CHAPTER X PLAN OF PROJECT IMPLEMENTATION

CHAPTER X PLAN OF PROJECT IMPLEMENTATION

10-1 Necessity and Urgency of Warehouse and Related Facilities

PWO will be unable to functionally operate the warehouses and related facilities, to be built throughout the nation under this project, until all components are fully installed. However, it should be considered that to purchase, store and sell a large volume of milled rice amounting to 450,000 tons annually in domestic and foreign markets is fairly big business. Business lines should be expanded gradually as PWO's management status strengthens.

Now, let us consider the necessity and urgency of each warehouse and related facility to be built under this project.

1) Storage Technology Improvement and Training Center

The recruiting and training of personnel are vital elements in the implementation of PWO's plan. Even if well functioned facilities are available, the objectives of the project will not be achieved unless they are operated by skilled personnel, none of which are currently fully trained. Thus, improvements in storage technology are prerequisites to smooth implementation of the overall plan.

2) Regional Warehouse

Most of PWO's regional storage space is presently leased from private sectors, though they are officially operated under the title of public entities. PWO's activities have been restricted by a lack of warehouses. It is important for PWO to build regional warehouses throughout the nation to strengthen regional activities.

However, it may be risky to build many large warehouses at the same time. Preferably, about half of the planned warehouse capacities in the Lower Northern (Nakhon Sawan), Upper Northern (Lampang) and Northeastern (Nakhon Ratchasima) should be built first. The remaining half should follow later.

Regional warehouses in the Central region (Nonthaburi) and the Southern region (Surat Thani) may be fully constructed at the initial stage due to their necessity and urgency.

3) Provincial Warehouses

The Paddy Bank Program which has recently been initiated in the tie-up with BAAC would become a major pillar in PWO activities. Provincial warehouses may be used by PWO for the program. However, it would be safer to build the warehouses after PWO is fully accustomed to the operation at regional warehouses and has acquired a number of trained personnel in each region.

4) Expansion of Mechanical Facilities for Milled Rice in Existing PWO Port Warehouses

PWO presently owns warehouses with a total capacity of 95,000 tons, in Rajburana (50,000 tons) and in Bukkalo (45,000 tons), both in the vicinity of the Bangkok port. These warehouses have been recently built and are superior to other private warehouses in the river port. However, they are not fully functioning because they lack the machinery and equipment necessary for domestic sales and exports. As they are intended as stations for collecting rice from the producing areas, it is important to add the appropriate facilities for processing milled rice. The operation of such facilities requires skill on the part of the workers, and loading at the port would have to be performed by workers in competition with private companies. PWO's autonomy would be impaired if PWO were leased to private sectors or if PWO anticipated that the operation would be undertaken by private sectors. If PWO intervenes in the government to government sales on the export of rice, it should establish a system for developing its business constantly and train personnel in the Training Center for improvements in storage technology mentioned in 1) above before beginning activities.

5) Export Facilities in Laem Chabang

The government is currently emphasizing the development of the eastern seaports in order to alleviate the congestion of outmoded facilities in the river port of Bangkok. It is significant for PWO to participate in the development, taking advantage of the merits of the new port. However, it should be considered that the new port will not be opened until June, 1989. In addition, a number of skilled persons will be required to handle the large volume of exported rice which includes the operation of the processing facilities for exporting quality rice.

10-2 Priority of Warehouse Construction or Machinery Installation

The order of priority for warehouse constructing or installing the machinery and equipment is shown by the following table 10-1. This order is determined based on the necessity and urgency of each item. The installation of machinery and equipment is timed with the construction of each warehouse.

10-3 Implementation Plan

The implementation plan of this project in accordance with the order of priority as provided in Table 10-1 and is shown by the following Figure 10-1. It is tentatively considered that the plan may be completed in five years. Ideally, the period should be divided into three stages, with the completion of each stage confirmed by the performance of PWO activities. For example, if the first stage is completed, the functions of the new warehouses will be confirmed, then construction of the second stage will begin. After confirming the overall activities of regional and provincial warehouses, the third stage at Laem Chabang will be put into action. This process may prolong the implementation period, but will achieve the best effects.

The total period of construction, including the time required for detailed design, is 5 years. The work schedules are divided into the following three stages according to their order of priority. Detailed design, tender, construction and installation of machinery are included in each stage of the work schedule.

First Year

Necessary sites are acquired by PWO prior to beginning construction, and the boring survey is conducted for detailed design. Subsequently, the detailed design for the first stage of construction is completed, and tenders are invited. The first six months are spent in these processes, with the second six months spent for receipts, the evaluation of tenders and the selection of successful bidders.

Second Year

Construction of the first stage is begun. Specifically, the sites are grounded and basic structural foundations are laid in the first half of the year. Machinery and equipment are simultaneously manufactured in factories. Aside from construction of the first stage, construction of the second stage is implemented to the extent that the sites have been acquired, and the boring survey, detailed design and selection of successful bidders.

Third Year

Construction of the first stage is complete. Buildings are constructed, machinery is installed and test runs are conducted. With regard to construction of the second stage, the sites are grounded, and basic structural foundations are laid. Machinery and equipment for the second stage are also produced. In addition, sites for the third stage are acquired, and the boring survey and detailed design are begun.

Fourth Year

Construction of the second stage is complete. Machinery and equipment are installed, and test runs are conducted. The successful bidders for the third stage are selected. Then, the sites for the third stage are grounded, the basic construction is completed and building is begun on the structures. Machinery and equipment are also manufactured.

Fifth Year

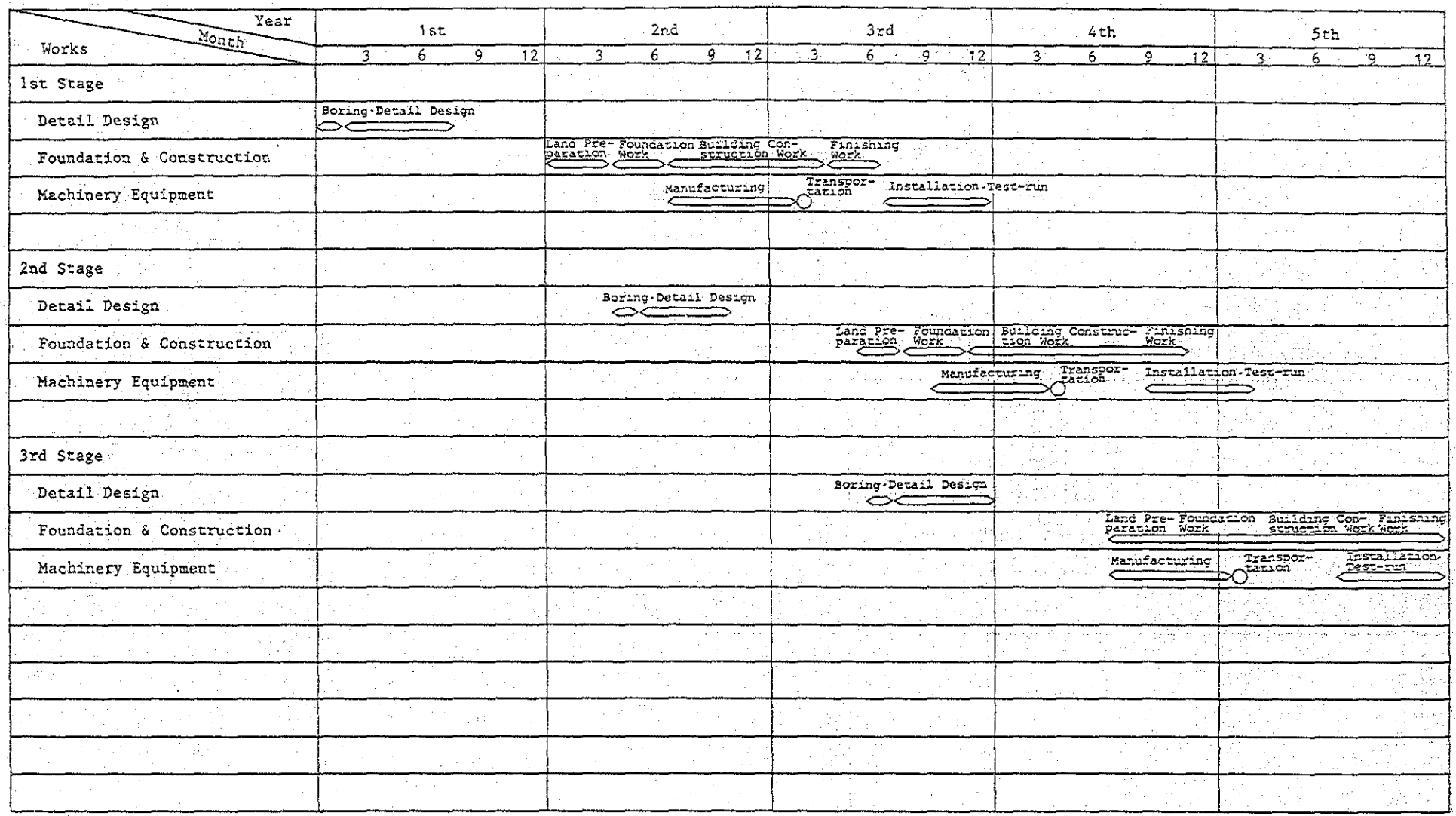
All construction is completed by the end of the fifth year. The structures which were started in the fourth year are almost entirely completed in the first half of the fifth year. All the machinery and equipment are also manufactured, shipped, installed and test run by the end of the fifth year.

Table 10-1 Implementation Schedule by Stage

Order of Priority	Type of Facilities	Place	Contents of Facilities
First stage	1. Training center for improvements in storage technology on storage	Nonthaburi Chai Nat	Warehouses, materials, equipment and attached test warehouses for improvements in storage technology and training, and model facilities for storing paddy.
	2. Regional warehouse	Nonthaburi (Central)	Warehouses with a capacity of 20,000 tons, and shipping facilities.
		Nakhon Sawan (Lower North)	Warehouses with a capacity of 20,000 tons and attached machinery.
		Lampang (Upper North)	Warehouses with a capacity of 10,000 tons and attached machinery.
		Nakhon Ratchasima (Northeast)	Warehouses with a capacity of 10,000 tons and attached machinery.
		Surat Thani (South)	Warehouses with a capacity of 5,000 tons and attached machinery.
Second Stage	1. Regional warehouse	Nakhon Sawan (Lower North)	Warehouses with a capacity of 10,000 tons
		Lampang (Upper North)	Warehouses with a capacity of 10,000 tons
		Nakhon Ratchasima (Northeast)	Warehouses with a capacity of 10,000 tons

Order of Priority	Type of Facilities	Place	Contents of Facilities
	2. Provincial warehouse	Suphan Buri Chai Nat Suraburi Chiang Mai Chiang Rai Phitsanulok Phichit Udon Thani Surin Ubon Ratchathani	Warehouses for storing agricultural products with a capacity of 5,000 tons each.
	3. Facilities for processing exporting rice in existing river port warehouses	Rajburana	Machinery and equipment for exporting 110,000 tons of milled rice annually.
		Bukkalo	Processing and packing machinery for selling 90,000 tons of milled rice annually in Bangkok.
Third stage	1. Export facilities in the seaport	Laem Chabang	Warehouses with a capacity of 70,000 tons and processing facilities for exporting 200,000 tons of milled rice annually.

Fig. 10-1 Construction Work Process Table



CHAPTER XI EXPENSES FOR OPERATION AND MAINTENANCE

CHAPTER XI EXPENSES FOR OPERATION AND MAINTENANCE

The annual expenses for operation and maintenance are shown in Table 11-1. The following is a description of each item.

Table 11-1 O & M Cost per Year

No.	Item	Cost (bahts)
1	Personnel Expenses	32,230,320
2	Overtime	1,611,516
3	Insurance, Welfare & Medical	1,611,516
4	Fuel Consumption	5,623,828
5	Electricity	10,748,642
6	Water Charge	53,156
7	Repair & Maintenance of Machinery, Equipment and Building	4,439,860
8	Fumigation Materials	14,786,720
9	Miscellaneous	7,110,556
	Total	78,216,114

Personnel Expenses

The labor plan based on the scope and functions of the facilities is indicated in Appendix K-1. The wage level is derived from the current wage schedules of PWO (Appendix K-2, K-3).

Overtime

Taking into consideration the survey on the warehouse industry, overtime expenses are estimated to be 5% of the labor expenses.

Welfare

Taking into consideration the examples of several cases in Thailand, welfare expenses are estimated to be 5% of labor expenses.

Fuel

Fuel expenses involve light oil and lubricating oil for internal combustion, for vehicles and drying equipment. The amount of

consumption is calculated in accordance with the operation plan of each piece of equipment (Appendix K-4) and the current standard price of 6.12 ฿/ℓ.

Electricity

The amount of electric power to be consumed for each piece of equipment is calculated from the operating hours based on the operation plan and the current power charge of MEA.PEA is shown in Appendix K-5.

Water

This project does not require a large amount of water. The amount of consumption (6 ℓ/m^2/month) required is calculated in proportion to the area of warehouses. The current water charge is shown in Appendix K-6.

Maintenance and Operation of Machinery and Warehouses

Expenses for the operation and maintenance of machinery and warehouse are estimated to be 0.3% of the total construction cost.

Fumigation

The standard price of fumigation materials as shown by Appendix K-7 is applied to the planned amount of storage. The frequency of fumigation is estimated to be 90 days, considered the behavior of insects in Thailand.

General Administration Expenses

General administration expenses including miscellaneous expenses and reserves for the above expenses are estimated to be 10% of the total expenses of operation and maintenance.

CHAPTER XII TOTAL EXPENSES OF WAREHOUSE CONSTRUCTIONS

CHAPTER XII TOTAL EXPENSES OF WAREHOUSE CONSTRUCTIONS

The total expenses for warehouse constructions and related machinery and equipment of this project are estimated to be approximately 909,040,000 bahts based on the prices made on December, 1984. This consists of 452,303,000 bahts in foreign currency and 456,737,000 bahts in local currency.

Since actual construction works for this project will not begin until 1986 or later, it is necessary to estimate the price escalation for fixed investments, in accordance with the progress of the schedules. These expenses must then be added in accordance with the estimated level of commodity prices for each fiscal year.

The total expenses thus adjusted are indicated as follows:

(Unit: 1,000 bahts)

Item	Foreign currency	Local currency	Total
I Civil engineering	32,923	26,773	59,696
II Construction	130,407	330,304	460,711
III Machinery and equipment	264,505	58,259	322,764
Total (I - III)	427,835	415,336	843,171
IV Procurement of sites	-	15,288	15,288
V General administration	-	16,863	16,863
VI Technical fees	24,468	9,250	33,718
Total (IV - VI)	452,303	456,737	909,040
VII Price escalation	141,656	142,834	284,490
VIII Contingency	59,396	59,958	119,354
Grand Total (I - VIII)	653,354	659,530	1,312,884

1) The expenses for fixed investments are based on the estimation of prices made on December, 1984 (at the exchange rate of ¥9.40 per baht.

2) The price of materials, evaluation of works, wages, etc. are based on the data of the central and local governments provided by local contractors, agents and importers of machinery and building equipment. However, the estimation of imported goods is based on the addition of CIF Bangkok in foreign currency with domestic transportation costs in local currency.

3) Most of the sites are owned by the central and local governments, but the expenses of procurement involve some private sites and the land of Laem Chabang Port.

4) 2.0% of the total expenses for total fixed investments as of December, 1984, are estimated in domestic currency as general administrative expenses for PWO.

5) Technical fees include service fees for civil engineering and construction, technical design for the installation of machinery and equipment, and evaluation of tenders and management of the works being estimated necessary services both in foreign and local currency.

6) The annual growth of commodity prices is 5% for both local and foreign currency.

7) 10% of the total expenses including the price escalations are indicated as a contingency.

8) In view of the public nature of this project, custom duties and other taxes are not included in the total expenses.

9) The annual disbursement of project cost and the statements of these fixed investments are indicated in Appendix L-1 to 3.

CHAPTER XIII FINANCIAL AND ECONOMICAL EVALUATION

CHAPTER XIII FINANCIAL AND ECONOMIC EVALUATION

13-1 General

13-1-1 Purpose and Scope

The purpose of this chapter is to examine the viability and soundness of the Project from the standpoints of both economic entities, PWO, and Thailand's national economy, by means of a financial and economic evaluation.

As stated in the previous sections, the Project comprises three areas; construction of regional and provincial warehouses for milled rice storage, development of a central shipping facilities and establishment of Storage Technology Improvement and Training Center. The financial and economic evaluation, however, excludes the last component as it provides no viable benefits that can be quantified and expressed in monetary terms.

13-1-2 Method

Implemented and operated by PWO, a state enterprise, the Project shall be evaluated financially from the standpoint of PWO as a business entity, as well as economically from a national economic viewpoint. For both aspects of the evaluation, the project shall be justified mainly by its profitability expressed in the Financial and Economic Internal Rate of Return (FIRR, EIRR).

During the phase II study, PWO proposed the seaport (Laem Chabang), now being developed under the Eastern Seaboard Development Program, as the location for the projected shipping facility. It requires a comparison in financial and economic superiority between alternatives representing two proposed locations. In the following sections, Alternative I represents the original proposal Nonthaburi at river port, as the construction site for the shipping facility, while alternative II represents the Laem Chabang at newly proposed seaport. The project evaluation will be carried out by comparing the profitability of each alternative.

13-1-3 Duration of the Project

The project duration was fixed at 30 years. This is based on the durable years of the projected warehouse equipment estimated by the technical division of the study team, and the legal useful life of similar equipment under Japanese corporation tax law.

When the useful life of the machinery and equipment is shorter than the project life, their replacement value is counted as cash outflow in the year when their usefulness expires. This is assuming, of course, that the equipment in question may be obtained at the same cost as its original acquisition price. On the contrary, the total undepreciated value at the end of the project is reckoned as cash inflow in the last year of the project. (Appendix M-1)

13-1-4 Project Cost and Benefits

The basic idea of the project cost and benefits in the financial and economic evaluation is as follows.

The estimated project cost in Chapter 12, based on the current market prices, is applied without modification to the financial evaluation. However, in the economic evaluation, some adjustments are needed regarding the following:

(1) Elimination of Direct Transfer Payments

Those payments relevant to the Project are export premiums and other export duties imposed on rice exports, tariffs and other import duties on machines and equipment to be imported for project implementation. As for tariffs and duties, however, this treatment is not applicable, as those transfer payments were already excluded in the project cost estimate assuming the government's tax exemption.

(2) Application of Shadow Prices

Shadow prices, instead of market prices, are to be applied for the evaluation of those items whose market prices are not considered to be determined competitively in free markets, and accordingly fail to

represent their marginal productivity. The shadow exchange rate is also applied instead of the official rate for conversion of the foreign cost portion into bahts.

The practical applications of the above adjustments will be given in section 13-3-1.

Only those items that can be quantified and expressed in monetary terms are chosen from among the benefits resulting from the project. These chosen items are considered in the calculation of the project's profitability; that is, the financial and economic internal rate of return.

The following benefits were recognized as relevant to those stated above:

1) Reduction in storage losses
2) Saving warehouse rent
3) Rental revenue from storage services for other crops
4) Increases in export earnings through the quality improvement of export rice
5) Saving barge freight and other relevant costs for loading onto vessels (Alternative II)

The contents and value estimate of each item will be described in the following sections.

13-2 Financial Evaluation

13-2-1 Financial Cost

As previously stated, no modification in the estimated project cost is made for the financial evaluation, except for exclusion of price escalation. The annual cash outflow during the construction period is given in Appendix M-5, based on the annual implementation and disbursement schedule in Chapter 10. The cash outflow by operation and maintenance costs is also given in Appendix M-5, based on the estimated amount of annual requirements in Chapter 11.

Appendix M-2 and M-4 show the project cost and annual disbursement schedule of Alternative I. Comparing both alternatives, the project of Alternative I is approximately 92 million bahts larger than that of Alternative II. The technical comparison which explains the difference in project cost is summarized in Appendix M-3.

For evaluation of Alternative II, which assumes the shipping facility to be established at the seaport (Laem Chabang), additional over-land freight 11,943,000 bahts of milled rice to the port must be recognized as a cost. This is because of the greater distance from the rice producing area than the present river port. However, barge freight savings and other relevant costs will be counted as benefits. (cf. 13-2-2 (5))

13-2-2 Financial Benefits

(1) Reduction in Storage Losses

The principal economic benefit of the project would be the reduction in milled rice storage losses presently incurred under the unfavorable storage conditions of the substandard facilities now being utilized by PWO. Most of the facilities are warehouses rented from the private sector.

Several causes of losses in quality as well as in quantity were observed and reported in the Phase I study report issued in September, 1984. However, losses redeemable by the Project would be mainly those caused by biological factors; such as, grain pests, rats, birds, mold and microorganisms.

a) Estimate of Redeemable Loss

The PWO's Project Request to the Japanese Government, submitted in June, 1982, mentions storage losses of milled rice showing a 3% quantity loss due to biological factors. An additional 20% price reduction or devaluation of milled rice stock is attributed to deterioration, on the assumption of a six-month storage period under the present conditions. We have adopted a 3% loss in quantity and 15% devaluation by deterioration presently incurred after a six month storage period based on

the previous figures, and judging comprehensively from the following:

(a) Expertise in the various fields concerned, and

(b) results of the field survey.

According to our estimation of monthly stock movement as described in Chapter 5, the average turnover period under the proposed procurement schedule is about six months, which corresponds with this assumption used in storage loss estimation.

Although a precise estimation of redeemable loss by the project warehouses is difficult, the expected rate of loss reduction was fixed at 50% of the low rate now prevailing in present storage. This is subject to a conservative estimate of the project benefits.

In addition to the project warehouses, contributions to reduce quality deterioration by cleaning and grading facilities to be introduced by the project can also be expected to be project benefits.

One-half of the present stock devaluation was assumed to be saved by new warehouses. Additionally, the above facilities are expected to reduce the other half which could not be saved by the projected warehouses. Accordingly, a total 11.25% devaluation could be saved. The details of the basic idea of the present state of loss incurrence and the expected rate of redeemable loss are given in Chapter 3-4.

b) Estimation of Loss Reduction Benefits

For evaluating the redeemable loss estimated in section a), a market price, or a sales price at which PWO is actually selling their milled rice is to be applied. The average sales price resulting from PWO's recent export and domestic sales is 5,164 bahts per metric ton. This figure is used for the evaluation.

Based on the average stock volume, the average turnover period estimated in Chapter 5, and the redeemable stock loss and unit price adopted in this chapter, the value of the loss reduction benefit is calculated at 179,442,000 bahts annually.

(2) Saving Warehouse Rent

PWO owned warehouse capacities are far less than the total space requirement for milled rice storage. This has made PWO dependent upon rented, private warehouses for most of its required space. The Project would save rent costs.

The amount of redeemable annual rent is estimated based on an average stock balance to be stored under the procurement and delivery schedule with the Project. According to the monthly stock movement set up in Chapter 5, the average stock balance is 196,900 metric tons. Applying the prevailing standard rent PWO is now paying, which is *10 baht per ton monthly, the rent redeemable through the Project is calculated to be 13,718,000 bahts annually.

* It is estimated to be 20 baht in Bangkok and in its neighboring area. For a conservative estimation of the project benefit, 10 baht, which is prevailing in other regions, is used for the calculation.

(3) Rental Revenue from Storage-service for Other Crops

The uneven nature of PWO's annual procurement pattern set up in Chapter 5 creates idle space available. PWO plans to utilize this space to render storage services for other crops. This will increase PWOs rental revenues.

Prepared data by PWO shows that the average monthly rent being paid for other crop storage is 11.5 bahts per ton. We used this figure for the estimate of rental revenues expected from this service.

However, the monthly rent above is only applicable for areas other than Bangkok and its neighborhood. Double this amount can be expected for the central port warehouse.

Applying these monthly rents collectible to the space and period available for this service, and taking into consideration the stock movement in Chapter 5, annual rental revenue is calculated to be 1,500 bahts.

(4) Increase in Export Earning

The main purpose of introducing new facilities, regrading, polishing, packing and other machines by the Project is to upgrade products, mainly for export, through general quality improvement. This should bring an increase in export earnings.

It is difficult to estimate the probable increases in export prices which will be attributable to the projected new facilities; however, analyzing determined factors of FOB prices published by the Rice Committee, Board of Trade of Thailand, and getting opinions of rice trade experts, a 3% price increase would be a conservative, but realizable, estimate of the project contribution (Refer to Chapter 8-5 for details).

The annual cash inflow from this source is 54,222,000 bahts.

(5) Saving Barge Freight Costs and Other Relevant Costs (Alternative II)

Alternative II represents the case in which the projected shipping facilities are to be installed in Laem Chabang port, now being designed under the Eastern Seaboard Development Program.

The present flow of exported milled rice, requires rice to be transported from the shipment point at the river port located in Bangkok. Rice is shipped by barges up to the vessel anchored in the offing of Laem Chabang. Alternative II would allow cost reductions by saving barge freight and related loading costs. Those costs would amount to 80 bahts per metric ton as shown in Appendix M-6. Considering the planned annual handling volume in the shipping facility of about 200,000 metric tons, 16,000,000 bahts would be saved and recognized as a benefit from Alternative II.

Offsetting this benefit is an additional overland freight charge. Including this charge, the annual net saving of inland freight comes to about 4,057,000 bahts.

13-2-3 Financial Internal Rate of Return

Appendix M-4 and M-5 show annual cash flow derived from Alternatives I and II, respectively.

The financial internal rate of return (FIRR) is calculated to be 11.0% for Alternative I, and 12.1% for Alternative II from the respective cash flows.

13-2-4 Sensitivity Analysis

Using the following three cases, with respect to changes in cost and benefit, internal rates of return are calculated as follows.

	Case	IRR
I	10% cost increase	10.1%
II	10% benefit decrease	9.9%
III	10% cost increase 10% benefit decrease	8.0%

13-2-5 Conclusion

The financial internal rate of return (FIRR), (11.0% for Alternative I and 12.1% for Alternative II) is judged to be higher than the cut-off rate and the expected marginal cost of capital which PWO has to raise for the Project. In other words, the Project is profitable enough for PWO to accept in financial terms.

In comparing the project alternatives, Alternative II shows a higher FIRR; therefore, the projected shipping facilities should be established in Laem Chabang instead of Nonthaburi from a financial standpoint.

The result of the sensitivity analysis performed for Alternative II, shows that in the most pessimistic case (Case IV in 13-2-4), the FIRR is depressed down to 8%. However, considering the benefits which cannot be

quantified and expressed in monetary terms; such as market expansion brought about by the Project, the Project is still considered to be feasible from a financial point of view.

13-3 Economic Evaluation

13-3-1 Economic Costs

While the project cost estimated based on market prices is used for financial evaluation, some modifications on the financial cost is needed in the economic evaluation.

Considering the following points in this context, practical applications are decided as follows for the respective items.

(1) Foreign Exchange Rate

A shadow exchange rate is used instead of an official exchange rate for converting cost items classified in foreign currency. The exchange rate, as determined in the international financial market, is adopted as a shadow rate.

(2) Unskilled Labor

The financial cost of unskilled labor is not adjusted because of the following reasons:

(a) The project sites are scattered throughout the country, and this makes it difficult to calculate opportunity costs of unskilled labor at each site. It is therefore unrealistic to apply a certain shadow wage rate uniformly to every project site, each of which has different employment conditions and different market wage rates.

(b) In 1980, Bank of Thailand did some research regarding wages of unskilled labor. According to this research, actual wages paid were well below the legal minimum wage rate throughout the country.

This indicates that although the market wage rates of unskilled labor might fail to indicate their marginal productivity, it should not be considered to differ much from the opportunity costs of unskilled labor.

(c) Land

For evaluating the land some adjustment is made for an economic evaluation. For most of the projected locations, land will be leased within the public sector. But some of the land is idle and presently making no contribution to national productivity; therefore, evaluating the opportunity costs, this land's economic value should be nil. However, for other land now being productively utilized, we adopt a market rate, assuming it is competitively determined by a relatively large demand for land lease.

13-3-2 Economic Benefit

For calculating the economic benefit, the export parity price, derived from the international price of milled rice, is applied as a unit price instead of a market price which was used in the financial evaluation.

The calculation of the economic export parity price of milled rice, as shown in Appendix M-7, gives 5,516 bahts per metric ton.

13-3-3 Economic Internal Rate of Return

From the cash flow shown in Appendix M-8 and M-9, for Alternative I and II respectively, each economic internal rate of return (EIRR) is calculated to be 12.0% and 13.1% respectively.

13-3-4 Sensitivity Analysis

Using the following three cases, with respect to changes in cost and benefit, the internal rate of return is calculated as follows:

	Case	IRR
I	10% cost increase	11.1%
II	10% benefit decrease	10.9%
III	10% cost increase 10% benefit decrease	9.0%

13-3-5 Conclusion

The economic internal rate of return calculated in Section 13-3-3 justifies the viability of the project whatever applicable rate is adopted as the cut-off rate, a selection of which, however, has been a matter of controversial opinion.

Comparing the project alternatives, Alternative II shows a higher EIRR as well as a better financial evaluation. Considering the socio-economic benefit from the sea port, which is superior in profitability, we can also conclude that the shipping facility should be established in Laem Chabang.

The result of the sensitivity analysis performed for Alternative II, which will be adopted, shows that in the most pessimistic case (Case III in 13-3-4), the EIRR is depressed down to 9.0%. However, considering the socio-economic benefit, stated in Section 13-4 and in the next chapter, the project is still judged feasible from the viewpoint of Thailand's national economy.

13-4 Socio-economic Benefits

There are several socio-economic benefits which could not be translated into volume or value for the purpose of calculating the ratio of internal return in the financial and economic evaluation of the project. These include;

(1) Improvement of loading efficiency with large vessels at seaport wharf

(2) Development of new export markets through improvements in quality and the packaging of rice for export

(3) Stabilization of prices of paddy and rice

(4) Provisions for benefits to farmers and public institutions such as BAAC by offering the use of the facilities.

13-5 Advice

It was found during the course of our study that PWO lacks an adequate stock loss control system in their management.

Because there is considerable financial losses due to stock losses during storage; control of stock loss, aimed to be reduced by the project, must be especially emphasized in a management control system.

Under the present stock control system, PWO has no means to precisely know the extent of loss in quantity, and how much impairment of stock value due to deterioration, should be recognized in certain periods and conditions of storage.

Although establishing a comprehensive stock control system, which includes adequate loss control, is subject to more detailed study and analysis, we would like to advise the following points:

(1) Management Information by Periodical Stock Inventory

1) Monthly stock inventory

Monthly stock inventory is to be carried out by responsible warehouse staff members in order to judge the quantity and quality losses incurred during storage. The results will be analyzed and reported to management.

2) Stock inventory at the fiscal year-end

At the fiscal year-end, physical stock inventory is to be carried out by checking physical stock against its book record in order to determine the year-end quantity and value of the inventory. Inventory has to be adjusted to the physical stock balance, and at the same time stock items found deteriorated must be devalued to its estimated market value. To meet these requirements, the present stock recording system should be improved.

These improvements in the stock inventory system are essential not only for management purposes, but for sound accounting practices concerning asset valuation for financial reporting.

(2) Scientific Research of Storage Loss

In order to establish an adequate loss control system, scientific research of storage loss is to be carried out, as well as knowing the actual loss incurrence by physical stock inventory.

CHAPTER XIV THE SOCIO-ECONOMIC EFFECTS OF THE PROJECT

CHAPTER XIV THE SOCIO-ECONOMIC EFFECTS OF THE PROJECT

14-1 The Socio-Economic Effects of the Comprehensive Storage Facilities

The modernization and expansion of agricultural product storage facilities, centering on rice, to be undertaken by PWO provides a powerful and practical support to the Government for implementing various policies. PWO particularly will be able to improve the income of farmers by having warehouses near producers and by actively participating in the business. PWO will be able to stabilize the rice price by having warehouses in the centers of the main marketing areas throughout Thailand. By having export rice processing facilities using modern technology in export ports, PWO will be able to render its assistance to further increase the earning of foreign exchange for Thailand through exports of agricultural products and by developing new markets as well as securing existing markets.

In an agricultural country like Thailand, the unit prices of agricultural products are low, reducing the incentive or motivation on the part of the private sector to build warehouses. As a result, this is suppressing income for farmers and is making it difficult to improve the quality of export agricultural products, which is a serious deficit of distribution channels.

The socio-economic impact will indeed be great if PWO, as a public entity, builds functional warehouses in main marketing centers throughout Thailand and economically and smoothly executes business based on government policies in order to remedy the foregoing marketing deficit.

The direct and indirect socio-economic impacts that are anticipated by implementing this project will be as follows:

a) Expansion of public participation by PWO

b) Support of producer paddy price and consumer rice price

c) Regulation and streamlining of distribution by modernizing and expanding rice market facilities and warehouses

d) Continued sales to existing markets and developing new markets by improving export rice quality and expanding shipping facilities and capacities for loading onto a large sized ocean-going vessels

e) Reducing losses generated during storage

f) Support activities of the agricultural cooperatives, BAAC, and other public organizations

g) Convenient provision for marketing of agricultural products by giving idle warehouse space during the off-season and utilizing auxiliary facilities.

14-2 The Socio-Economic Impact of Storage Technology Improvement and Training Center

These facilities are equipped with organizations and activities to study the grain storage problem in Thailand from an overall viewpoint, and to survey the rice marketing process, as well as to reflect on the conclusions thus obtained in real policies. Therefore, it is clear that these facilities will make a sufficient contribution to improve, modernize, and expand overall storage in Thailand.

It is further anticipated that various types of training activities to be undertaken in these facilities will trigger autonomous activities of a large number of people concerned. In addition, these people will be trained in the appropriate storage technology in order to further stabilize agricultural production, achieve a smooth marketing, and increase exports.

CHAPTER XV CONCLUSIONS AND RECOMMENDATIONS

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15-1 Conclusions

The findings and evaluation of the survey indicate that the Project should be implemented as soon as possible. In order to implement the project successfully, priority should be given to the construction and installation of facilities that are urgently required for the operation of PWO.

15-2 Recommendations

The study team would like to recommend that the following points be considered for the purpose of successfully implementing the Project.

(1) Recruiting and Training Personnel

The recruiting and training of personnel is the most important element in the set-up of PWO's organization for implementing the Project.

It is necessary, therefore, to begin operating the Storage Technology Improvement and Training Center contained in the Project as soon as possible. This serves the purposes of training personnel and improving storage technology.

(2) Optimum Management and Operation

When agricultural products are stored in humid tropical areas, it is essential to prevent their loss during storage. PWO should strengthen its management position so that it can operate these facilities efficiently and economically after they are constructed and installed.

The total construction period of the project is estimated to be 5 years, which is divided into three stages. It is safe to proceed to the next stage only after the facilities completed in the preceding stage are confirmed in full operation.

The shipping activities for the export of milled rice in ports under this Project are required to be carried out in cooperation with other governmental agencies concerned and the private sector. In view of the above "A Corporation for Shipping Operation" should be organized, and is expected to manage and operate such shipping activities independent of PWO.

(3) Research and Development in Cooperation with Other Organizations

As the functions of the facilities for the development of storage technology and the necessity of such activities have a socio-economic significance in Thailand, they should be operated by PWO in extensive cooperation with other government agencies, research institutions and academic institutions.