone Project area for the survey. Several discussions were held in the Tha Ngone Project area as well as in Vientiane with the staff of the Royal Lao Government and members of the resident OTCA Expert Team. In addition, the Team visited some concerned offices and stations such as the USAID, ADO, Hat Dokkeo Pilot

Farm, National Agricultural Research Station at Sarakam, etc. to collect data and information.

Besides, for four days, from 7 to 10 February, the Team made a short trip to collect data in the Northeast Thailand. As a result, much data and information which were useful for further studies in Tokyo were collected.

II. FOOD PROBLEM IN LAOS

2.1 A Recent World Food Problem[1/]

World food production, which appeared healthy and growing only a few months ago, has suddenly shrunk close to the point of gloval crises. No mass starvation is reported, but there is widespread hunger in many countries. Further, it is said that another poor crop year in 1973 could be disastrous.

In many areas the setback has canceled gains of the "green revolution" that used new seeds and modern equipment to bring a sharp increase in agriculture. Food production in many developing countries did not improve enough in 1972 even to keep pace with the rise in population, let alone raise the quality of substandard diets.

Soviet officials call the harvest of 1972 "the worst harvest in 100 years". In China, a drought in corn and wheat fields of the North Region and a similar lack of rain in rice area of the South Region are bound to reduce output. India, Bangladesh, Afghanistan, Burma, Indonesia, and the Philippines were also affected by droughts or floods.

Cambodia, which once exported rice, is forced to import half a million tons of it in 1972 because of bad weather and disruptions by military operations. South Vietnam had a doubled shipment from U.S.A in 1972.

While countries short of food resort to imports for survival, some nations such as Australia, Canada and U.S.A. that traditionally produce surplus crops are having problems of their own.

1/: Refer to "U.S. News & World Report" published on 11 Dec., 1972, and "Toyo Keizai" (Japanese economic weekly) published on 3 March, 1972.

Increasing calls for grains are expected to cut world wheat stocks from last summer's 50 million tons to less than 34 million tons by coming July. That would be the slimmest reserve in seven years. The FAO says that, for the second consecutive year, the world's developing countries are falling behind in the race to match food output with growing population.

2.2 Present Food Situation in Laos[1/]

Agriculture is the most important sector of the Laotian economy and provides employment and sustenance to 80-90 per cent of the population. The subsistence sector is, however, very large and production falls short of the requirements of the entire population of the country, necessitating import of foodstuffs, notably from Thailand. The Government has in recent years made efforts to increase domestic output with the ultimate aim of achieving self-sufficiency in basic food-stuffs.

Rice, which has been grown in some 700,000 hectares of farm land, is by far the most important crop and the staple food in Laos. Other major crops are corn, vegetables, potatoes, coffee, tobacco and cotton, all of which are utilized within the country, with the exception of coffee.

The crop production are given in Table 2.

1/: Refer to "Economic Survey of Asia and the Far East, 1971" published by the United Narions in 1972, and "Country Development Brief on Laos" prepared by E.H. Hartmann. Director, Area Service Division of FAO Regional Office for Asia and the Far East, Bangkok in 1972.

Table 2 CROP PRODUCTION[1/]

(ton)

Item	1968	1969	1970	1971
Milled rice	513,845	536,910	540,830	507,418
Corn	23,000	26,000	28,000	28,000
Cotton	2,500	2,700	3,000	3,320
Tobacco	4,000	3,800	3,800	3,800
Coffee	3,500	3,450	3,200	2,800
Vegetables	18,500	19,200	19,500	-

Livestock farming is one of the most promising industries in this country, but not much development is seen. Cattle and buffaloes are mainly used for field works and for transportation purposes. Hogs and poultry form a source of farmer's income.

Meantime, in the Vientiane Plain, IRRI rice, which allows double cropping, was introduced in 1967 and the use of fertilizers and insecticides has become more widespread. Thus the rate of increase in rice production has accelerated substantially since 1967. However, it seems to have suffered a setback as a result of the disastrous floods in the Vientiane Plain in August - September 1971. Production estimated are not available, but it seems that per capita output remained more or less stagnant.

In addition, the price of rice, which had declined sharply since the beginning of 1970, had continued until the end of 1971. During this period, a serious study had made on the marketable upland cash crops as the alternative croppings instead of paddy in order to get more profits in the Tha Ngone Project area.

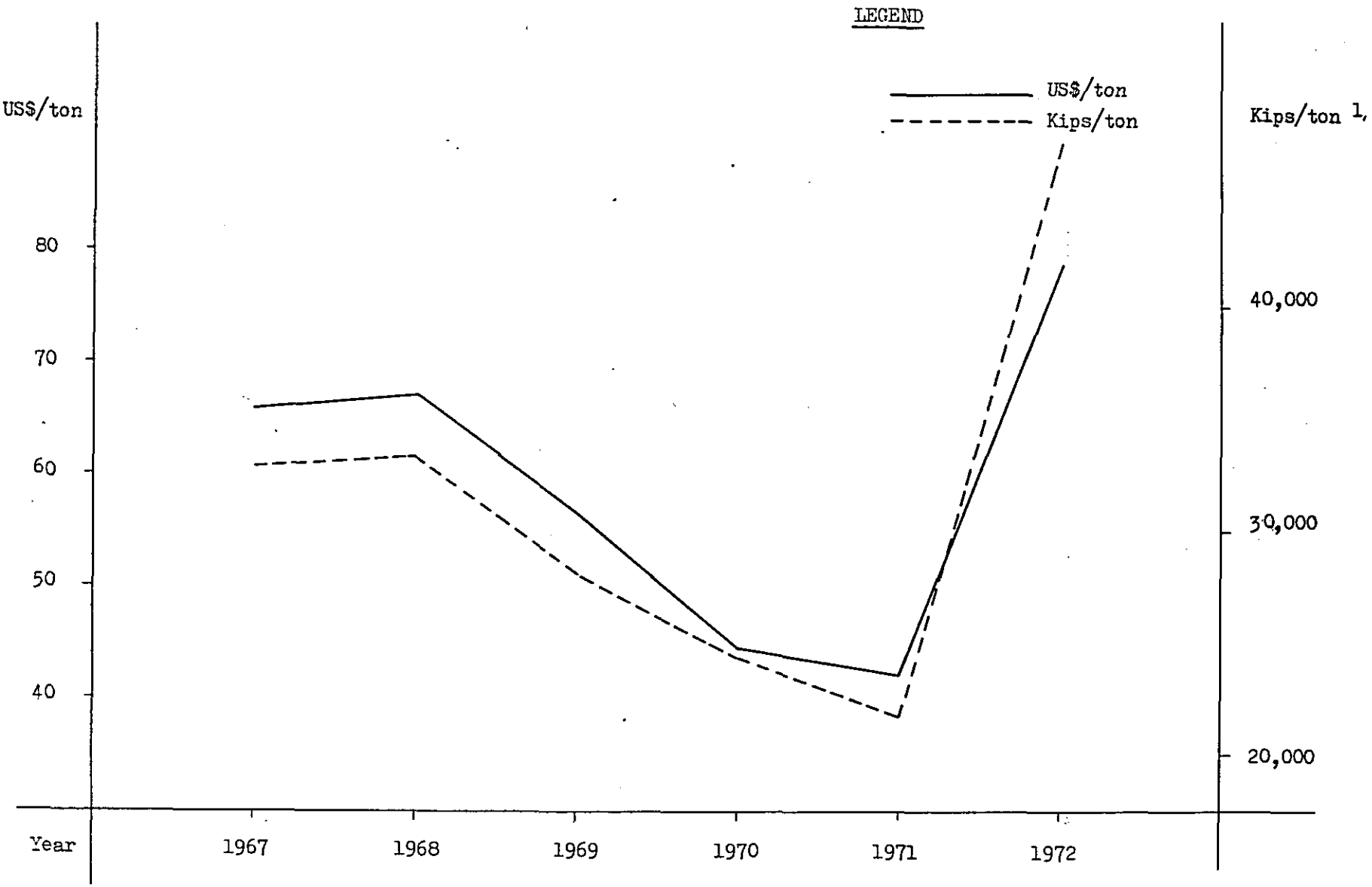
1/: Obtained from "Summary Report on the Economic and Financial Situation for 1971-1972" prepared by the Commissariat General au Plan, Royaume du Laos in June, 1972.

The price of rice in Vientiane, however, has hiked since the beginning of 1972 as shown in Figs. 1. This tendency continued because of the shortage of rice supply mentioned in Paragraph 3.1. On the other hand, vegetables and stock products are mainly from Thailand as shown in Table 3 and 4.

According to the survey[1/] on the potential demand for maize and other food grains, requirements for locally produced animal feeds would be 29,000 tons per year. The energy portion from maize, rice bran and broken rice would be 24,070 tons. Protein source from soybean meal, fishmeal would be 4,060 tons and the remaining 870 tons would be minerals, vitamins and medication. In 1971 the ADO indicates that the milling of rice by Vientiane mills was around 12,000 tons of paddy. This would provide, 1,200 tons of rice bran and about 500 tons of broken rice.

1/: Refer to "Potential Demand for Corn and Other Food Grain" prepared by the USAID.

Fig. 1. ANNUAL TREND OF MARKET PRICE OF 10% GLUTINOUS RICE IN VIENTIANE 2/



1/: The exchange rate was changed from Kips 500/US$ to Kips 600/US$ in the first week of November, 1971.

2/: Obtained from the ADO.

Table 3. SOURCE OF VEGETABLE IN QUANTITY IN VIENTIANE 1/

(%)

Year	QUANTITY		Value	
	From Laos	From Thailand	From Laos	From Thailand
1964	52	48	41	59
1965	50	50	39	61
1966	52	48	49	51
1967	54	46	52	48
1968	65	45	48	52
1969	56	44	52	48
1970	47	53	41	59

1/: Prepared from the results on RLG Vegetable Market Survey.

Table 4. SOURCE OF POULTRY AND EGGS IN QUANTITY AND AVERAGE PRICE IN VIENTIANE 1/

Item	QUANTITY		Average Price
	From Laos (%)	From Thailand (%)	
Chicken Egg	2.83	97.17	20.75 Kips/piece
Duck Egg	5.58	94.42	13.94 Kips/piece
Duck Egg (salted)	0	100.00	22.00 Kips/piece
Chicken Alive	15.36	84.64	562.50 Kips/ton
Chicken Dressed	1.61	98.39	492.86 Kips/ton
Duck Alive	16.48	83.52	580.00 Kips/ton
Duck Dressed	0	100.00	388.89 Kips/ton

1/: Obtained from the results on market survey in Vientiane conducted on 12-13 January, 1972.

2.3 Food Condition in Northeast Thailand 1/

2.3.1 Drought and Flood in 1972

The economy of Laos, especially that of Vientiane Plain, entirely depends upon the capacity of the Northeast Thailand economy just have mentioned above. From this point of view, an analysis on the Thai agriculture is necessary to clarify the real situation of the cropping pattern in the Tha Ngone Project area.

The rains, which in normal years begin some time in June, this year failed to fall in earnest until September, though there was some precipitation in May which persuaded farmers in some areas to plant early. The subsequent drought ruined large areas of crops, particularly maize, paddy, kenaf and cotton.

It is estimated that this year's crop of maize will be below 1.5 million tons, 45 per cent less than that of last year. Now, floods caused by tropical storms in September, have added their havoc to the drought damage and towards the end of the month inundation still threatened large area of farm land. Estimates for this year's rice harvest stand at 12 million tons, a 2 million ton drop from last year's figure and possibly the lowest yield since 1968.

2.3.2 Rice

Rice trade was quite active due to a strong demand from abroad and a small amount of new crop reaching the market, causing prices to rise continuously.

1/: Refer to "Monthly Bulletin" published in December, 1972 by the Bank of Thailand.

With a view to keeping domestic price of rice at a reasonable level the authorities, on 10 November, reinforced the regulation which had been suspended since 18 September, 1972, requiring exporters to sell 5 % white rice amounting to 10 per cent of the amount to be exported to the Government as a reserve for exports on a Government-to-Government basis and for local consumption[1/].

During November, four Government-to-Government contracts were made with Indonesia; the first amounted to 20,000 tons of 25 % white rice at a price of 125 U.S. dollars per ton, the second amounted to 20,000 tons of 15 % white rice at 133 U.S. dollars per ton and the third sale was for 5,000 tons of 15 % white rice at a price of 133 U.S. dollars per ton followed by another of 5,000 tons of 15 % white rice at 138 U.S. dollars per ton, all of which are to be delivered during 1973. Throughout 1972, Thailand concluded contracts with Indonesia totalling 157,435 tons and with Bangladesh amounting to 30,000 tons, consisting of 20,000 tons of 15 % parboiled rice at 125 U.S. dollars per ton and 10,000 tons of 25 % parboiled rice at 122 U.S. dollars per ton.

According to the Foreign Trade Department, total exports during January-November, 1972 amounted to 1,866,556 tons, an increase of 448,494 tons or 32 per cent from the same period in 1971.

2.3.3 Maize

Maize trade during November was rather confusing with small supply reaching the market as local traders were holding up stock for speculative purpose. This caused local prices to rise rapidly. Exporters, facing losses from the sales to Japan and Taiwan made the following requests to the Ministry of Commerce.

1/: The ratio was later reduced to 5 per cent.

1. Extension of the delivery period to Japan and Taiwan to June, 1973[1/].

2. Suspension of exports to markets other than the contracting countries, namely Japan and Taiwan.

These proposals were now being considered by the Ministry of Commerce as well as the Japanese and Taiwanese delegates and if approved, speculation by local exporters should be reduced and the price would not rise so rapidly.

The November wholesale price in Bangkok averaged 74.12 baht per picul or 1,240 baht, equivalent to 62 U.S. dollars per ton. With other expenses, the export price amounted to 1,410 baht, equivalent to 70.5 U.S. dollars (F.O.B. Bangkok) per ton. However, the price sold to Japan and Taiwan in November was only 1,251.8 baht, equivalent to 62.59 U.S. dollars (F.O.B. Bangkok) per ton, or a loss of 150 - 160 baht, equivalent to 7.5 - 8.0 U.S. dollars per ton.

Since the beginning of the year, exports of maize amounted to 1.5 million tons, of which 0.69 million tons went to Japan, 0.42 million tons to Taiwan and 0.39 million tons to other countries.

2.3.4 Soybeans

The average price of soybeans in November was slightly above that of the previous month. Previously the Bangkok market price declined thus discouraging rural traders to release supply and promoting the Bangkok traders to demand higher price.

1/: According to the maize trade agreement with Japan, deliveries are due in March, 1973 and in February, 1973 for Taiwan.

At the end of November, there was an increased demand for exports to Japan, as Japan was unable to purchase the amount required from China during the recent Canton Trade Fair due to decreased production. This also led to an increase in soybean prices in the Tokyo market. The average soybean prices in the Hongkong market increased by about 3 U.S. dollars per ton. Thai soybean price increased from 54 U.S. dollars to 57.35 U.S. dollars per ton.

III. PRESENT CONDITIONS OF THA NGONE PROJECT AREA AND ITS SURROUNDING AREAS

3.1 Physical Conditions

The Tha Ngone Agricultural Development Project area is situated at about 5 kilometers north-east of B. Tha Ngone, which is about 25 kilometers north of Vientiane.

The Project area overlooks the Nam Ngum from north to east and is bounded from west to south by the uplands with an elevation ranging from 170 to 185 meters. The Project area with an elevation between 163 and 167 meters is a flat plain covering an area of about 1,000 hectares.

The mean annual precipitation is estimated at 1,717 millimeters, about 88 per cent of which comes in the rainy season from May to September. However, the rainfall records frequently indicate "no drop of rain" in November, December and February of the dry season. It is then inevitable that supplement of water to crops by irrigation is needed during such period for profitable and economical agricultural development in this area.

The mean monthly temperature for the past 10 years varies between 21°C and 28°C in this area. On the other hand, the daily mean temperature which is about 25°C in February, drops sometimes to 20°C in the latter part of February or early March; during this period, the daily range of temperature is about 15°C, although the daily highest temperature rises to 30°C.

The relative humidity is rather high, the average maximum relative humidity being never below 90 per cent all round the year and the mean relative humidity being around 85 per cent in the rainy season and 70 per cent in the dry season. However, the relative humidity is clearly lower in the daytime during the dry season and during which the lowest value is almost 40 per cent; this shows a wide variation in the mean daily relative humidity.

The soils within the Project area are mostly of recent alluvial origins (Refer to ANNEX I-2). Most of the Project area at lower elevations has clayey soils which are more heavy in texture and somewhat less fertile. On the other hand, in the north, in about one-tenth of the Project area along the levee of the Nam Ngum River (at an elevation of 165 meters and above) the soils are medium texture, fairly well drained, and moderately fertile.

As pointed out by ADB in the appraisal report[1/], generally, the soils in the Project area are well suited for paddy cultivation and also for some other field crops and vegetables under proper tillage and irrigation practices. However, high yields from these crops will be attained only with the proper and liberal use of fertilizers.

According to this field survey, in half of newly prepared farm fields in the Project area the original surface soils have been removed, and the subsoils have been exposed. The soils of such farm fields seem to be not so well suited for cultivation of dry field crops such as soybeans, groundnut, root vegetables, etc. for the time being.

1/: ADB: "Appraisal Report on Tha Ngone Agricultural Development Project in Laos" prepared in February, 1970.

3.2 Socio-economic Conditions

3.2.1 Marketing System

The natural barrier to trade in Laos is so immense that without massive investments in roads and other forms of transportation, certain sections of the country will never be economically integrated with the rest. Without adequate roads within homogeneous geographical areas an efficient rice marketing system cannot be developed.

Given the current security situation the country can be readily divided into fairly well defined marketing zones or marketing areas. Because of the natural barrier these marketing zones will remain essentially unchanged when peace finally comes to Laos. From north to south Laos is divided into nine marketing zones. (Refer to Annex I-3).

The Vientiane plain and Borikhane province marketing zone is one of the largest and fastest growing rice consumption areas in the country. Traditionally a rice deficit area, the fact that USAID also uses Vientiane as a point of delivery for refugee relief rice requirements places a greater significance on the rice supply deficit in the zone.

The Thailand rice marketing system has been an inhibiting factor in the development of an effective Lao rice marketing system, particularly in the rice deficit areas. First, the probability of realizing a return on investment in rice marketing facilities on the Lao side of the Mekong would be small since developed facilities are readily available on the Thai side.

Second, the Mekong is not necessarily considered national boundary by the local residents but rather a natural navigational

system for the transportation of commodities, a good many of which go across rather than up and down the channel.

Third, the surplus of Lao rice in some marketing zones has been so seasonally variable that investment was not feasible. Thai millers could send rice buyers into Laos, buy what they wanted at prices they were willing to pay and move it out without extensive investments. In effect, procurement in Laos by Thai buyers was nearly a supplement to their normal milling operations.

Compared with Thailand, generally, the price of milled rice in Laos is higher, refelecting the difficulty of marketing rice in Laos. (Refer to the tables of Annex I-4). Thailand farm paddy prices do affect Lao paddy prices in adjoining geographical areas. Conversely, unduly high Lao farm prices would undoubtedly attract Thai rice given unrestricted procurement.

3.2.2 Agro-Industry

As a nation's agriculture develops, agriculture-related industries must also be developed at a proportional rate. These include the business enterprises which supply farmers with the modern agricultural inputs, and process and distribute agricultural production.

The input-supplying firms are poorly developed in Laos. Partly to this end, and to meet the input demands of the ADVP, ADO was created in 1965. Since that time some merchants throughout the country have begun selling fertilizers, insecticides, small irrigation pumps, tools and implements to farmers. In some cases these are on consignment from ADO for resale in rural communities and in others the enterpreneurs themselves import the goods from Thailand. In Vientiane there are at least seven enterprises selling agricultural tractors.

The second type of agriculture-related industries, those processing the agricultural production, though generally inadequate, are somewhat better developed. The most important of these are the rice mills.

In March 1969 a rice mill inventory was taken in an effort to assemble the best data available on all aspects of rice production, processing and distribution. A summary of the results follows in Tables A-4 of ANNEX I-5.

Throughout the country there are small, sometimes portable mills with a daily capacity of up to 1 ton which husk and polish the subsistence needs of rural villagers. However, most subsistence farmers distant from urban centers still mill their own rice by hand in the traditional fashion.

Rice millers usually operate their mills six to eight months out of the year. This is the time span they consider necessary to earn a "reasonable" profit. The quantity of rice milled depends on the mill size and the milling time per day. As an average, a mill with a capacity of 25 tons per 12 hours-day will require about 625 tons of paddy per month or a yearly average of 3,750-5,000 tons of paddy per year. However, generalization is dangerous as millings fluctuate markedly from year to year in response to unpredictable swings in supply and demand. Moreover, market information is unreliable and inadequate, so profit margins tend to very from year to the next.

In addition to the rice mills, several other small industries are dependent on Lao rice. These include a number of alcohol distillery (Lao-lao), 15 in Vientiane, 1 in Khong Sedone and 1 in Pakse, which are registered by the Ministry of National Economy. This registry omits numerous small producers. There are also 2 rice noodle plants registered, 1 each in Pakse and Savannakhet. Other small

industries associated with agriculture include coffee grinding plants (2 registered in Vientiane), a thresher factory(Pakse), and a new sorghum distilling plant. The raw materials for the latter are entirely imported from Thailand, and the plant is still operating at a fraction of its capacity.

3.2.3 Trades in Vientiane

Vientiane, the largest city in Laos, has an estimated population of 174,000. Despite of its locations in a potentially productive plain[1/], the city must import three-fourth of its food requirement, while the rural people barely produce their own food[2/].

1/: AVERAGE UNIT YIELD OF PADDY BY VARIETIES AT PILOT FARMS IN RESPECTIVE REGIONS CONDUCTED BY USAID

(ton/ha)

Region	C4-63	IR-253	BPI-76
Central Region (Vientiane and Borikhane)	5.68	5.43	-
South-Central Region (Savannakhet and Khammaoune)	3.40	3.40	3.40
Southern Region (Sedone, Wapikhamthong, Sithandone, Champassak and Saravane)	4.61	4.37	4.10
Northern Region (Sayaboury, Luang Prabang and Houa Khong)	3.79	3.03	-
Country-wide Average	4.39	4.05	3.75

Remarks: Refer to "Report on Extension Service 1969-1970 ... Dry Season Rice Production Demonstration" prepared by the USAID.

2/: FAMILY CONSUMPTION RATE OUT OF FARM PRODUCTS BY PROVINCES

(%)

Province	Rate	Year
Seven provinces	86.1	1971
Savannakhet	98.8	1970

Remarks: 9,883 families and 6,323 families who got loans from the ADO were surveyed respectively in the above seven provinces and the Savannakhet Provinces. Refer to "Summary of ADO Survey of Farmers' Rice Stocks".

It is estimated[1/] that Laos currently imports approximately ten million U.S. dollars worth of food annually. Out of these, 85 per cent are probably consumed in Vientiane. Rice is the largest single import marketing up 37 per cent of the total. Animal protein foods as a group make up 37 per cent of the imports with beef and buffaloes, pork and dairy product being the most important items.

Other significant foods are fruits and vegetables 14 per cent, sugar 6 per cent and fats and oils 1 per cent. The amount of rice imported was 42,751 tons in 1969, 66,567 tons in 1970 and 52,016 tons during 6 months in 1971. Break down to commercial imports is shown in Table 5.

Table 5 AMOUNT OF IMPORTED RICE

(ton)

Year	Commercial Imported Rice	Non-Commercial Imported Rice by USAID	Total
1969	19,284	23,467	42,751
1970	31,285	35,282	66,567
1971 (Jan. to Jun.)	29,017	22,999	52,016

In the meantime, in parallel with trades in Vientiane, price structure of paddy and rice in Vientiane was studied in this report. Price structure of paddy and rice in Vientiane is as follows:[2/]

(1) Price structure of imported rice

FOB at Udorn mill gate	230 baht per ton
Bag	5 baht per ton
Transportation fee	7 baht per ton
Nongkhai municipality fee	8 baht per ton

1/: Refer to "Food Production for Vientiane" prepared by USAID/AGR in February, 1972.

2/: Obtained from the Agency for the Development of the Vientiane Plain.

Sub-total(CIF Vientiane price)	250 baht per ton
	or 105,000 Kips per ton[1/]
Custom duties	12,000 Kips per ton
Total CIF Vientiane	117,000 Kips per ton

(2) Price structure in Vientiane

Paddy price at farm gate[2/]	50 Kips per kg
Bag	1 Kip per kg
Transportation fee to rice mill	1 Kip per kg
Milling service	3 Kips per kg
Total	55 Kips per kg
	or 55,000 Kips per ton

(3) Data on milling given from one ton of paddy are as below:

400 kg of rice, 1st quality at 105 Kips/kg	42,000 Kips
200 kg of rice, 2nd quality at 75 Kips/kg	15,000 Kips
20 kg of broken rice at 50 Kips/kg	1,000 Kips
70 kg of bran, 1st quality at 30 Kips/kg	2,100 Kips
30 kg of rough bran at 20 Kips/kg	600 Kips
Total price at mill gate	60,700 Kips
Net margin of mill	60,700 Kips - 55,000 Kips
	= 5,700 Kips

1/: 840 Kips = US$1.00

2/: PADDY PRICE AT FARM GATE

Year	Average Unit Price (Kip/kg)	Average Unit Price (US$/kg)	Parity
1967	25-30	50-60	500 Kips-US$1.00
1968	-do-	-do-	-do-
1969	-do-	-do-	-do-
1970	18-20	36-40	600 Kips-US$1.00
1971	25	42	840 Kips-US$1.00
1972	50	60	

3.2.1 Diet Custom and Livelihood in Villages

Diet Custom

The original inhabitants here in Vientiane usually have glutinous rice for their diet and recently new demand for non-glutinous rice for rice noodle. On the other hand, as described earlier in Paragraph "4.2.1 Marketing System", there are more than 27,000 refugees waiting for delivery of rice by the Government as a new demand. This is quite urgent so that there is no room to choose quality or taste. From this point of view, high yielding varieties are expected to be cultivated in the area for the security and peace of this country.

In addition, the Government with assistance of the USAID directs the vegetable gardening, poultry and stock production, maize production and animal and poultry feed production to those refugees in and out of the Vientiane area. Details are shown in ANNEX I-6. These facts mentioned above should be taken into consideration in the review of cropping pattern for the Tha Ngone Project.

Livelihood in Long-Established Villages

According to the data[1/] given by the USAID, the average yearly living expenditures are approximately 185,037 Kips, equivalent to 300 U.S. dollars. All villagers are involved in the agricultural activities and receive approximately 85 per cent of their income from agricultural sources. Engel's coefficient in the data is about 50 per cent showing the stabilized livelihood. This living standard would be adaptable for the farm budget in the Tha Ngone

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1/: Refer to "A Comparative Study of Refugee and Non-Refugee Villages ..... Part 1. A Survey of Long-Established Villages of the Vientiane Plain" prepared by the USAID, Laos.

Project. Because consumer price index[1/] in Vientiane has been quite stabilized in recent years as shown in the "Annual Statistical Bulletin, 1971" published by the Mekong Committee, ECAFE.

1/: CONSUMER PRICE INDEX IN VIENTIANE

Year	Index	Year	Index
1964	100	1968	143
1965	108	1969	145
1966	127	1970	135
1967	137	1971	136

IV. PROPOSED CROPPING PATTERN AND REPRESENTATIVE FARM BUDGET

4.1 Basic Concept

The conditions of location in the Tha Ngone Project have some difficulties not only in the natural conditions such as heavy clayey soil and low temperature in January but also in the economic aspects.

It is very doubtful that in the near future, farmers in the Vientiane Plain can realistically be expected to produce sufficient rice to meet the needs of both rural and urban areas. An estimated 50,000 hectares of paddy land is reported to produce an average of 1,200 kilograms per hectare.

At this rate the rural areas produce only about a half of the total requirement. Production can be increased, but it is unlikely that average production could be doubled to meet current needs or attain 2.7 tons per hectare that will be required by 1975 and 3.2 tons by 1980. Those levels of production cannot realistically be achieved without water control.

While water control and improved cultural practices can increase production, the implementation time lag will be far behind food requirements. For the time being the main countermeasures for rice supply should be (1) to continue to import from Thailand, (2) to develop marketing and transportation systems to bring surplus rice from the Southern Regions to Vientiane.

However, those countermeasures can not stand such an unstabilized supply as in the drought or flood in recent years and the fluctuation of rice prices prevents the healthy economic growth in Laos. Therefore, the Royal Lao Government eagerly desires to attain the self-sufficiency of rice production building irrigation and flood control facilities to provide farmers with the water control required for high production.

In the meantime, in the Tha Ngone Project area, pumping facilities are necessary for both irrigation and drainage, thus O & M costs would be higher than that of gravity irrigation system prevailing in the Northeast Thiland. In addition, the Tha Ngone Project area is surrounded by the flood protection dykes in order to practice the double cropping through a year, thus the O & M costs for these facilities are also inevitably high.

As mentioned already, the agriculture in the Vientiane Plain is affected by that of the Northeast Thailand and sometimes they have to compete with each other.

The Royal Thai Government intends to introduce on a large scale a modern, intensive type of agriculture based on advanced rice production during the rainy season and diversified intensive irrigated non-rice cropping during the dry season in the low land (paddy) area of the Northeast, traditionally utilized only to practice subsistence rice cultivation during the monsoon rain period.

Areas expected to be eventually irrigated amount to about 400,000 hectares. In order to provide the necessary storage capacity in the order of 5 billion cubic meters, including concrete-lined main irrigation canals were constructed by the Royal Irrigation Department over the past 20 years. So far the farmers, for various reasons, have made little effort to practice dry season irrigation cropping.

To accelarate the implementation of irrigated farming, the Government with the support of UNDP/FAO, has established in 1965 the Kalasin Project which was operated as the phase I till 1970, at which time it has been extended as the phase II till 1975. Thus the great efforts have made over 8 years already in Thailand[1/].

1/: Refer to "Position Paper" (UNDP/SF Project THA 70/558) published on 21 August, 1972.

In the Tha Ngone Project area, a two-ha farm management for double cropping of rice is a heavy work for a farming family labour. In general, it is said that in the Philippines about 60 per cent of necessary labour for one season of rice cultivation are supplied by the hired labour. The information given by the Kalasin Experimental Station shows about 20 per cent of labour are also supplied by hired labour.

The location of the Tha Ngone Project is quite near by the Vientiane City. Consequently, the opportunity costs of labour are rather higher than original villages in the region therefore if the settlers take the traditional way of rice cultivation and if they have to employ the hired labour, the net return of the rice production would be quite small. It may be safely said that the high productivity of labour can be realized by the mechanization under the cooperative farming. This is an only way to overcome the conditions of the locality of the Project area.

As for the upland crops in the dry season, explained in Paragraphs 2.3.3 and 2.3.4, the wholesale prices of maize and soybeans at Bangkok market are 62 U.S. dollars per ton and 57 U.S. dollars per ton respectively.

It was not available to get the data of wholesale prices in Vientiane, the farm gate prices of those products are estimated deducting the conveyance fee of about 10 U.S. dollars per ton from the wholesale prices at the Bangkok market.

In the meantime, as quoted in Paragraph 2.2, according to the survey[1/] made by the chief of agricultural division, USAID. Laos, potential demand for maize or other food grains requirement for locally produced animal is estimated as 29,000 tons per year. Among them, 1,200 tons of rice bran and 500 tons of broken rice would be supplied by the locally polished paddy of about 12,000 tons.

1/: Refer to "Potential Demand for Corn and Other Food Grrain" prepared by the USAID.

The remaining would be imported from Thailand and maize are available from upland fields here already.

Under those conditions mentioned above, the upland crops such as maize and soybeans are not promising in the paddy fields with high cost irrigation facilities compared with the paddy production under the stabilized price trend in the world at present. Therefore, first of all, the self-sufficiency of main foodstuff for the original inhabitants and refugees should be accomplished through the irrigation project. The Tha Ngone Project is not large enough for the self-sufficiency of rice in this country but the role is very important to secure the peace and prosperity. This is the basic concept of the cropping pattern adapted after reviewing in the light of recent conditions in 1973.

4

4.2 Review of Original Cropping Pattern and Representative Farm Budget

According to the feasibility report prepared by the Government of Japan in 1968, the representative farm budget was considered as shown in Table 6.

Table 6. REPRESENTATIVE FARM BUDGET IN ORIGINAL PLAN 1/

(2-ha unit farm)

Crop	Cropped Area (ha)	Unit Yield (ton /ha)	Total Yield (ton)	Unit Price (US$ /ton)	Gross Return (US$)	Production Cost (US$)	Net Return (US$)	Living Expenses (US$)	Capacity to Pay (US$)
Paddy (dry season)	1.9	6	11.4	65	741				
Paddy (rainy season)	1.9	5	9.5	65	617				
Vegetables	0.2	10	2.0	80	160				
Green manure	1.9	15	28.5	1	28				
Total					1,546	704	842	462	380

In the above table, the unit price of paddy was estimated at 65 U.S. dollars per ton, and the unit yield of paddy per hectare was expected at 6 tons in the dry season and 5 tons in the rainy season by the application of IR-8, an improved high-yielding rice variety. Besides, some vegetables and green manure were taken up as the secondary crops in the original cropping pattern.

1/: OTCA: "The Feasibility Report on the Tha Ngone Agricultural Development Project" prepared in March, 1968.

The total farm gross return from a representative farm with unit area was estimated at 1,546 U.S. dollars per annum in which about 88 per cent, or 1,358 U.S. dollars were occupied by paddy products and only about 12 per cent of the total was occupied by dry field crops.

The total production cost was estimated at 706 U.S. dollars. Of them, 240 U.S. dollars, or about 34 per cent would be paid for purchasing chemical fertilizers necessary for ensuring properly high paddy yield by cultivating paddy rice of IR-8 variety. Further, the contract charge for medium scale farm mechanization was estimated at 290 U.S. dollars or approximately 41 per cent of the total cost.

Then, the net return or net value was evaluated at 840 U.S. dollars as the remainder of gross return minus production cost. Since living expense was estimated at 640 U.S. dollars, the capacity to pay was calculated at 380 U.S. dollars which could be available for the repayment of initial investment cost as well as the payment of operation, maintenance and replacement cost. The Tha Ngone Project was appraised to be technically feasible and economically justifiable based upon the above-mentioned favourable farm budget.

On the way of project implementation, however, it occured that the pre-estimated representative farm budget could not be secured mainly because of the heavy fall of paddy price from 65 U.S. dollars to less than 30 U.S. dollars per ton in Vientiane due to the considerable amount of inflow of low-priced Thai paddy since the beginning of 1972.

In order to keep the soundness of representative farm budget under the condition of paddy price declining, trial studies were made by the resident OTCA Experts at the Pilot Farm in cooperation with the Laotian officials. As a result, an alternative plan was made to reform the original cropping pattern as shown in Table 7.

Table 7. REPRESENTATIVE FARM BUDGET IN ALTERNATIVE PLAN BY RESIDENT OTCA EXPERTS 1/

(2-ha unit farm)

Crop or Livestock	Area or Number (ha or head)	Unit Yield (ton /ha)	Total Yield (ton)	Unit Price (US$ /ton)	Gross Return (US$)	Production Cost (US$)	Net Return (US$)	Living Expenses (US$)	Capacity to Pay (US$)
Paddy (rainy season)	2.0	2.5	5.0	32	160				
Maize	1.0	2.5	2.5	50	125				
Soybeans	0.8	1.0	0.8	117	93.6				
Vegetables (carrot)	0.1	4.0	0.4	300	120				
Vegetables (cauliflower)	0.1	7.0	0.7	133	93.1				
Pig	4	80 (kg /head)	320 (kg)	300	96.0				
Fowl	20			0.75	15.0				
Cattle	3			27	40.0				
Total					741	250	491	300	191

On the other hand, the Asian Development Bank prepared another representative farm budget in the appraisal report of the Tha Ngone Project area as shown in Table 8

1/: Abstracted from the official letter written by the resident OTCA Experts at the Pilot Farm to the Head Office of OTCA, Tokyo.

Table 8. REPRESENTATIVE FARM BUDGET IN ADB APPRAISAL PLAN 1/

(2-ha unit farm)

Crop	Cropped Area (ha)	Unit Yield (ton /ha)	Total Yield (ton)	Unit Price (US$ /ton)	Gross Return (US$)	Production Cost (US$)	Net Return (US$)	Living Expense (US$)	Capacity to Pay (US$)
Paddy (dry season)	2.0	5	10.0	60	600	150	430		
Paddy (rainy season)	2.0	5	10.0	60	600	150	430		
Vegetables	0.25	2/	2/	2/	2/	2/	100		
Total					2/	2/	960	100	860

In the resident OTCA Experts' alternative plan, the culture of paddy in the dry season was replaced by several dry field crops such as maize, soybeans, vegetables, etc. and pig, cattle, fowl and duck were introduced for mixed farming. Then the gross return derivable from dry field crops and livestock was estimated at 582.7 U.S. dollars per unit farm.

Since the gross return derivable from paddy would extremely decrease to 160 U.S. dollars as compared with 1,358 U.S. dollars in the original plan, the total gross return would be limited to 741 U.S. dollars or approximately 47 per cent of the total gross return for the original plan. With the decrease of cultivating area of IR-8 paddy, the cost of chemical fertilizers would be reduced largely to 91 U.S. dollars from 245 U.S. dollars in the original plan.

1/: Abstracted from the following report.

ADB: "Appraisal Report on the Tha Ngone Agricultural Development Project in Laos". pp. 45-46.

2/: Not mentioned.

Then the net return could be estimated at 491 U.S. dollars or only a little more than a half of the net return in the original plan. Even if the living expense could be reduced to 300 U.S. dollars[1/] the capacity to pay would amount to only 191 U.S. dollars, which would be about a half of 380 U.S. dollars in the original plan.

According to the representative farm budget prepared by ADB as shown in Table 5.3, the net return was calculated at 960 U.S. dollars. In the calculation made by ADB, the living expense was estimated at 100 U.S. dollars. Then the capacity to pay was worked out 860 U.S. dollars. Of this amount, 350 U.S. dollars would be assessed for the operation, maintenance and debt repayment costs of irrigation facilities annually.

1/: In the original plan, the living expense was assumed at 460 U.S. dollars per unit farm. Compared with 200-250 U.S. dollars per unit farm in the present conditions without irrigation, the figure seems to be fairly larger.
In the resident OTCA Experts' alternative plan, it was estimated at 300 U.S. dollars per unit farm.

4.3 Proposed Cropping Pattern

The cropping patterns presented in Figs. A-1, A-2, B-1 and B-2 have been worked out in due consideration of the physical conditions of the Project area and the institutional conditions in the Project area and its surrounding areas.

Several discussions on this matter were held between the Agency for the Development of the Vientiane Plain (ADVP) and the Japanese Survey Team. As a result of full study on the matters concerned, the ADVP and the Team have reached the same opinion that first priority should be given to Cropping Pattern A-1, i.e. the double cropping of paddy.

Pattern A-1

Taking into consideration of the dietary custom of farmers who deal with the paddy cultivation in the Project area, glutinous paddy is adopted to 0.6 hectare in the rainy season for self-sufficiency throughout the year[1/], and new high yielding variety like IR-22 or IR-24 is adopted for profitable marketing on the remaining 1.4 hectares of farm land.

In the dry season, a new high yielding variety is to be planted to 1.9 hectares, because self-sufficiency of rice is obtainable in the rainy season as explained above. To the remaining 0.1 hectare marketable vegetables are to be planted. In addition to that, a small number of pig and poultry would be feeded for the each income. Thus total gross income amounts to 1,137.00 U.S. dollars.

1/: Assuming that amount of rice consumption per capita per year is 170 kilograms, a family consists of 6.5 persons and milling recovery rate is 62 per cent, it is estimated that 1.8 tons of paddy are necessary for a family a year from the following calculation.

170 kg of rice x 6.5 ÷ 0.62 = 1.8 tons of paddy

The unit yield of paddy is assumed at 3.0 tons per hectare, therefore, for the paddy production of domestic use, 0.6 hectare of paddy fields are required.

Pattern A-2

Without considering the dietary custom of farmers, a new high yielding variety is to be planted to all areas in the rainy season aiming at the high yield and high income. In the dry season same cropping would be adopted as in Pattern A-1, thus total gross income amounts to 1,173,000 U.S. dollars. In this case, if the farmers would like to have glutinous rice they have to buy it in cash.

Therefore, even though they will get more income in Pattern A-2, they will lose more money for purchasing the polished glutinous rice. The difference of budgets between Pattern A-1 and Pattern A-2 is not problematical, rather emphasis should be given to the similarity between Pattern A-1 and Pattern A-2.

Patterns B-1 and B-2

Cropping Pattern B consists of paddy in the rainy season and dry field crops such as soybeans or groundnut, maize and vegetables in the dry season. Pattern B-1 has the cultivation of glutinous rice and Pattern B-2 has no glutinous rice just same as in Patterns A-1 and A-2. Since Pattern B is not practicable in the Tha Ngone area at present as mentioned previously, the figures are shown only for a reference.

In the meantime, as for rice variety, the currently grown varieties in the surrounding areas are not considered to be suitable for raising two full harvests a year, owing to their photoperiodic sensibility, their long maturation period and liability to lodging in response to the application of large amount of fertilizer in view of obtaining higher yield.

From the viewpoint of the above, for this Project area, improved high yielding varieties were rather selected. Furthermore, from the viewpoint of the characteristics of the Project area which has a role of demonstrating and extending improved farming practices in the surrounding areas lack of irrigation facilities, also improved local varieties[1/] would be applied there.

It is needless to say that in the Tha Ngone Project area the study and experiment on the dry field crops and vegetables should be continued aiming at the diversification of crops in parallel with the double cropping of paddy in both the rainy and dry seasons.

1/: Improved local varieties such as RD-1, RD-2, RD-3, RD-4, etc. bred in Thailand. Refer to ANNEX I-7.

4.4 Prospective Representative Farm Budget

4.4.1 General

The result of comparative studies on the representative farm budgets of gross income by alternative cropping patterns is shown in Table 9 , and in ANNEX I-8.

Table 9 REPRESENATIVE FARM BUDGETS

(2-ha unit farm)

Item		Pattern A-1 (US$)	Pattern B-1 (US$)
(1) Gross Income			
	Paddy	957.0	444.0
	Dry field crops	-	308.0
	Vegetables	100.0	100.0
	Livestock	80.0	80.0
	Sub-total	1,137.0 (100%)	932.0 (100%)
(2) Management Cost			
	Seeds	11.0	10.0
	Fertilizer	48.0	43.0
	Pesticides	40.0	32.0
	Rent of machines	90.0	80.0
	Hired labor	48.0	24.0
	Feeds and livestock	25.0	26.0
	Miscellaneous	26.0	21.0
	Sub-sub-total	288.0	236.0
	Interest	17.0	14.0
	Agency's margin	114.0	93.0
	Lease charge of state land	114.0	93.0
	Sub-sub-total	245.0	200.0
	Sub-total	533.0 (47%)	436.0 (47%)
(3) Net Income		604.0 (53%)	496.0 (53%)
(4) Living Cost		300.0	300.0
(5) Remainder		304.0	196.0
(6) O&M Cost		110.0	109.0
(7) Saving		194.0	87.0

As shown in Table 9, the net income of Pattern A-1 and Pattern B-1 were evaluated at 604 U.S. dollars and 496 U.S. dollars respectively as the remainder of gross income minus management cost. Since living cost was estimated at 300 U.S. dollars, the remainders were calculated at 304 U.S. dollars and 196 U.S. dollars respectively.

On the other hand, the O & M costs were calculated at 110 U.S. dollars and 109 U.S. dollars respectively as shown in ANNEX I-9. Therefore, respective savings were worked out to 194 U.S. dollars and 87 U.S. dollars.

4.4.2 Gross Income

In calculating the gross income, the unit prices of paddy, groundnut (or soybeans), maize and vegetables were estimated at 60 U.S. dollars, 150 U.S. dollars, 50 U.S. dollars and 100 U.S. dollars per ton respectively.

The unit yield of paddy per hectare was expected at 4 tons in the rainy season and 4.5 tons in the dry season by the application of IR-22 or IR-24, an improved high yielding variety of rice.

As for glutinous rice, improved local variety such as Sampaton, RD-2, RD-4, etc. the unit yield per hectare was estimated at 3.0 tons in the rainy season. Furthermore, the unit yield per hectare of groundnut (or soybeans), maize and vegetables were estimated at 1.3 tons, 2.5 tons and 10 tons respectively. Table 10 shows the gross income by cropping patterns.

Table 10. GROSS INCOME BY CROPPING PATTERNS

(2-ha unit farm)

Pattern A-1

Crop	Cropped Area (ha)	Unit Yield (ton/ha)	Total Yield (ton)	Unit Price (US$/ton)	Gross Income (US$)
Paddy (rainy season)					
Glutinous	0.6	3.0	1.8	60	108
Non-glutinous	1.4	4.0	5.6	60	336
Sub-total					444
Paddy (dry season)					
Non-glutinous	1.9	4.5	8.55	60	513
Leaf Vegetables[1/]	0.1	10.0	1.0	100	100
Sub-total					613
Livestock	(head)				
Pig	4	80 kg	320 kg	0.215US$/kg	69
Poultry	20			0.55US$/kg	11
Sub-total					80
Total					1,137

Pattern B-1

Crop	Cropped Area (ha)	Unit Yield (ton/ha)	Total Yield (ton)	Unit Price (US$/ton)	Gross Income (US$)
Groundnut (or soybeans)	1.0	1.3	1.3	150	195
Maize	0.9	2.5	2.25	50	113
Leaf vegetables[1/]	0.1	10			100
Sub-total					408
Livestock	(head)				
Pig	4	80 kg	320 kg	0.215US$/kg	69
Poultry	20		20	0.55US$/kg	11
Sub-total					80
Total					932

1/: Planted in the dry season

4.4.3 Farm Management Cost

In order to obtain the gross income mentioned above, the new technology and inputs for improved variety have to be introduced in good timing. For this purpose, marketing system for agricultural inputs such as fertilizers and agricultural chemicals should be improved.

For the time being, the Agency has to be responsible not only for procurement and delivery of those inputs but also for selling activity of products to the market. Therefore, as the Director-General of the Agency mentioned already the Agency has to levy the margin from the farmers about 10 per cent of their gross income in order to maintain the special account of agency budgets.

At the same time, the farmers who settled in the state land have to pay about 10 per cent of their gross income as the lease charge of state land concession. This amount is reasonable because tenants have to pay as the rent about 30-50 per cent of the yield in general. For the first 5 years this charge should be exempted because this Project is the reclamation of new land.

Next big items are hired cost and rent of machines[1/]. To overcome the difficulties like heavy clayey soil condition and peak of labour requirement in transplanting and harvesting, much expenditures are necessary. Necessity for fertilizers and pesticides is also very large in the new technology of rice cultivation.

Total farm management cost amounts to 533.00 U.S. dollars in Pattern A-1 and 476.00 U.S. dollars in Pattern B-1. Thus the net income amounts to 604.00 U.S. dollars in Pattern A-1 and 456.00 U.S. dollars in Pattern B-1. Break down of farm management costs is shown in ANNEX I-11.

1/: Refer to ANNEX I-10.

Table 11. MANAGEMENT COST

Pattern A-1

Item	Per Hectare	Rainy Season		Dry Season		Total	
Seeds(paddy)	30 kg x kip 75 kip 2,250	2.0ha	kip 4,500	1.9ha	kip 4,280	kip 9,280	US$ 11
(vegetables)	2.5 kg x kip 2,000 kip 5,000	-		0.1ha	kip 500		
Fertilizer(paddy)	16-16-8; 187 kg x kip 36 kip 6,700 Urea(N: 45%) 66 kg x kip 50 kip 3,300	2.0ha	kip 20,000	1.9ha	kip 19,000	kip 40,700	US$ 48
(vegetables)	N: 18 kg x kip 50 kip 900 P: 9 kg x kip 50 kip 450 K: 7 kg x kip 50 kip 350			0.1ha	kip 1,700		
Pesticide(Paddy)		2.0ha	kip 15,000	1.9ha	kip 14,250	kip 33,250	US$ 40
(vegetables)			-	0.1ha	kip 4,000		
Rent of machine			kip 37,800		kip 37,800	kip 75,600	US$ 90
Hired labor	25 days x kip 400		kip 20,000		kip 20,000	kip 40,000	US$ 48
Feeds(pig)	4 kg x kip 800 kip 3,200		kip 2,000		kip 2,000	kip 21,400	US$ 25
(poultry)	1 kg x kip 800 kip 800						
Livestock (pig)	4 kg x kip 3,600 kip 14,400		kip 7,200		kip 7,200		
(poultry)	20 kg x kip 150 kip 3,000		kip 1,500		kip 1,500		
Miscellaneous	10 %		kip 10,800		kip 11,220	kip 22,020	US$ 26
Sub-total (A)			kip 118,800		kip 123,450	kip 242,250	US$ 288
Interest	(A) x 0.01 x 6 months		kip 7,130		kip 7,410	kip 14,540	US$ 17
Agency's margin	10 % of gross income		kip 47,750		kip 47,750	kip 95,500	US$ 114
Lease charge of state land concession	10 % of gross income		kip 47,750		kip 47,750	kip 95,500	
Total			kip 221,430		kip 226,360	kip 447,790	US$ 533

Table 12. MANAGEMENT COST

Pattern B-1

Item	Per Hectare	Rainy Season		Dry Season		Total	
Seeds(paddy)	30 kg x kip 75 kip 2,250	2.0ha	kip 4,500	-		kip 4,500	US$ 5
(groundnut or soybeans)	30 kg x kip 60 kip 1,800			1.0ha	kip 1,800		
(maize)	40 kg x kip 60 kip 2,400			0.9ha	kip 2,150		
(vegetables)	2.5 kg x kip 2,000 kip 5,000			0.1ha	kip 500		
Sub-total					kip 4,450	kip 4,450	US$ 5
Fertilizer(paddy)	same as A-1	2.0ha	kip 20,000	-		kip 20,000	US$ 24
(groundnut or soybeans)	100 kg x kip 50 kip 5,000			1.0ha	kip 5,000		
(maize)	200 kg x kip 50 kip 10,000			0.9ha	kip 9,000		
(vegetables)	same as A-1			0.1ha	kip 1,700		
Sub-total					kip 15,700	kip 15,700	US$ 19
Pesticides(paddy)		2.0ha	kip 15,000			kip 15,000	US$ 18
(groundnut or soybeans)				1.0ha	kip 5,000		
(maize)				0.9ha	kip 2,700		
(vegetables)				0.1ha	kip 4,000		
Sub-total					kip 11,700	kip 15,700	
Rent of machine			kip 37,800		kip 29,400	kip 67,200	US$ 80
Hired labor	25 days x kip 400		kip 20,000		-	kip 20,000	US$ 24
Feeds	same as A-1 in the		kip 2,000		kip 2,000	kip 4,000	US$ 5
Livestocks	rainy season		kip 8,700		kip 8,700	kip 17,400	US$ 21
Miscellaneous			kip 10,800		kip 7,200	kip 18,000	US$ 21
Sub-total			kip 118,800		kip 79,150	kip 197,950	US$ 236
Interest			kip 7,130		kip 4,750	kip 11,880	US$ 14
Agency's margin			kip 47,750		kip 30,500	kip 78,250	US$ 93
Lease charge of state land			kip 47,750		kip 30,500	kip 78,250	US$ 93
Total			kip 221,430		kip 144,900	kip 366,330	US$ 436

4.4.4 Living Cost

As explained in Paragraph "4.2.4 Diet Custom and Livelihood in Villages", living expenditures are approximately 300,000 U.S. dollars in the long-established villages. Therefore, the living cost of settlers in the Tha Ngone Project area would be same in the future as those who live in the long-established villages. Break down of living cost is as follows:

Item	Rate of the Total (%)	Cost (US$)
Food	50	150
Clothes	11	33
Housing	9	27
Kerosene, candle	4	12
Transportation	11	33
Bicycle, boat and repair cost	6	18
Medicine, school	6	18
Others	3	9

4.4.5 Operation, Maintenance and Replacement Cost

Operation, maintenance and replacement cost for canal, dyke, pump, etc. amounts to 110 U.S. dollars per unit farm per year for Pattern A-1 and 109 U.S. dollars per unit farm per year respectively. Details are as shown in ANNEX I-9.

4.4.6 Build-up Period and Provision of Credits

The target of yield and income would be realized in the fifth year. Until this time, a certain amount of credits is necessary for the performance of the agriculture.

According to the result of culculation, the peak of accumulated outstanding would amount to 300,00 U.S. dollars per household in the third year after the settlement and it will be paid back entirely at the end of the fifth year as shown in ANNEX I-8.

In this culculation, the lease charge of state land is not included in the management cost for 4 years because this Project is the reclamation of new land. Farmers are available for pay for the Government from the 6th year. Thus the Government would be able to pay back the ADB loan to the Bank utilizing this charge of state land after the grace period is over.

4.5 Economic Evaluation of Tha Ngone Project

As a result of high investment for irrigation and flood control facilities, the fundamental conditions for the cultivation in the Tha Ngone Project area were completely stabilized, and consequently the O & M cost is comparatively higher than other area. In general, the agriculture in Vientiane Plain is strongly affected by that of the North-east Thailand and sometimes they have to compete with each other.

Under those circumstances mentioned above, the agriculture in the Tha Ngone Project area has to take the double cropping of paddy as the steadiest way for the progress and thus it will reach its target of the first stage in the fifth year as shown in ANNEX I-9.

The marketable paddy amounts to 2,240 tons in the rainy season and 3,420 tons in the dry season respectively. In order to polish these products at the Project area, a mill with a capacity of 25 tons per 12 hours-day will be necessary in the future[1/].

It is informed that even though there are 221 mills with average daily capacity of 1.8 tons, equivalent to 400 tons per day capacity, in the Vientiane Plain, many of them complain the shortage of paddy at present. This fact requires further study on the necessity and availability for the construction and operation of a new mill facility in the Project area.

The total amount of paddy marketable in the Project area through a year is 5,660 tons, equivalent to 3,500 tons of rice.

1/: Refer to Paragraph "3.2.2 Agro-Industry"

This amount is about 5 per cent of imported rice in recent years and it will contribute the foreign currency saving of 350.00 U.S. dollars per year on the Laotian Economy.

This amount is not so big during the first stage, however, after accumlating the necessary capital by themselves in the second stage (at least from 6th year after their settlement as shown in the table of ANNEX I-11) they will be able to expand more intensive practices in dry field crops, vegetables and livestocks if there would be enough demands in such commodities. Needless to say, for this stage the experiment of crop diversification have to be continued under great emphasis.

The reasons why such a gradual intensification and steady diversification is necessary are mainly the low experience of settlers for such practices and few information for marketability and lack of credit system in this country.

The necessary amount of credit for agricultural development per household is about 230 U.S. dollars, thus, as a whole Project, a fund of 92,000 U.S. dollars is essential.

In addition, there will be also necessity to establish some facilities for the operation of a cooperative organization of settlers. Thus more than 120,000 U.S. dollars, equivalent to 100 million kips would be necessary as a whole.

This amount is so large that how to provide and operate this credit system is quite important as well as the individual farm management problem. Realization of the net income estimated in report entirely depends upon the activities of the credit system.

Furthermore, as mentioned in Paragraph "Prospective Representative Farm Budget", the Agency's margin, lease charge of state land and O & M cost of constructed facilities are heavy burdens for the farmer's economy. Concerning the O & M cost amounting to 100 U.S. dollars per household there is a proposal, which is already made in Paragraph "5.1 Basic Concept" of this chapter, that the revenue from generated power at the Nam Ngum Dam should be utilized not only for the charge of electricity used for the operation of pump facilities but also for the maintenance cost of infrastructures such as dykes, roads and water facilities in the Project area, which should be realized early as possible by the decision of the Royal Lao Government.

Next, as for the Agency's margin, the government has to pay at least for the personnel costs worked for the agency by the government subsidies. Otherwise, excellent people who owe to the special training in and abroad the country for the development of the Project cannot work for the agency continuously.

Because those people will be promoted to other fields by original personnel circle owing to the shortage of budget for the personnel cost in the Agency's special account which depends upon the unstable farm income. Thus, only unskilled and comparatively cheaper salaried person will remain in the Agency. If so the development of the agriculture in the Project area will be unpromising.

The last, the state land is the fundamental resource for the nation. Therefore, the lease charge should be levied from the utilizers in unexpensive rate. In the farm budget culculation, it is considered tentatively that 10 per cent of gross income is the amount of lease charge of state land from fifth year after their settlement. However, the levy of this

rate is changeable owing to the fluctuations of the income, the fixed amount for acreage should be studied immediately for the convenience of budget practice, the deduction of the amount and the extension of exempt period aiming at the prompt stabilization of settlers in the Project area.

Those decisions for policy making mentioned above in the Government should be clearly defined and be practiced for the development of Laotian economy.

It is to be noted that the costs for the dwelling of settlers and for the new village establishment are not included in above estimation and explanation because still there are many unknown factors for those items.

Total Production of the Tha Ngone Project area is shown in Table 13.

Table 13. TOTAL PRODUCTION IN THA NGONE PROJECT AREA

Pattern A-1

Crop	Product (ton)	Self-sufficiency (ton)	Marketable Product (ton)	Unit Price (US$/ton)	Total Value (US$)
Paddy (rainy season)					
Glutinous	720	720	-	-	-
Non-glutinous	2,240	-	2,240	60	134,400
Paddy (dry season)					
Non-glutinous	3,420	-	3,420	60	205,200
Vegetables 1/	400	88	312	100	31,200
Livestock	32,000 (US$)	8,000 (US$)	24,000 (US$)	-	24,000
Total					394,800

1/: Planted in the dry season

Pattern B-1

Crop	Product (ton)	Self-sufficiency (ton)	Marketable Product (ton)	Unit Price (US$/ton)	Total Value (US$)
Paddy (rainy season)					
Glutinous	720	720	-	-	-
Non-glutinous	2,240	-	2,240	60	134,400
Groundnut 1/ (or soybeans)	520	-	520	150	78,000
Maize 1/	900	-	900	50	45,000
Vegetables 1/	400	88	312	100	31,200
Livestock	32,000 (US$)	8,000 (US$)	24,000 (US$)	-	24,000
Total					312,600

Fig. 2. PROPOSED CROPPING PATTERN

Fig. A - 1

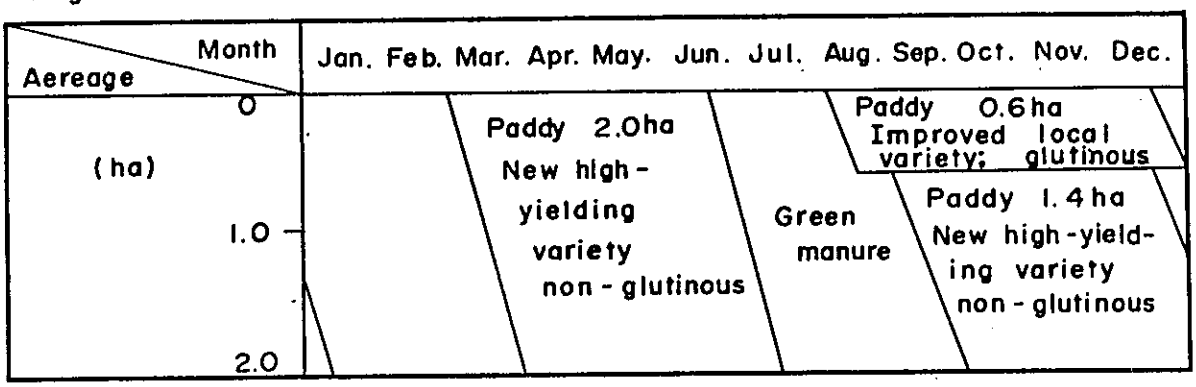


Fig. A-2

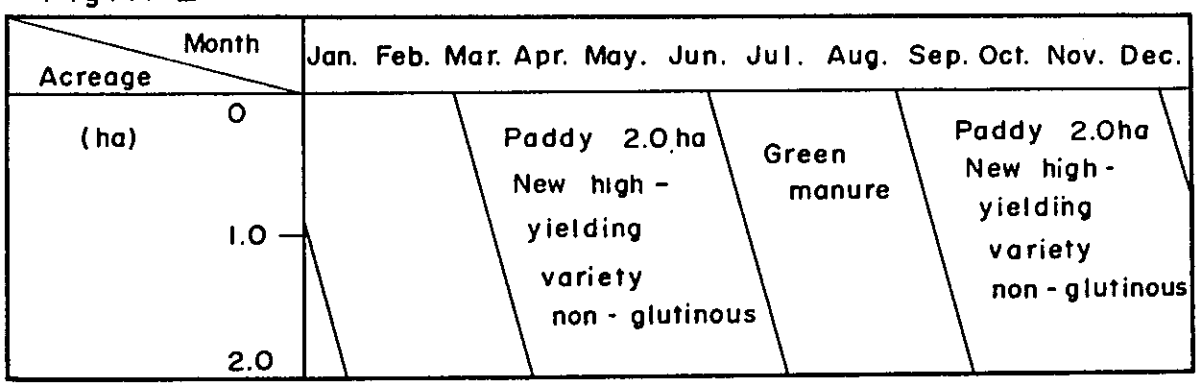


Fig. B - 1

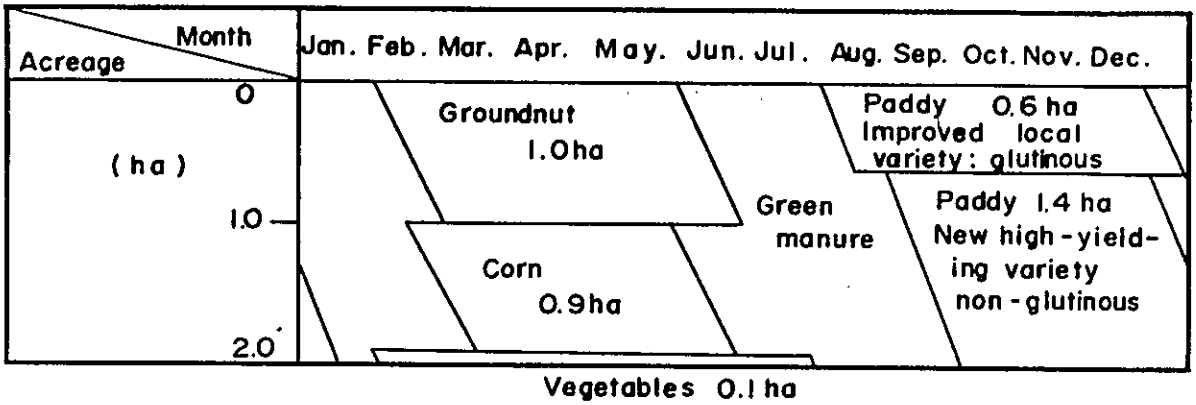
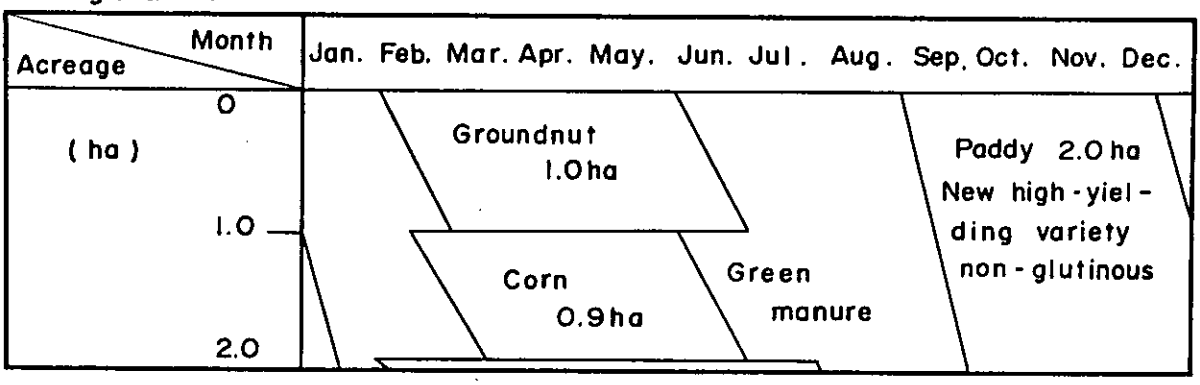

Month
Acreage
Jan. Feb. Mar. Apr. May. Jun. Jul. Aug. Sep. Oct. Nov. Dec.
0
(ha)
1.0
2.0
Groundnut
1.0ha
Corn
0.9ha
Green
manure
Paddy 0.6 ha
Improved local
variety : glutinous
Paddy 1.4 ha
New high-yield-
ing variety
non-glutinous
Vegetables 0.1 ha

Fig. B-2


Month
Acreage
Jan. Feb. Mar. Apr. May. Jun. Jul. Aug. Sep. Oct. Nov. Dec.
0
(ha)
1.0
2.0
Groundnut
1.0ha
Corn
0.9ha
Green
manure
Paddy 2.0 ha
New high-yiel-
ding variety
non-glutinous
Vegetables 0.1 ha

V. FARMERS' ORGANIZATION AND FINANCING SYSTEM

5.1 Farmers' Organization

5.1.1 What Farmers' Organization Should Be

The problem of what the Farmers' Organization should be, will be clarified in due course, especially on functions to be performed by the organization, internal organization, operations of organization, etc. in detail, as the 100 ha. Pilot Farm will have experiences from time to time. However, basic conception may be outlined as follows.

(1) One organization will be organized by all the settlers (50 families) who immigrate to the 100 ha. farmland.

(2) Then, referring to the farmers' organization in the Pilot Farm, and their experience, the organization of all the settlers (400 families) to the The Ngone area will be developed. It is of course reasonable to have one organization by all the settlers, but actually it may be more realistic to start with grouping the farmers by settlement, and make these groups developed. These settlement groups will finally be consolidated into one organization.

(3) As sub-unit of the farmers' organization, groups of 10 - 15 families alloted along the lateral canals will be grouped. These groups aim at functioning effectively in utilizing irrigation and drainage canals, controlling and maintenance of farm roads, insect control, and other cooperative works of cultivation.

5.1.2 Function of Farmers' Organization

The followings are the ideals of the functions to be performed by the organization. For the time being, however, actions should be taken on important items which can be executed.

a. Furnishing operational fund and supply of agricultural materials

b. Storage, processing and sales of agricultural products

c. Maintenance and control of farm roads, irrigation and drainage canals, pumping stations, agricultural machines and facilities concerned

d. Deposits

e. Supply of necessaries of life

f. Education and training on agriculture

g. Other items concerning development of farm operation and of organization

Activities with respect to the items a., b. and c. should be launched.

When the organizational function becomes fully competent to carry out all the items above in future, in consequence of advanced operation of the farmers' organization, activities should further be extended to agro-industrial development, improvement of agricultural life and culture, health services, etc.

5.1.3 Establishment and Operation of Farmers' Organization

In establishing and operating the organization, it is necessary to raise the establishment fund needed for utilizing such facilities as offices and store-houses, and operational fund needed for salaries of officials and staff, office expenses and other operational costs.

(1) Establishment fund

Necessary fund for establishing the farmers organization will be raised by the capitals equally contributed by the respective settlers. Increase in capital amount may be permitted as the activities be expended. Capitals will be levied from those who joined the organization later on.

(2) Operational fund

i Levy

For a certain period of time after the establishment, a part of the operational fund will be levied from the respective

settlers semi-annually at the harvest time. It is desirable that the levy will be appropriated to the guidance activities when the organizational function fully advances. However, such expenses should be levied from the farmers in future as for maintaining and controlling farm roads, protective dike, canals, etc. situated in the Project area.
(The levy will be collected after full six years in immigration.)

ii The following incomes may be incurred from business activities conducted by the farmers' organization.

a. Commissions on Sales and Purchases
Certain sum of commissions can be expected when the organization will sell or purchase agricultural products and other productive items.

b. Commissions on Credit Financing
Certain sum of commissions or charges can be expected when the organization will do credit financing (Subloan of governmental or banking financing, loan of the organization's capital, etc.)

c. Utility charge of agricultural machines etc.
When the tractors will be employed on commission basis, or agricultural products be processed or stored, a part of such charges will be allocated to the operational budget.

(3) Government Assistance

The role of the organized settlers in this Development Project is great. Whether or not modern agriculture will take its root depends upon the operation of the organized settlers. The Royal Government of Laos is therefore required to render its positive assistance for the development of the farmers' organization. Especially, government support in fund or in material should be made to cover the necessary expenditures at the initial stage of the establishment of organization.

5.1.4 Internal Organization

The farmers' organization will have in its internal network the general meeting and the committee.

(1) General Meeting

The general meeting is the highest organ of the organization, and important subjects concerning the operation of the organization will be decided by the general meeting. The general meeting will be held regularly on the fixed date every year, and may be provisionally held through fixed procedures if necessary. The general meeting is effective with more than 2/3 of the members present, and decisions must be made by the majority of the members present.

(2) Committee

The committee is the substantially operational organ of the organization, and executes operational business of the organization. The members of the Committee are composed of the representatives of the farmers' groups (one representative from each group). The committee meeting will be held in principle regularly twice a month.

The Chairman of the committee will be elected by mutual votes from among the members, and will represent the organization. He also integrates overall operational businesses.

(3) Organization Chart

Fig. 3 represents a typical internal organization of the farmers' organization.

5.1.5 Processes of Organizing Farmers

In organizing farmers, special attention should be paid to the farmers' notion and the social and economic conditions surrounding them. They have been working on the basis of blood relationships under the conditions without such systems as distribution of products and financing. Now, establishment of the farmers' organization is required

to introduce modern agriculture aiming at volunteers selected from among these settlers. The settlers are subjected to absolutely new environment where great quantities of agricultural products as well as productive materials are being delivered, a lot of fund is required, and cooperative works are imposed on an areal basis. It is a very difficult problem for the farmers to establish their organization by themselves under these conditions. It is therefore needed for the Royal Government to step forward pertinent processes to meet their actual conditions as well as render broad assistance including governmental financing for the project.

The process should start with forming the groups aiming at every lateral. These groups consist of 10 - 15 families jointly function effectively in utilizing water, controlling and maintaining farm roads and their water facilities, insect control, rice cultivation, etc. However, the groups have no capabilities of selling, purchases and credit financing, therefore, the P.D.A.T. should depute the functions or trust part of those functions to the groups. At this stage of process, efforts should be made to make farmers' notion altered and improved so that they will be prepared to realize such arrangements as agricultural financing system of the organization.

Following this stage and based upon these groups, larger groups should be organized, and expanded in accordance with the following categories and priority. (1) Maintenance and control of farm roads, irrigation and drainage canals, pumping stations (2) Furnishing agricultural materials and fund (3) Sales of agricultural products (4) Deposits (5) Supply of necessaries of life.
Table 14 represents actual processes in developing the farmers' organization.

5.1.6 New Village Construction Plan

The Royal Government of Laos aims to introduce new agricultural techniques as is called "Green Revolution", by which the Government seeks prospects for increased agricultural products, levelling up

farmers' living standards, etc. The construction of New villages for 400 settlers of the Project, is to establish three settlements on a hill along the southern main canal.

In organizing the farmers, it is prerequisite for them to live together in a fixed and limited place, and the new villages are necessary from this viewpoint. However, execution of the plan is regarded difficult without support from foreign countries since a lot of construction cost is needed. A Laos engineer estimated that the total cost will be approximately 340,000,000 Kip. (410,000 U.S.Dollar)

Fig. 3. EXAMPLE - INTERNAL ORGANIZATION

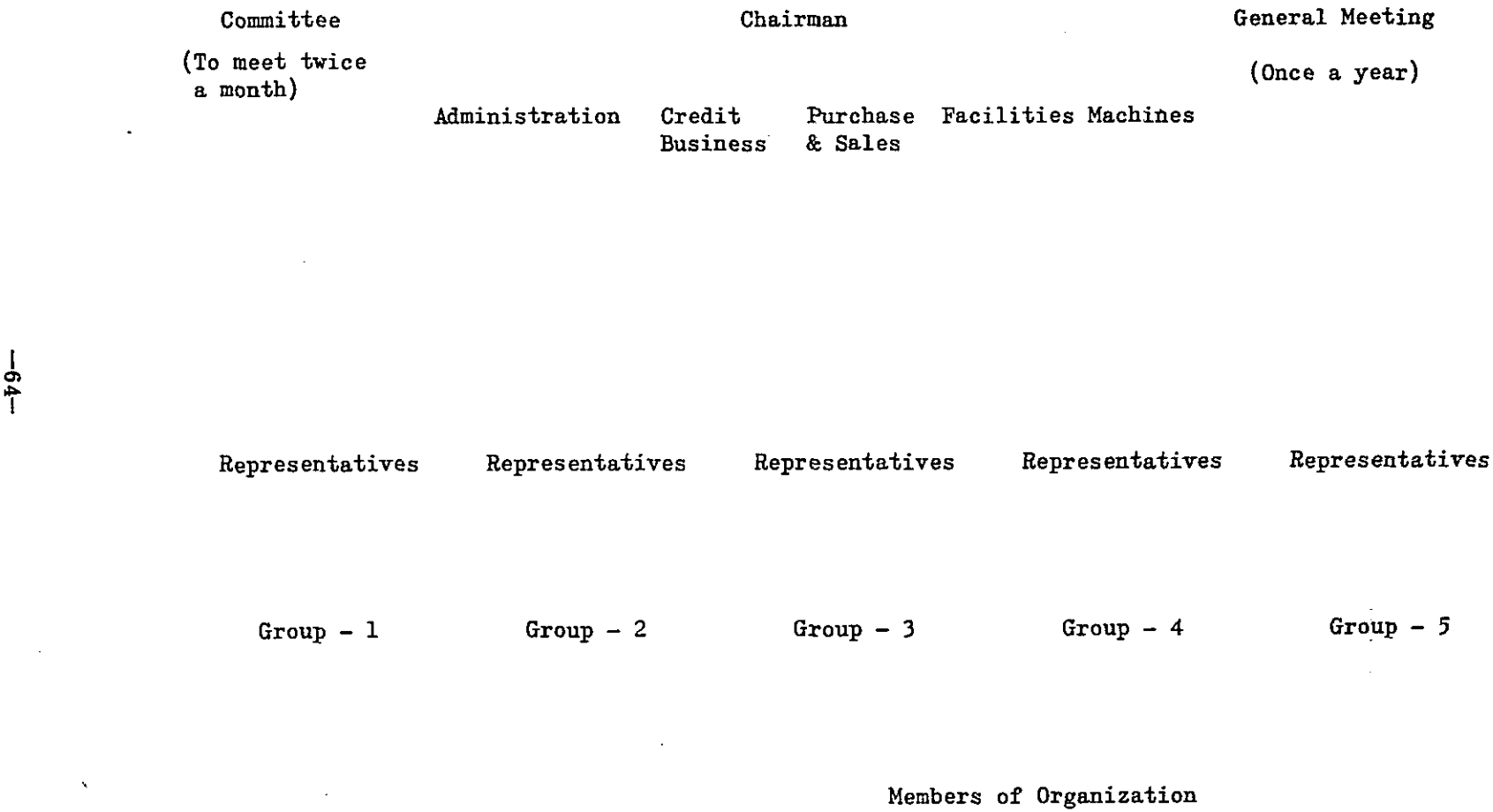


Table 14. PROCESSES OF ORGANIZING FARMERS

Calendar year/month		Engineering & Immigration	Organizing at Pilot Plant	Organizing at The Ngone Project area
1st year	April 1970	Agreement concluded (Cooperation launched)		
	December 1971	Engineering work launched		
	April 1972	Pilot Farm completed (partly) Immigration of 12 families (1st) and training Farming started by 12 families Pilot Farm completed		
	May 1973	Immigration of 38 families (2nd) and training Farming started by 38 families Major construction work complete 360 ha. farmland complete Immigration of 160 families (3rd) and training	Farmers' grouping and guidance start (cooperative farming to launch)	
	April 1974	Farming started by 160 families	Farmers' organization to launch, supply of productive materials, sales of products, activities to start.	Grouping immigrated farmers (3rd), cooperative works to start
	April 1975	Immigration of 190 families (4th) and training Farming to launch by 190 families. Agreement to terminate (cooperation completed).		Organizing farmers (3rd), supply of productive materials, sales of products, activities to start
	April 1976			Organizing farmers (4th) supply of productive materials, sales of products, activities to start.

5.2 Financing System

5.2.1 Necessity for Establishing Financing System

In the Project area, double rice cropping will be conducted on the basis of modern agricultural techniques, introducing new varieties such as IR-22 and IR-24, which promises high yield. The settlers need much fertilizer and agricultural chemicals, hired labor, and have to raise lots of operational funds. Many farmers are not capable of raising their funds, and few channel has been open for them to obtain such loans in Laos.

It is no exagerration to say that the success of farm operation depends upon whether they can secure fund support. Therefore, establishment of agricultural financing system is one of the dispensable and urgent problems.

5.2.2 Substantial Character of Agricultural Financing System

Establishment of agricultural financing system is one of the important tasks not only imposed on the agricultural development project in the The Ngone area but also to have been settled in the course of modernizing Lao agriculture.

The problem of agricultural financing is originally a problem of agricultural policy. From a viewpoint of basic character of the problem, the Royal Government of Laos should establish the system and take necessary measures for financing and others. The Government should immediately study the system and make arrangements for its settlement.

The establishment of the financing system is urgently required, and the existing banking facilities such as the Laos Development Bank and the Agricultural Development Organization (A.D.O.) should be made use of for the time being until the proper system be established. As to the Laos Development Bank which has been established for purpose of developing social and economic improvement in Laos, a special fund should be opened in it for Tha Ngone Agricultural Development Project.

Financing and agricultural modernization should be advanced in such a way. Furthermore, the fund will be expanded to an agricultural development fund, and the service area be also extended to the entire Vientiane Plain and other major agricultural regions. The experience of establishing the agricultural financing system in this area will be of much help, representing valuable date, for studying substantial character of agricultural financing system, which will be clarified as cases be experienced.

The Royal Government of Laos now intends to utilize the Laos Development Bank (L.D.B.) as an agricultural financing agency, and expects its initial fund to be loaned by the Asian Development Bank (A.D.B.). The plan is quite realistic, and an earlier realization of the plan is anticipated.

5.2.3 Terms and Conditions of Financing

Taking into account the low profitability and unstability of agriculture, terms and conditions for financing funds to build farm houses and to utilize agricultural machines are recommended to be of low interest on a long-term basis, and for fertilizer and agricultural chemicals to be of low interest on a short-term basis.

Considering terms and conditions with the existing financing agencies such as the L.D.B. and A.D.O.,*) as well as the estimated input and outcome of the farmers, financing terms and conditions will desirably be less than the following standards.

(* Standards on the following page)

5.2.4 Furnishing Credit Fund

Total fund needed for financing this agricultural product amounts to approximately 100,000,000 Kip (US$120,000), as shown in 5.5. Of the above sum, the agricultural operation fund is 77,000,000 Kip (US$92,000), and the facilities construction fund is 23,000,000 Kip (US$28,000).

Category	Interest	Period for Repayment	Items financed
Fund to secure facilities	5 - 7.5% / year	5~ years [2]	Farm house, machines & tools
		(1~) [3]	Livestock
Fund to operate farming	10 - 12% / year	Not more than 1 year	Fertilizer, medicines, seeds, laborers, etc.

/2 The period for repayment will be decided in accordance with the years of durability by group of farm house, machines & tools, etc.

/3 ( ) indicates the period of deferment.

The key problem is how these funds will be procured and financed to the farmers in order to make this Project successful. At this moment, there may be no other way than to expect loan from the A.D.B. The loan, when procured, will be financed to the L.D.B. as the development fund for the The Ngone agriculture, and will be financed through P.D.A.T. to the farmers for a time being until the activities of the farmers' organization become advanced.

Concerning the operational fund for the second settlers of 38 families in the 100 ha. Pilot Farm, any suitable measures should be taken as technical assistance, in consideration of the very difficult situations for the Royal Government of Laos to raise its fund for this project of agricultural development.

VI. WORKING PLAN FOR THA NGONE PILOT FARM

6.1 Overall Operational Plan

Following the conclusion of the inter-governmental agreement in April 1970, construction work for the main facilities for the Tha Ngone Agricultural Development Project started in December 1971. The work included construction of the protection dike, canals, preparation for paddy fields, and the dike was almost completed in April 1972, when 30 ha. of the land was also consolidated and delivered to the Royal Government as part of the Pilot Farm. The new land has so far provided the staff of the Agency for Development of Vientiane Plain of the Lao Government and the Japanese experts with test farm to develop new agricultural techniques, to carry out various studies and researches and to train the Lao technicians and the settlers.

The said 30 ha. were alloted by 2 ha. to each of the twelve settlers, and the remaining 6 ha. have been directly supervised by the Government, for use as the experiment and demonstration farm and also as the training center for developing agricultural techniques in the proposed 800 ha., the entire The Ngone Project area.

The yield of the first rainy season of May to October 1972, was 2.1. ton per ha., which represented approximately three times as much as the average production of local rice variety in Laos. The success of the first rice cultivation on the newly reclaimed Pilot Farm is attributed to the efforts of the officials of the Lao Government and the assistance of the Japanese experts. This result also guarantees the possibility of achieving production targets of 4.0 - 4.5 t/ha. of nonglutinous rice and 3.0 t/ha. of glutinous rice as mentioned in IV.

In addition, every settler was supplied with two pigs and twenty chicks free of charge, in an effort to promote animal raising and diversified farming. This suggests a way of future in farm management, and the same thing should be done for the coming settlers of the Project.

In order for the The Ngone Project to develop into a model area in the Vientiane Plain, it is necessary to recruit capable settlers following the successful result of the last rainy season, and make them acquire and utilize new agricultural techniques.

At this moment, a portion of local currency for the construction work of 800 ha. of the Tha Ngone Project is esteemed insufficient. Besides, rapid increase in costs of construction materials and labor, together with the Kip devaluation, might affect to the construction work of 800 ha. rice fields. Nevertheless, there is a fair prospect of success on our part; more than 200 ha. of the land will be completed in the coming rainy season, and the settlers will commence rice cultivation on the reclaimed area. Originally, 800 ha. of the Tha Ngone Project are to be operated by 400 families, otherwise, if operated by less than 400 families, the main facilities designed for 800 ha. would become too large in scale, inevitably bringing about more irrational results over the settlers. Namely, because of increased share in per capita expenses each farmer will be unable to operate his farming, which will be followed by various difficult problems such as repayment of loan, maintenance and administration costs, farmers' organization, etc.

The agreed period of technical assistance by the Japanese Government is five years - from April 1970 to April 1975. The objectives and working plan for the remaining two years should be re-examined and utmost efforts should be made to achieve them. Based upon this plan, the Royal Lao Government should start its studies on the method of operation after the inter-governmental agreement expires.

Special consideration should be made on the Project staff to be recruited, by all means; and also for the technicians to be trained.

6.2 Objective of Each Division

The following are the references to review the objectives of activities in each division, which should be achieved by 1975. The staff of the Agency for Development of Vientiane Plain and the Japanese experts should review these objectives and formulate the working plans of each division.

6.2.1 Water Control (Irrigation)

The irrigation system would be established based on the main and lateral canals which will be completed year after year. The proper guidance of this system will be made for the water-controllers who will be selected from among the settlers for each canal. Identical system will be established for drainage, and the drainage work will be guided in line with the water control system. Necessary control should be made to minimize unnecessary operations of irrigation and drainage since both functions of this Project area are subject to mechanical pumping.

Main facilities including irrigation and drainage equipment, Nong Sam Kha Dum, main canals, flood gates, etc. will have to be operated and controlled by the Agency. Operation standards should also be prepared by the Agency. Training of the staff of the Agency and the water-controllers with regard to operation and control of the main and lateral canals will be made in accordance with the said standards.

Due estimation will be made on operation cost of the pumps and maintenance cost of irrigation and drainage facilities.

6.2.2 Rice Cultivation

Recommendable glutinous rice varieties to be introduced are local variety such as Sanpatong and RD series rice developed in Thailand. As for non-glutinous rice, new IR or RD varieties will be introduced. No standards of cultivation of those IR and RD series varieties are established yet in Laos, and the formulation of the standards are

therefore urged. For the time being, a combined method of operation will be taken: farmers will cultivate them in their field, and on the other hand studies and experiments will be continuously made in the 6 ha. of directly-controlled test farm of the Pilot Farm. A manual in Lao language which inform the settlers about the selection of suitable varieties, nursery bed preparation, transplanting methods, pest control techniques, fertilizer application etc. will have to be distributed. Training and guidance of the staff to extend improved farming techniques will also be carried out.

6.2.3 Other Crops than Rice

As the result of the survey, double croping of paddy rice is recommended for the time being. However, a problem will still remain on researches and studies about other crops to be introduced in order to easily diversify farming when necessary. In fact, a problem of introducing cash crops etc. is yet pending, and the price of rice is fluctuating. Soybeans, peanuts, Indian corn, and vegetables will be subjected to experimental work. Studies on varieties to be possibly introduced to the Vientiane Plain will be made in terms of topographic and natural conditions such as soil, drainage, meteorology, etc. On such social and economic conditions as marketability and preference of the products, motivation researches and tracing researches will be conducted.

6.2.4 Farmers' Organization

In a prospect that 400 families in 800 ha. will form one farmer's organization (agricultural cooperative association) in the future, measures to organize elementary units should steadily be taken. The smallest units will be organized with 10 - 15 families covering 20 - 30 ha. by lateral canal. This unit of farmers will utilize the common canals and agricultural machines, and develop cooperative farming by collaborating in rice and other cultivation. The farmers will elect the water-controller, who collects the water control and maintenance fee. Agricultural machines will be co-operatively utilized on loan. The selected key farmers will be trained for machine operation and

administration, and they will collect the machine rental fee. They will also work for blanket loan of fertilizer, agricultural chemicals, seeds, etc. and for farmers' refunds.

Number of these units will be increased by 1975, and election and training of the key farmers and water-controllers will be done. The collection of levies and fees will be set right, and diagnosis and suitable advice on their farm management will be given to each settler. Preparation of the diagnosis sheet will be studied.

6.2.5 Agricultural Machines

The mechanization program for the double rice cropping should quickly be formulated and necessary machines be procured, and guidance or orientation will be conducted to realize this program. The soil of this area is of heavy clay, and the cultivation work in the dry season requires large-size tractors. Researches and studies are necessary on feasibility of plowing immediately after the harvest in the rainy season and when the soil still contains available water in the paddy fields, which enables easy land preparation for the dry season.

An over-all mechanization program will be established in order to develop utilization of machines which requires much operational cost, by classifying farm works into two kinds; mechanical jobs and manpower jobs. Also, studies should be made on mechanization in case of introducing dry field crops, and by crop items.

Concerning the management of agricultural machines, the Agency for Development of Vientiane Plain intends to control the large-size tractors for land preparation. Necessary advice will have to by given on this. Regulations will also be prepared for operating other mechanized farming such as weeding, harvesting, coordination and management, control function, calculation of the rentals, repair and maintenance, spare-parts supply, etc.

Methods of management concerning rice processing and thrashing of the entire 800 ha. Project area will quickly be reviewed in connection with the functions of the agricultural cooperative association.

6.2.6 Animal Raising

In line with diversified farming, a supply center will be established which provides piglets, chicks, and ducks to the settlers. In selecting and distributing these pigs and chickens it must be considered whether they can be raised under rough care, and in such conditions as poor supply of feed and lack of measures against epidemic diseases. Production plans and supply system for the livestock will be prepared and coordinated with the settlement plan (programes of facilities construction and staff recruitment).

It is also necessary to offer guidance for usual prevention of diseases of livestocks, especially to keep vaccines available in order to minimize damages caused by epidemics. Settlers' sense of animal health control should be improved by holding seminars, etc.

In order to minimize the purchase of feed-stuff from outside, guidance will have to be made to self-supply the feed-stuff. Seeds of selected forage crops which match the local climate and soil conditions will be distributed to the settlers. Counter-measures against shortage of feed in the dry season will be taken. Technicians of the animal raising division will have to be trained to acquire broad scientific techniques covering veterinary knowledge and livestock farming, so that they will be able to act as adviser of animal raising activities in the Project. They should also be trained in the field of management of the said supply center.

6.2.7 Training of Settlers and Extension Work

The settlers will be selected among those participants who will undergo the course of training in the basic theory and farm operation as well as practices of rice culture at least. The program will

therefore cover a series of rice growing practice; from planting to harvest. Only capable participants showing satisfactory results in these courses will be selected for settlement. Agricultural operations in 800 ha. of this Project area should be done in accordance with a series of regulations or standards (e.g. concerning water control, unification of certain varieties, common use of machines, etc.) If the regulations are not observed, it is feared that overall activity of this project might be out of order and will end in failure, as well as the farmers in the neighborhood be badly affected. Taking these into account, it is necessary to give permission to the farmers having acquired a certain technical level.

It is therefore necessary to quickly study the program, schedule and method of training and put them into practice. It is no exaggeration to say that the quality of settlers will furnish a key for a success or a failure of the Project.

Efforts will have to be made on systematic training of the staff who extends the improved agricultural techniques to the farmers. Guidance program should include not only outlining the new techniques but the ways how to share the extension workers' knowledge to the settlers.

6.3 Selection of Settlers and New Villages

6.3.1 Selection of Settlers

The first selection of settlers was made in December 1971, and a seminar and practical training of agricultural techniques were conducted in April - May 1972. The settlers started farming in the rainy season of 1972 and harvested the first crop, the average of which per ha. was fairly high and worthy of appreciation.

However, the results of this selection were not evaluated satisfactorily effectively from the viewpoints of yield, morale of farmers, and operation of farmland. There were some settlers whose achievements indicated dissatisfaction with the original objective of the Project aiming at self-supporting operation of farmland. In fact, some farmers did not observe the guidance given by the Agency or PDAT, some had their employees done almost all the workload, and some other lost their working spirit because their crops were seized by their landowners and other people.

These unfavorable conditions can be attributed to that the land compensation scheme was arranged in the criteria of selection of the settlers. Accordingly, those who had the right of cultivation were preferentially selected, while those who were capable of realizing new agricultural techniques were not selected. According to the Agency, the present settlement is of tentative step and the farmers showing poor achievement will be excluded in the future. It should rather be advised that capable farmers be selected in the first place and that severe check be made against agencies, substitutes of farmers, and relatives of those who had had the right of cultivation in the site before the Project was launched.

As is described in the Implementation Survey Report of September 1969, the following criteria for the selection should be applied, avoiding such selection as connecting with land expropriation.

1. Sufficient working ability and power to operate farming
2. Enthusiastic working spirit
3. Apptitude to acquire and realize new agricultural techniques
4. Certain sum of operational funds
5. Cooperativeness for joint farm operation and express agreement to farmers' organization
6. Physical Strength

6.3.2 New Village Construction

At present, no farm house is built in the Project area for twelve families; and these settlers are commutating from the neighboring villages. Under these circumstances, such problems are arising as loss of time in commutating, difficulties in communication and liaison for usual and joint farming, guidance visits to the respective farmers, and finishing necessary operations within fixed period of time. No progress is made in the organization and development of the agricultural cooperative association. To solve the above problems, organizing the farmers should be the first step to be launched; and for this purpose a new villages should be constructed on a hill in the back of the Tha Ngone Project, as formulated in the initial plan. The settlers will be gathered in the villages to establish their collective living.

The Master Plan of the new village construction now being formulated at the Agency requires a great amount of fund of approximately 340,000,000 Kip, equivalent to US$410,000. The Plan may be unable to be realized immediately, and the first step as the construction of key establishments such as simple farm houses, stables, storehouses, water supply and drainage equipment, electricity distribution network, and roads. Then, as the farmers' funds increase, farm houses will be modified and public institutes such as schools and hospitals be developed. At the same time, schedules of working plans and funds for the overall construction plan should be reviewed.

The Royal Government of Laos should make efforts to orderly develop the Tha Ngone Project, by utilizing its available budget for such construction work.

6.4 Problems of Pilot Farm Operation

6.4.1 Staff of the Agency and Tha Ngone Pilot Farm

The organization setup for the current Agency and the Tha Ngone Agricultural Development Project (PDAT) cannot be said as complete. Activities so far have been concentrated mainly upon the construction work of the Project site, and the reclaimed area of the Pilot Farm is still small. Whilst, from now on, the land will be increasingly consolidated, the number of settlers be increased, and technical guidance to the farmers will be more important tasks of the PDAT. Management work including farmers' organization will also be expanded, and the staff concerned with this work should be recruited from time to time.

The Agency works for planning and supervision and coordination of all the projects of the Vientiane Plain and the Tha Ngone Project will put priority on researches, studies and farmers' training. Some many technicians will have to be secured in these two offices.

The number of these staff is noticeably smaller than that of the resident Japanese experts, and the sufficient number of staff should be recruited and fully trained, so that they will be able to continue the work transferred from the Japanese experts upon the termination of the technical cooperation agreement. Assignment of these technicians should be prompted now, or many problems may be left unsolved. Moreover, recruitment of the technicians cannot be realized in a short period of time. As a matter of fact, there are few technicians for irrigation, agricultural machines, animal raising, etc., and this often results in the experts' hard work.

The annual budget for the Tha Ngone Project is approximately 10,000,000 Kip, the sum of which is almost fixed every year. Moreover, most appropriation of the budget is for staff salary and other labor cost, and therefore no satisfactory activities are expected within the limit of this budget. It is scheduled now that the size of the Pilot Farm will be expanded from 30 ha. of the present

to 100 ha. in completion; more 130 ha. be added and 340 ha. be completed in 1973; and the total 800 ha. be completed in 1974. Budget for operational and personnel expenditures should be increased in accordance with the expansion of activities as above-mentioned. Fortunately, another source of the running expenses was creaded in the fiscal 1972 in the form of the Tha Ngone Special Fund (T.S.F.), while a thorough review is required for the future expenditures.

As specified in IV and V, the overall program of fund supply-and-demand such as financing to the farmers, primary investment, loans for new villages construction, etc. should be reviewed on a long-range basis. It is of special concern that a part of the running expenses for both the Agency and P.D.A.T., on and after the completion of the Tha Ngone Project, will be appropriated from among the shares of the settlers. Such expenses including operational costs and staff salary of the Project may well be committed by the government funds and should not be imposed upon the settlers whose operational conditions are not always stable.

6.4.2 T.S.F. (Tha Ngone Special Fund)

In 1972, both the Royal Lao Government and the Japanese Government agreed upon the creation of the T.S.F. of some 26,000,000 Kip for the purpose of advancing the operation on the 30 ha. Pilot Farm newly completed. This "T.S.F." has been utilized as part of the operational fund. The detailed procedures to use the T.S.F. are specified in the Management Regulation in the ANNEX IV. This Fund is contributing remarkably to the development of the Project.

The T.S.F. is divided into two categories - 18,800,000 Kip, loan to the Lao Government as the fund for construction of the Pilot Farm facilities, operation and maintenance of the Center (ex-CAAE), and operation of the experiment/demonstration farm or Test Farm; 7,200,000 Kip loan to the settlers as the funds for their initial investment and for raising livestocks. The latter or the loan to the settlers will be paid back to the Royal Government by the farmers after they obtain their harvests.

The above fund was offered to meet the requirement for the operation in the fiscal 1972 year; and another fund will have to be considered by the Japanese Government if no sufficient budget for the operation in and after fiscal 1973 year were expected on the part of the Lao Government. Under the situation of expanding the activities in the Tha Ngone Project, the Royal Government of Laos should now establish its drastic allocation of the budget.

The allocation of the T.S.F. for the fiscal 1972 is as tabulated in Table 14.

6.4.3 Tha Ngone Agriculture & Livestock Training Center (ex-CAAE)

There has been discussions as well as questions in the relationships between the Tha Ngone Agricultural & Livestock Training Centre (or the branch described in Item 2 of Article 1 of the Agreement) and the 6 ha. directly-controlled Experiment/Demonstration Farm in the Pilot Farm. Taking into account the various problems above-mentioned, especially concerning the budget and manning, management and operations of these two Farms are recommended as follows, for which enough discussion as well as a working plan should be made for complete execution. Special consideration should be made not to leave the matters undone, or the land becomes desert.

The farmland in the ex-CAAE will be utilized as the dry field to produce feed-stuff for the livestocks to be distributed by the Supply Centre. Some irrigation facilities are available in the farmland, certain experiments will be conducted in the farmland in regard with the forage crops.

The 6 ha. Demonstration/Experiment Farm will function as the training center for the 800 ha. Tha Ngone Project, and the training will aim at the staff and the key farmers who will extend the improved agricultural techniques to the settlers. The Farm will also be utilized in the researches and studies for establishing standards of agricultural cultivation by varieties which will be

propagated to the farmers, and in the seed multiplication of superior crop items which will also be distributed to the farmers.

6.4.4 Organization of Tha Ngone Project

The Project is headed by the Project Director, who directs the Departments of General Affairs, Rural Economy, and Techniques. Each Department has its sections of respective field of work. Conception of the organization is all right, and necessary recruitment will be made and the staff will be trained and brushed up. Fig. 7 represents an example of the future organization of the Tha Ngone Project. The example is expected to be a help in strengthening the organization and recruiting the staff on a planned schedule basis.

6.4.5 Program of Training of Counter-part Technicians in Japan

There are 22 technicians among these in the Tha Ngone Agricultural Development Project, who are expected to be technically trained in Japan. They are marked by O in Fig. 4. Among the marked staff, the Director, the Chief of Economics Department and the Chief of Technical Department have already finished the training. Other seven staff have also undergone the training in the group training courses which took place in 1972 and 1973. Therefore, twelve technicians are recommended to undergo technical training within the years of 1974 and 1975.

Based upon this program, additional recommendation should be made if other qualified staff are found out and identified. Special consideration should also be made on the other training opportunities for which group training courses have not organized in Japan.

there are also mechanics who are required for repairing and maintenance of agricultural machines and driving large-size tractors. For them short time practical training (two or three months) at the Project site by resident Japanese experts may be considered rather than sending these operators to Japan for training.

Finally, it is hoped that those who completed their training in Japan will be reinstated in the Tha Ngone Project and be engaged in the extension and guidance of the settlers or the 400 families in the 800 ha. There have been some cases that some of them, immediately after coming back, found an employment in other post and his techniques acquired in the training could not fully be utilized in the Tha Ngone Project. This is strongly asked that the Royal Government of Laos will allocate these trained technicians properly.

Fig. 4. ORGANIZATION OF THA NGONE PROJECT (Draft)

- General Affairs Section
- Administration Division
  - Planning Section
  - *Accounts Section (To collect levies, machine charges, Fertilizer fees and other fees) 1
- *Director
- *Economics Division
  - *Agricultural Co-op. Section (Planning, operation, guidance, etc.) 1
  - *Purchase Section (To purchase productive materials, process and sell products) 1
  - *Economics Section (To economically diagnose farmers) 1
- *Techniques Division
  - *Machines Section *(To maintain large-size machines, plan operation, supply parts) 1
    *(To train machine operation, maintain and lease small-size machines) 1
  - *Propagation Section *(Control of waters, maintenance and control of roads and canals) 1
    *(Rice cultivation guidance) 1
    *(Dry field cultivation guidance) 1
    *(Livestock farming guidance) 1
    *(Planning of education and training) 1
    *(Life improvement) 1
  - *Techniques Section *(Farmland planning) 1
    *(Ex Dino Farm operation) 1
    *(Operation of Agriculture and livestock center) 1

15 (Total 28)

Note: * marked - training in Japan advised

15 tractor operators are required for the Machines Section

Table 15 PROGRAM OF TRAINING IN JAPAN (Draft)

			1972	1973
Administration Division	General Affairs Section			
	Planning Section			
	Accounts Section (Accounting)			
Economics Division	Agricultural Cooperative Section (Guidance of Co-op)		Thanousinh	
	Purchase Section			
	Economics Section (Agronomics)			
Techniques Division	Machines Section	Machine Operation		Sisomouth Soukpraseuth
		Machine Utilization	Na Khamphay	
		Land Reclamation		
	Propagation Section	Rice Culture (Extension)	Kampha Phondanouvong	Nhong Noisisouk
		Dry Field Crop (Extension)	Sengphat Souvannarath	Sisouk Chanmanivong
		Livestock Farming (Extension)		
		Training		
		Life Improvement		
	Techniques Section	Farmland Planning		
		Ex Deno Farm		
		Agriculture & Livestock Center		
Total			4	3

1974	1975	Total
o (Book-keeping)	o,	1
		1
	o (Agricultural Co-op.)	1
o (Agronomy)	o (Agriculture, Forestry,	2
	Fisheries, -Designing-)	1
	o (Machines, Tools, -Maintenance-)	2
o (Land Reclamation)		1
		2
o (Poultry Technique)		2
		1
o (Agriculture Extension)		1
o (Life Improvement)		1
	o (Farmland Evaluation)	1
	o (Rice Culture)	1
	o (Animal Health)	1
6	6	19

Note: No group training course

Continued