

APPENDIX III

**CHUMPHON TROPICAL FRUIT
DEVELOPMENT INITIATIVE**

CHUMPHON TROPICAL FRUIT DEVELOPMENT INITIATIVE

1. BACKGROUND

The proposed initiative has been selected for the preparation of an action program under the framework of the Western Seaboard (WSB) Regional Development Master Plan Study. This initiative aims at translating into practice some of the concepts proposed in the Master Plan Study, particularly the restructuring of the agriculture sector in the WSB region by promoting the production of high-value crops such as tropical fruit for domestic as well as international markets. This undertaking has a similar objective as that of the Government's ongoing Agricultural Restructuring Program, which encourages farmers to shift from the production of traditional and low-value crops such as rice and cassava to high-value crops and activities such as tropical fruit and livestock production.

Furthermore, the Government has given high priority for the development of tropical fruit production as a way to increase agricultural income and export earnings in the future. This concept is clearly spelled out in Thailand Vision 2020: "At present, Thailand is the largest exporter of many other agricultural products. In addition, there are many other agricultural commodities from Thailand that could become major income earners in the future, such as numerous varieties of top quality tropical fruits".

In Thailand, a wide variety of tropical fruit is cultivated all over the country. Tropical fruit cultivation is particularly concentrated in the Eastern region (e.g., Chantha Buri), Lower Southern region, and the Lower Western region. In the Lower Western region, where Chumphon province is located, agro-climatic conditions are quite favorable for fruit production. The region has an annual average rainfall of 1,900-2,100 mm, about 60 per cent of which is concentrated in the rainy season from May to November. Soils and topography are also favorable for cultivation of various tree crops in the flat lands and in the sloped lands of different elevations. Chumphon province is regarded as one of the most advantageous regions for production of tropical fruit.

In fact, land in Chumphon province is widely used for fruit and tree crops. Provincial agricultural statistics indicated that the area under fruit cultivation was 530,000 rai (84,800 ha), representing about 30 per cent of the province's agricultural land in 1995. Cultivation of tree crops (coconut, coffee, oil palm, and rubber) extends over 1,192,000

rai (190,720 ha) or 63 per cent of the agricultural land. On the other hand, paddy fields have decreased from 185,000 rai in 1984 to 54,000 rai in 1995.

The evolution of area under major fruit trees is shown in the table below. The area has increased by about 56 per cent since 1990/91; 1992/93 and 1993/94 showed significant growth.

Evolution of Areas Under Major Fruit in Chumphon

Year	Fruit Area '000 rai	Growth
90/91	248.4	
91/92	257.0	3%
92/93	320.6	25%
93/94	398.9	24%
94/95	384.4	-4%
95/96	388.3	1%

Source : Chumphon Provincial Agricultural Office.

Chumphon province produces a wide range of tropical fruit for domestic consumption and export. The four major tropical fruits produced in the province are: durian, rambutan, mangosteen, and pomelo. Area under fruit production in Chumphon province in 1995/96 is shown in the table below.

Area under Fruit in Chumphon by District

Fruit	District								Total
	Muang	Lang Suan	Pathu	Sawi	Tha Sae	Phato	Lamae	Thung Tako	
Durian	19,540	9,860	8,350	20,160	39,630	16,650	3,340	16,140	133,670
Rambutan	6,140	18,050	680	4,210	9,090	10,100	3,820	13,560	65,650
Mangosteen	8,920	22,490	1,340	2,590	7,150	11,810	820	3,620	58,740
Pomelo	10,650	890	510	1,150	9,080	70	300	-	22,650
Gold Banana	2,220	300	-	420	450	160	1,490	-	5,040
Nam-Wa Banana	2,100	700	2,040	11,340	9,500	1,420	18,160	-	45,260
Lep-mea-nang Banana	3,170	2,000	-	1,870	500	480	400	160	8,580
Jackfruit	290	50	380	380	100	150	690	50	2,090
Long Kong	5,860	780	1,460	1,150	1,830	2,570	260	570	14,480
Lansai	50	880	-	1,070	20	2,000	100	570	4,690
Papaya	1,050	-	2,870	4,140	4,500	20	1,080	-	13,660
Other Fruit	2,560	30	2,590	1,140	6,670	250	500	150	13,890
Total	62,550	56,030	20,220	49,620	88,520	45,680	30,960	34,820	388,300

Chumphon produced 48,881 tons of durian, 50,475 tons of rambutan, and 25,994 tons of mangosteen in 1992-1993, and the production of fruit in this area is increasing to meet

the increasing demand for fresh fruit and processed fruit products. The production of other types of fruit such as pomelo, papaya, bananas, guava, and tangerine has also been increasing in this area as the farmers are expanding their fruit tree plantations. A total of 229,150 tons of fruit worth 2.5 billion Baht was produced in 1995 in the area. The major production districts within Chumphon province are Lang Suan, Sawi, Thung Tako, and Tha Sae.

Most farmers of tropical fruit in the province are generally classified as small farmers (70 per cent of the total), while the remaining 30 per cent are classified as commercial farmers. Use of simple irrigation equipment such as sprinklers is widespread among fruit farmers, and the percentage of farmers using simple irrigation equipment is estimated at about 80 per cent of the total. Nevertheless, discussions with Thai agronomists suggest that the farming practices of fruit farmers in Chumphon are well behind those of other fruit-growing areas in Thailand, particularly in the Eastern and Southern regions. Fruit farming in Chumphon is described as "backyard and traditional" because: (i) fruit trees are predominantly cultivated by small farmers; (ii) fruit trees are generally mixed and thus it is difficult to control disease and finally; and (iii) fruit varieties have much to be improved. One of the reasons for this backwardness is the "close production system", i.e., the area is quite isolated and not easily accessible to export markets as compared with the Eastern and Southern regions.

The most common form of fruit and vegetable marketing in the area is through local traders (intermediaries). Farmers bring their products to the traders and the traders buy them with cash. The fruit and vegetables are then transported to wholesalers in Bangkok. Hua Hin and Surat Thani are other major destinations of fruit and vegetables produced in this area. Another form of marketing is roadside sales. There are a number of temporary and permanent structures along Route 4, aiming at direct sales of seasonal fruit and processed fruit products to passing traffic. There are district retail markets, but there is no wholesale market in Chumphon area.

2. PROGRAM CONCEPT/RATIONAL

The main thrust of the proposed program is to increase farmers' income in Chumphon by optimizing the use of natural resources available in this province. This goal would be achieved through the expansion of tropical fruit production which is well adapted in Chumphon as it provides ideal agro-climatic conditions, including a favorable rainfall pattern for tropical fruit production. Another objective of expanding tropical fruit

cultivation is to promote reforestation by planting tree crops. Since most of planting is programmed in the watershed of river basins in Chumphon province, the fruit tree planting is regarded as one of the programs for reforestation and improvement of the environment in the province. Since the lower river basins in the region are subject to periodic floods, such floods and soil erosion might be mitigated by fruit tree plantation.

In theory, two options could be considered for the expansion of tropical fruit production: (i) clearing of new area, particularly forest area, for fruit production; and (ii) conversion of unsuitable and low-value crops towards the production of fruit. However, scope for option (i) is rather limited as land suitable for agriculture is almost fully utilized, and as discussed in the foregoing chapter, there is an urgent need to protect forest area and preserve the environment in order to prevent further natural calamities and disasters. Thus, option (ii) is considered the more likely approach to expand fruit production in the province. The conversion process has already been in progress for quite some time either spontaneously by farmers themselves or supported by Government programs.

Increasing the proportion of tropical fruit production is also considered beneficial and suitable to an economy where labor will be scarce and its cost will rise in the future. As in other parts of the WSB as well as in the whole Thailand, Chumphon province will face labor shortage in the future because of the dynamics of Thailand economy in general, and of many development projects in the area such as those in Bang Saphan and Pathiu. As a result, labor-intensive activity represented by the agricultural sector will face acute constraints. As fruit production would require less labor demand as compared to paddy or field crop production, it is considered justified to promote fruit production, which will generate a higher return but at the same time require less labor input.

From the environmental point of view, increasing the number of fruit trees would have positive impact; particularly, reforestation and better watershed management would reduce the likelihood of flood in the province. The proposed program would aim at converting unused land, paddy land, field crop land, and other tree crops into tropical fruit production. It is clear that tropical fruit trees would have a positive effect on the environment such as soil fixing and mitigation of floods during heavy rain.

In addition to the physical increase in fruit production, the proposed program would also aim at improving the quality of fruit in order to increase agricultural income, particularly to increase the farmgate prices to farmers. This quality improvement would be achieved through the strengthening of adaptive research, training to farmers and extension officers, and improvement in the marketing system. Currently, fruit farmers in the area

appear to face a disease problem that relates to the production of durian. Farmers face substantial losses as major part of their products were rejected or bought at lower price. On average, the quality of fruit is generally poor as the percentage of medium to low quality fruit is high (about 70 per cent).

The opening of Pathiu airport and the expansion of Bang Saphan deep-sea port also presents a good opportunity for the expansion of tropical fruit in Chumphon. Easy access to both domestic and international markets is a very important factor for fruit production. Not only the improved marketing system would increase the farmgate price to farmers, but also easy access to markets would bring into the producing area new information, technology, and other requirements for farmers, who will eventually make efforts to increase their production as well as to improve the quality of their products in order to respond to the market demand, and thus harvest new opportunities presented in market places.

Domestic consumption of fresh fruit, particularly tropical fruit, is increasing due to the change in dietary habits of local people and the expansion of the tourism industry. Although they still remain a small proportion of the domestic economy, fresh fruit exports have also been increasing, mainly destined to Hong Kong, Singapore Malaysia, and Taiwan. There are a number of companies buying durian within the area and exporting the fruit to Taiwan, Singapore, and Malaysia; these traders are concentrated in Sawi and Thung Tako districts. According to local officials, these traders could expand their business in the area if the fruit production is increased. Domestic traders buy other fruits from the farmers in the area and transport them to wholesalers in Bangkok.

Demand for processed fruit products such as frozen fruit, fruit juice, canned fruit, and dried fruit is also increasing. Major processed fruit products in the area are coconut juice, dried banana, banana crisps, and durian crisps. There is no frozen fruit factory in the area, and thus the establishment of the factory should further diversify the marketing of fruit products of the area. The nearest frozen fruit factory is in Nakhon Pathom, which is too far for individual farmers to transport their products.

3. PROGRAM DESCRIPTION

3.1 Components

The proposed program for tropical fruit expansion would include three major components:

- Tropical Fruit Development
- Tropical Fruit Marketing Support
- Tropical Fruit Center

3.1.1 Tropical Fruit Development

The proposed program would aim at expanding in Chumphon province about 100,000 rai (16,000 ha) of tropical fruit production over a period of 10 years. This expansion would be achieved not through the clearing of forest land, but rather through the conversion of unsuitable and low-value crops into tropical fruit area. The estimated possible expansion of 100,000 rai is based on the estimation of district agricultural officers in Chumphon. This area is assumed to include all potential area for fruit production in the province including all planned area for agricultural development. This expansion represents about 26 per cent of the current tropical fruit area in Chumphon over a period of 10 years.

To achieve this goal, a line of credit is required as a mean to speed up the conversion process in a desirable manner. All fruit tree plantation takes a long time (3 to 6 years) from plantation to the first harvest. The provision of credit is deemed a way to minimize risks and encourage farmers to engage more in tropical fruit plantation. Establishment of tropical fruit plantation could be considered similar to the provision of basic infrastructure such as roads and bridges to the national economy. While it will generate benefits to the national economy in the long run, initial investment is required in the first place. Another argument that could be used to argue in favor of providing subsidized interest credit to farmers is the high interest rate in Thailand. The BAAC currently provides agricultural loans at 13.5 per cent p.a. to farming activities. This rate is considered very high for fruit tree plantation as it takes long time to receive the first harvest after initial investment, and at the same time about 70 per cent of farmers in the area are considered "small farmers". This credit line would be used as a program loan for all farmers interested in this tropical fruit expansion program.

This credit line will be used to cover the following activities:

- Land preparation
- Plantation cost including seeding, all inputs and hired labor
- Maintenance cost until the first harvest
- Simple irrigation equipment such as sprinkler

Credit requirement is calculated as shown in table below. On average, the total investment cost of tropical fruit plantation is estimated to vary between 30,000 Baht to 50,000 Baht per rai. This variation in investment cost reflects the topography in each specific area, the period from planting to the first harvest, and the required irrigation equipment. At this stage, the average cost of 40,000 Baht per rai is used in the estimation of the credit requirement. Over the program's period of 10 years, the total credit requirement is estimated at 3,200 million Baht.

Estimated Credit Requirement of Fruit Production

	Unit	Phase I 5 years	Phase II 5 years	Total million Bt
Area for Expansion	000 rai	30	70	100
Total Cost per Rai	Bt	40,000	40,000	40,000
Total Cost	million Bt	1,200	2,800	4,000
Credit Requirement 1/	million Bt	960	2,240	3,200
	million \$	38.4	89.6	128.0

Source : JICA Study Team.

1/ Assuming 80% of the total cost.

The proposed credit program will be distributed through the BAAC, the major agricultural bank, as generally practiced in Thailand. General credit norms will be broadly the same as those currently applied by the BAAC. One major item of these norms is that farmers should contribute 20 per cent of the total cost, while the credit portion covers at most 80 per cent of the total cost. However, the interest should be subject to further discussions. Currently, the BAAC is giving loans at 13.5 per cent p.a., which is considered high for the fruit plantation purpose. It is desirable that the favorable impacts on enhancement of the environment be taken into consideration in deciding the interest rate. It should also be noted that under the Agricultural Restructuring Program, the Government is giving loans at 5 per cent p.a.

The provincial as well as district agricultural officers are expected to play a central role in this fruit production expansion program. Through close communication with potential farmers, they will identify potential area for conversion to fruits, provide technical advice in the selection of fruit varieties, provide irrigation equipment, and assist farmers in their coordination with the BAAC for the required credit.

3.1.2 Tropical Fruit Marketing Support

To streamline and improve the marketing system of the above mentioned crops in the study area, the following measures are recommended:

- establish provincial fruit and vegetable market
- establish frozen fruit factory
- improve market information system

(1) Fruit and Vegetable Market

The nearest existing wholesale market for fruit and vegetables is Srimuan Market in Ratchaburi, which is about 400 km north of the study area. It is recommended that a market of this type be established either in Thung Tako or Sawi districts. Major traders are already based in these two districts, which are conveniently located in the middle of fruit producing areas. The land area of about 50 rai is required with an estimated construction cost of about 125 million Baht. Private sector initiatives are recommended with assistance from BOI, provincial government, and provincial commerce office. The proposed market will facilitate tropical fruit marketing, and the possibility of linkage with the planned Pathiu airport and Bang Saphan deep-sea port should be explored.

(2) Frozen Fruit Factory

Establishment of a frozen fruit factory will improve the marketing opportunities for fruit and vegetables produced in Chumphon. The factory will process fruit such as rambutan, mangosteen, sugar apple, lychee, longan, mango, papaya, and durian. Major export destinations of frozen fruit are Japan, Netherlands, Germany, and Hong Kong. Japan currently imports only frozen Thai fruit except a limited number of fresh fruit such as mango and bananas which are approved with special treatment for fruit flies. There are domestic customers such as airway catering companies with demand for frozen vegetables. Some Japanese factories in Thailand buy frozen vegetables for producing mixed frozen meat and vegetable dishes ready for cooking and distribute them

domestically and overseas. The frozen product factory should be equipped with industrial system freezers. Existing factories in Nakhon Pathom are too far from the production centers in Chumphon province. The approximate total cost of frozen food factory would be 150 million Baht (or US\$6 million).

(3) Market Information System

Price information is important for producers for their production and marketing decisions. The provincial commerce office regularly sends surveyors to markets and traders to collect price information. The collected information is not widely circulated to farmers. If price information of different markets including Bangkok were readily available through district agricultural offices, producers would have opportunities to sell their products at a higher price. Improvement of price information systems in the area should be integrated into a nationwide network. Total cost for the improvement in the market information system in Chumphon is estimated at 20 million Baht (US\$0.8 million).

3.1.3 Tropical Fruit Center

The main objective of the Tropical Fruit Center (TFC) program is providing necessary technical as well as marketing support for the production of tropical fruit in the region. It will also be used as the center for coordination, training to farmers, and exchange of technical information among Thai researchers as well as researchers from neighboring countries, particularly from ASEAN. It will promote the improvement of quality and production efficiencies of fruit and processed fruit products in the region. Components to support this Tropical Fruit Center would include:

- Establishment of the Tropical Fruit Center
- Support for adaptive research on tropical fruit and marketing
- Provision of training for farmers, traders, and researchers from neighboring countries

(1) Establishment of the Tropical Fruit Center

It is considered desirable that this Center be located in a fruit-producing province in the WSB region. It is considered appropriate and economical that the existing Chumphon Horticulture Research Center (HRC) of the Department of Agriculture be expanded and used as the Tropical Fruit Center. Currently, the Chumphon HRC is mainly focusing on

perennial tree crops such as coconut, cocoa, and spices. The center is staffed, at present, with 34 professionals who focus their research on: (i) crop science, (ii) plant production; (iii) soil science; (iv) plant protection; and (v) post-harvest. The existing HRC in Chumphon is currently equipped with library, training and meeting facility, a dormitory, an experimental field, and a laboratory for various research.

The existing Center will be expanded to also cover adaptive agronomic research as well as marketing research on major tropical fruit such as durian, mangosteen, rambutan, and citrus fruits. Additional equipment should be added to allow the Center to expand its research activities into tropical fruit, and to provide support for marketing research as well as training. The expansion of the building for the tropical fruit laboratory can be funded by the Thai Government but equipment and technical assistance may be provided from international aid agencies. Staff of the Center will consist of the relevant government research staff, international experts, and staff from fruit exporting industries under an agreement that the research findings will be shared among the participating organizations. The following areas of expertise are considered necessary for the expansion of the HRC: (i) tropical fruit experts; (ii) disease and pest control experts; (iii) marketing and export promotion experts, (iv) agricultural economist, and (v) toxicological expert.

The cost for the TFC has been preliminary estimated as follows: building at US\$1.5 million, equipment and laboratory at US\$3 million, and international experts for the first five years at US\$4 million.

(2) Support for Adaptive Research on Tropical Fruit and Marketing

Agronomic Research

In order to provide support for the tropical fruit expansion program, agronomic assistance is needed not only for agronomic extension but also for agronomic research. As discussed above, the Chumphon HRC's research program focuses only on coconut, cocoa and some spices, but not tropical fruit. Therefore, it is deemed necessary to expand its program to include adaptive research and farm demonstrations of major tropical fruits such as durian, mangosteen, rambutan, and citrus fruit. Additional adaptive research would cover the following areas: (i) crop and quality improvement; (ii) disease and pest control; (iii) irrigation and water management; (iv) pre- and post-harvest and; (v) toxicology.

At the same time, tropical fruit research is also being carried out in other parts of Thailand, particularly at the Chanta Buri HRC and Surat Thani HRC. Thus, close coordination and exchange among these centers should be promoted in order to share research results and avoid duplication. Similarly, part of the existing research equipment and facilities at the Chumphon HRC could be shared and used for the expanded tropical fruit research. However, other parts specifically relevant to tropical fruit research would have to be added to the Center.

Marketing Research

One of the main activities of the Center is close monitoring of export markets. The research will focus on the world fruit market and preferred varieties for each potential destination country. Trade barriers such as tariff and non-tariff barriers will be monitored including quarantine requirements. The marketing activity should be coordinated with the domestic and overseas tourism industries and the preparation of advertisements to familiarize foreign tourists with fruit produced in the Study Area.

Based on an analysis of the export market, research into quality improvement programs will be established. For each destination country, preferred varieties of fruit will be determined. Such research should include: (i) quality improvement and production efficiency; (ii) effective sterilization methods for Thai fresh fruit against Oriental fruit flies and melon flies and; (iii) post-harvesting storage, grading, and packaging methods to enhance product marketability.

The research fund and cost of personnel for both agronomic and marketing research have been estimated at US\$6 million over 10 years.

(3) Provision of Training for Farmers, Traders, and Researchers from Neighboring Countries

It is expected that the Center will also play vital role in coordinating activities for the expansion of tropical fruit production, in giving training on tropical fruit farming to farmers as well as to agricultural extension officers, and in promoting exchanges on tropical fruit among researchers in ASEAN countries. The Center will carry out on-farm trials and demonstration plots to show new technology to farmers. Study tours will be organized for farmers, and farmer-to-farmer exchanges should be promoted. Farmers' training will also include farm management as well as the pipe irrigation method in order to optimize water use. To carry out this farmers' training more effectively, cooperation

between the Center and the Provincial Agricultural Office is crucial. As part of its mandate, the Center will organize occasional seminars to disseminate research findings to fruit growers and export traders. Field trips to successful plantations within the country will also be organized.

Concerning exchanges among ASEAN researchers, it is expected that the Center will invite researchers from ASEAN countries for its periodic seminars as well as inviting guest researchers to the Center for an agreed period. Currently, the HRC is promoting this type of exchange as the Center is equipped with relevant facilities such as guest dormitory, library, meeting room, and training room. However, exchanges have been limited to coconut, cocoa, and some spices. With the expansion of the Center's activities to tropical crops, it is expected that exchanges will increasingly emphasize tropical fruit. One of the clear needs for this type of exchange is the development of tropical fruit on the Myanmar side of the WSB as it presents similar potentials and constraints as that of the WSB. There is also scope for subregional cooperation with Lao PDR, Cambodia, and various countries in ASEAN.

To enable the Center to carry out the above tasks, funds should be made available for the Center. It is difficult at this stage to estimate with precision the fund requirement. However, for the purpose of estimating the overall program cost, \$200,000 per year is assumed as the cost for training and exchanges. Funds could be provided by all parties concerned including the private sector, international organizations, international donors, and probably partly by farmers themselves. In addition to the fund for training and exchange, the cost for training material is estimated at \$0.5 million.

3.2 Schedule/Phasing

The proposed program is expected to be carried out over a period of 10 years, divided into two 5-years phases. The schedule and phasing of the program is summarized in the following figure:

Program Schedule/Phasing

	PHASE I (5 years)	PHASE II (5 years)
1. Tropical Fruit Development		
First Tranche, 30,000 rai	████████████████████	
Second Tranche, 70,000 rai		████████████████████
2. Tropical Fruit Marketing Support		
Fruit & Vegetable Market	██████████	
Frozen Fruit Factory	██████████	
Market Information System	████████████████████	████████████████████
3. Tropical Fruit Center		
Establishment of the Center	██████████	
Agronomic Research	████████████████████	████████████████████
Marketing Research	████████████████████	████████████████████
Training & Exchange	████████████████████	████████████████████

3.3 Institutional Arrangements

The proposed program would involve various institutions, namely the Agricultural Extension, the Horticulture Research Institute, the Ministry of Commerce, the BAAC, the Chamber of Commerce, and fruit producers' cooperatives. It is proposed that each institution will implement its relevant task; for example, the Agriculture Extension will coordinate with the BAAC to implement the tropical agriculture expansion program; the Ministry of Commerce will collaborate with the Agricultural Extension, and the private sector to build and operate the proposed market and improve the marketing system; and the Horticulture Research Institute will run the research and training programs.

To harmonize progress of all activities and to exchange information, it is proposed that a steering committee be established to supervise the proposed program. Members of the committee would include all participating institutions: the Agricultural Extension, the Horticulture Research Institute, the Ministry of Commerce, the BAAC, the Chamber of Commerce, and fruit producers' cooperatives. Taking into consideration of the nature of the program and capacity of each institution concerned, it is proposed that the

Chumphon Horticulture Research Center will act as chairman of the steering committee, and the Agricultural Extension as co-chairman.

4. PROJECT ASSESSMENT

4.1 Estimated Costs

The total estimated cost of the program is estimated at 4,770 million Baht or \$190.8 million. Detailed cost by component is summarized in the table below.

Estimated Total Cost of the Chumphon Tropical Fruit Development Initiative

	Unit	Phase I	Phase II	Total	
		5 years	5 years	mil. Bt	mil. \$
1. Tropical Fruit Development	Bt mil.				
First Tranche, 30,000 rai		1,200.0		1,200.0	48.0
Second Tranche, 70,000 rai			2,800.0	2,800.0	112.0
Sub-total		1,200.0	2,800.0	4,000.0	160.0
2. Tropical Fruit Marketing Support	Bt mil.				
Fruit & Veg. Market		125.0		125.0	5.0
Frozen Fruit Factory		150.0		150.0	6.0
Market Information System		10.0	10.0	20.0	0.8
Sub-total		285.0	10.0	295.0	11.8
3. Tropical Fruit Center	Bt mil.				
Establishment of the Center		112.5		112.5	4.5
Research		75.0	75.0	150.0	6.0
Experts		100.0	50.0	150.0	6.0
Training & Exchange		37.5	25.0	62.5	2.5
Sub-total		325.0	150.0	475.0	19.0
Program Total	Bt mil. US\$ mil.	1,810.0 72.4	2,960.0 118.4	4,770.0 190.8	190.8

Source : JICA Study Team.

4.2 Economic/Financial Justification

It is premature to estimate with precision the economic and financial justification of the proposed program at this early stage of preparation; cost estimates are still preliminary, and the allocation of planted area by crop is not well known. However, a broad assessment indicates that planting tropical fruit is financially viable for farmers provided that farmers are supported with reasonable credits for their initial investments which normally take a long time to harvest its first benefit. Farm surveys also indicate that fruit farmers are generally better off than paddy and field crop farmers.

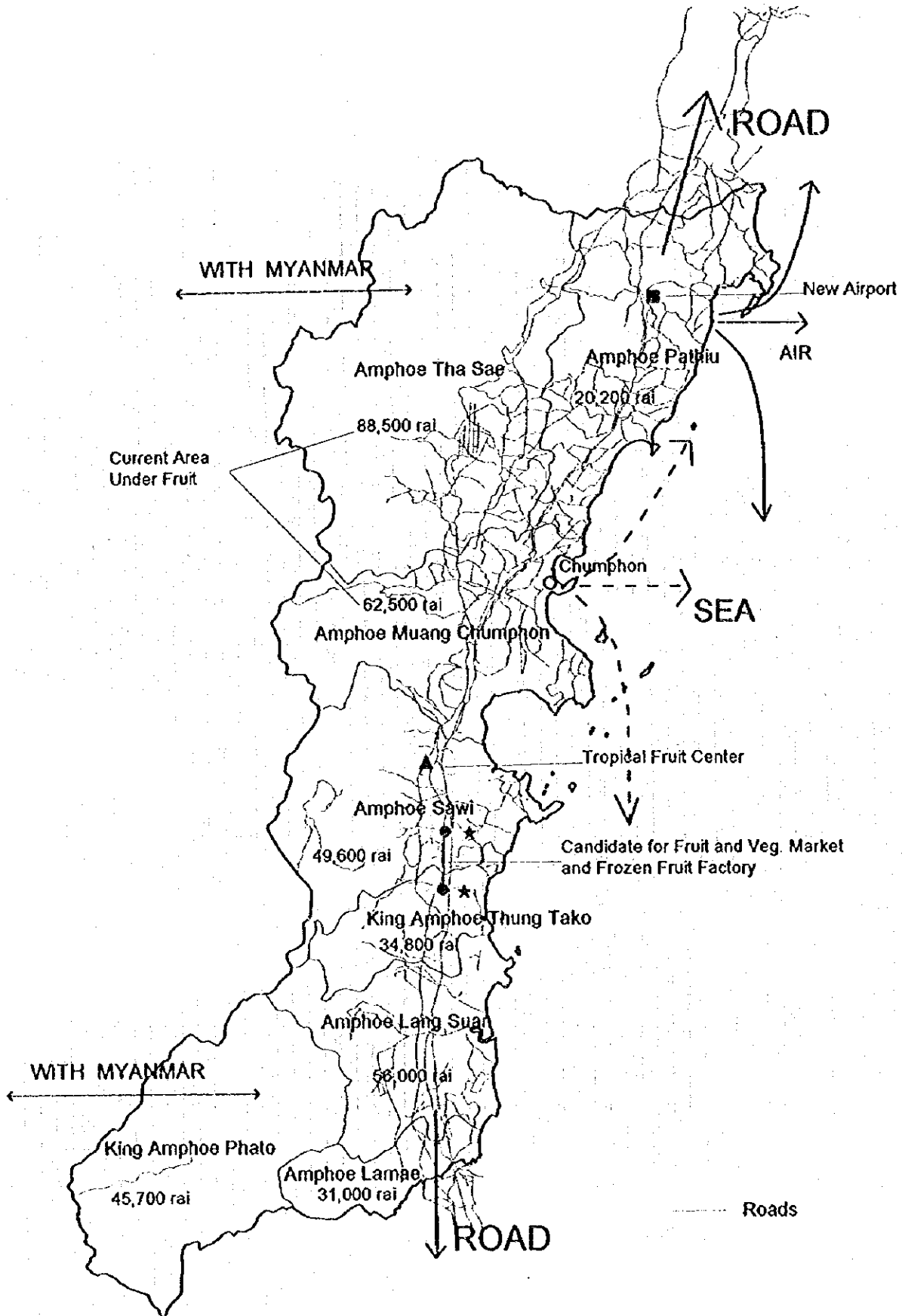
In economic terms, planting tropical fruit trees generates multiple benefits to the national economy: (i) firstly, fruit trees generate higher value added than that of paddy and field crops; (ii) secondly, fruit trees require fewer labor force which will become scarce in Thailand in the future; and (iii) Chumphon is agronomically well suited for fruit production. In addition, fruit tree plantation would provide a positive impact on the environment through promoting soil fixing, and thus mitigating flood which is a major problem in Chumphon.

5. RECOMMENDED ACTIONS

In view of the social, economic, and environmental impacts, it is recommended that the proposed Chumphon Tropical Fruit Development Initiative be implemented under coordination of the authorities concerned and the farmers in the province. Regarding implementation, the following recommendations are put forward:

- 1) Concerning the lines of credit, it is recommended that the two-step loans extended by OECF to BAAC be utilized to the maximum extent. In view of the favorable environmental effects of fruit tree plantation and the time required from planting to harvest, it is suggested that the current loan conditions (both interest rate and maturity period) be reviewed and modified so that incentives are granted for promotion of tropical fruit plantation in Chumphon province.
- 2) With respect to the realization of the Tropical Fruit Center (TFC), it is recommended that the existing Chumphon IRC be expanded under technical cooperation programs of international donors and the Thai Government. It is suggested that the existing building facilities be funded by Thai government and that the research experts and equipment be provided under technical cooperation by the international agencies and donors.
- 3) Some parts of the proposed programs should be implemented under public and private partnership (e.g., the program for fruit market and frozen fruit factory). It is recommended that discussions and arrangement be initiated between the public authorities concerned and the private sector on how to practically implement such programs.

Chumphon Tropical Fruit Development Initiative





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