

CHAPTER 8 PROJECT EVALUATION

Chapter 8 Project Evaluation

8.1 Outline of the Project Evaluation

8.1.1 Basis of the Evaluation

(1) Approaches

Project Analysis may be undertaken from different point of views ranging from Economic, Financial, Socio-economic analyses to, more recently, Environmental Analysis.

In this section, the economic and financial analyses were undertaken for the proposed projects 1) Small Dike System Improvement Plan and 2) Rice Production/Marketing Improvement Project.

(2) Assumptions

The basic conditions or criteria for economic evaluation and financial evaluation are as follows.

1) Project Life

The project life is set as 30 years from the commencement of the project, which includes detailed design period and construction works period.

2) Currency

The currency for the evaluation adopted here is Viet Nam's Dong (VND).

3) Exchange Rate

Exchange rate adopted here is 14,010 VND/US\$ as the foreign exchange rate of State Bank as of March 2000.

4) Economic Discount Rate

An economic discount rate of 10.0% is adopted. It represents the opportunity cost of capital for the agricultural sector as recommended by World Bank,

5) Financial Discount Rate

The interest on annual basis for the State Bank of Vietnam of 11.0% is applied for a financial discount rate in the evaluation.

6) The Prices for Agricultural Products and Construction Materials

Farm-gate prices are used for the prices for agriculture products in the evaluation.

Ex site prices, namely prices of delivery on site are used for the prices of construction materials and agricultural inputs in the evaluation.

8.1.2 Contents and Methods of Calculating Indicators for Project Evaluation

(1) Benefit identification

Benefits of the project are composed of direct and indirect benefits as follows.

1) Direct benefit

- the net value of additional farm output arising from increased cropping intensity, breakdown of which includes increased cultivated area, yield and stabilized harvest
- cost saved in terms of lower maintenance cost that had previously expended without the project
- Saved production loss by the decrease of damage caused by recurrent inundation,

2) Indirect benefit

- Benefits of improving rural inhabitant's living condition created by activities of infrastructure improvement including rural road and canal, etc.
- Contribution to poverty eradication from increase of job opportunities
- Contribution to national food security

Farm output is valued only for main products such as paddy, fruits and livestock. Income generation induced by the processing of the output is not included.

(2) Prices and Price Conversion

1) Prices

Market price at project site is used for financial analysis and following economic price is adopted for economic analysis,

- For imported commodities: CIF price at Saigon port adding transportation cost, storage and handling charges at locality.
- For the exported commodities: FOB price at Saigon port.
- For other commodities with annual inflation rate of 10%: market prices.
- Shadow price is valued by multiplying each conversion factor of market prices for resource and services price.

2) Standard Conversion Factor

- Exchange rate : Exchange rate is considered based on shadow exchange rate. For the purpose of adjusting the effects of trade distortion, the price of import goods are economically estimated using the shadow foreign exchange rate. This project evaluation applies the mean annual inter-bank exchange rate, which has unremarkable influence on formation of trade commodity prices, to calculate conversion factor of shadow exchange rate as follows.

$$\text{Mean inter-bank exchange rate as of annual average for 1999} / \text{Exchange rate of State Bank} \\ = (13,784 \text{ VND/US\$}) / (13,960 \text{ VND/US\$}) = 0.99$$

- Based on national total import and export value and taxes for 1997 to 1998, a standard conversion factor is estimated as 0.95. Therefore, the standard conversion factor in this evaluation is applied 0.97 which is mean value between 0.99 and 0.95.

3) Construction Conversion Factor (CCF)

- Items of construction works in this plan are formulated of earth works, concrete work and others. Construction conversion factor (CCF) shall be set up for each item by item.
- For estimation of a conversion factor for earth works, earth works is divided into sub-items such as machinery operation, unskilled labor and administration. Each conversion factor for the sub-items are assumed to several values. Therefore the conversion factor for earth works is estimated as 0.70. In the same way, concrete works divides into sub-items for cement work, reinforcement work, labor and administration. According to integration of each conversion factor for sub-items, the conversion factor for concrete works is estimated as 0.92. In the estimation of conversion factor for earth works, alternative employment opportunity can be considered about 50% of annual number of days worked. Therefore the opportunity cost for unskilled labor is assumed as 0.5.

8.2 Benefits of the Project

8.2.1 Benefits of the Small Dike System Improvement Plan

Benefit of the plan was valued separately for F/S area, Brock-4 and Brock-8 of Pre-F/S area.

(1) Benefits for the F/S area

Following benefits were valued for F/S area.

- Total increased farm output is valued at 3,689 VND. This is achieved by introduction of triple rice cropping with resultant increased cultivated area of 595 and increased rice production by

stabilizing S-A and A-W crop cultivation

- Increased production of 313 million VND is valued by increase of domestic animal raising.
- Foregone benefit of fish production is valued at 23millionVND in the area.
- By the decrease of damage caused by recurrent inundation, production loss of 567millionVND is saved.
- Saved cost in terms of lower maintenance cost of 754millionVND.

Total amount of the benefit is estimated at 5,301millionVND.

(2) Benefits for the Block-4

Following benefits were valued for the Block-4.

- Total increased farm output is valued at 36,870millionVND. This is achieved by introduction of triple-cropping of rice with resultant increased cultivation area of 5,950ha and increased rice production by stabilizing S-A and A-W crop cultivation.
- Increased production of 3,130 million VND is valued by increase of domestic animal raising.
- Foregone benefit of fish production is valued at 230 million VND in the area.
- By the decrease of damage caused by recurrent inundation, production loss of 5,667millionVND is saved.
- Saved cost in terms of lower maintenance cost of 7,531millionVND.

Total amount of the benefits is estimated at 52,968 million VND.

(3) Benefits for the Block-8

Following benefits were valued for the Block-8.

- Total increased farm output is valued at 13,710 million VND. This is achieved by increased rice production by stabilizing S-A and A-W crop cultivation.
- By increase of fruit cultivation, 7,200 million VND will be increased.
- Increased domestic animal raising will generate additional benefit of 1,330 million VND.
- By the decrease of damage caused by recurrent inundation, production loss of 5,265 millionVND is saved.
- Saved cost in terms of lower maintenance cost of 7,374millionVND.

Total amount of the benefits is estimated at 34,879millionVND.

8.2.2 Benefits of the Rice Production/Marketing Improvement Project

Benefit of the project will be increased market value of paddy by improved quality.

Farm gate price of paddy is estimated at 1,758 VND/kg, increased from 1650 VND/kg with the following assumptions.

- After completion of the construction works, the quality improvement proceeds gradually.
- Ratio of quality improvement in 10 years is assumed to be 20 % of the total production.

8.3 Economic Evaluation

Economic evaluation for the projects is undertaken as follows.

8.3.1 Estimation of economic index

(1) Small Dike System Improvement Plan

Project criteria for the economic analysis are given below separately for F/S area, Block 4 and 8 of Pre-F/S. A particular consideration was made on cost allocation because it is deemed rather equitable if the cost for bridge construction is shared by broader beneficiaries. It was analyzed for two cases of project costs, 1) with and 2) without bridge construction cost.

With bridge construction cost

Area	EIRR	ENPV	EB/C
Dike Plan* F/S area	12.1 %	4,995 million VND	1.16
Block-4	15.6 %	101,547 million VND	1.38
Block-8	12.3 %	30,381 million VND	1.14
Pre-F/S area (Block-4& Block-8)	14.2 %	131,991 million VND	1.27

*Dike Plan: Small Dike System Improvement Plan

Without bridge construction cost

Area	EIRR	ENPV	EB/C
Dike Plan* F/S area	14.8 %	10,453 million VND	1.34
Block-4	19.1 %	144,782 million VND	1.64
Block-8	17.3 %	79,962 million VND	1.49
Pre-F/S area (Block-4& Block-8)	17.6 %	162,298 million VND	1.41

*Dike Plan: Small Dike System Improvement Plan

(2) Rice Production/Marketing Improvement Project

Analysis of the integrated project for rice production/marketing improvement is given below.

	EIRR	ENPV	EB/C
Rice Production Project**	23.2%	138,084 million VND	3.02

**Rice Production Project: Rice Production/Marketing Project

(3) Combination of the two projects

In addition to above-mentioned independent analyses of single project, a case study was also made by combining cost and benefit of these two separate projects.

Area	EIRR	ENPV	EB/C
Dike Plan* F/S area and Rice Production Project**	21.4 %	147,558million VND	2.48
Dike Plan* Pre-F/S area and Rice Production Project**	16.3 %	270,012 million VND	1.49

*Dike Plan: Small Dike System Improvement Plan

**Rice Production Project: Rice Production/Marketing Project

8.3.2 Sensitivity Analysis for Economic Evaluation

Sensitivity analyses were conducted as a part of Economic Analysis for the two projects under three different assumptions, 1) 10 % increase in Project Cost, 2) 10% decrease in Benefit and 3) Prolonged construction period for 1 year. It was confirmed that change in construction period has a larger influence on the overall valuation of the project.

Increase of project cost may be induced by increased construction work volume and rise in material cost and wages. Decrease in the project benefit may be induced by rise of the production cost, decreased yield and decline in farm gate price of agricultural product.

Economic Sensitivity Analysis for the Small Dike Improvement Plan (Pre-F/S area)

Item	EIRR	ENPV	EB/C
Standard Value	14.2 %	131,991 million VND	1.27
10% increment in Cost	12.5 %	83,753 million VND	1.16
10% decrease in Benefit	12.3 %	79,495 million VND	1.15
Prolonged construction period (1 year)	12.0 %	71,538 million VND	1.15

Economic Sensitivity Analysis for the Rice Production/Marketing Improvement Project

Item	EIRR	ENPV	EB/C
Standard Value	23.2%	138,084 million VND	3.02
10% increment in Cost	21.7%	131,230 million VND	2.74
10% decrease in Benefit	21.2%	117,425 million VND	2.71
Prolonged construction period (1 year)	20.4%	117,156 million VND	2.71

In the analysis of the rice production/marketing improvement project, it is confirmed that variations in construction period have more remarkable influence than the other 2-factors.

8.4 Financial Evaluation

8.4.1 Estimation of financial index

(1) Small Dike System Improvement Plan

Project criteria for the financial analysis are given below separately for F/S area, Block 4 and 8 of Pre-F/S. A particular consideration was made on cost allocation because it is deemed rather equitable if the cost for bridge construction is shared by broader beneficiaries. It was analyzed for two cases of project costs, 1) with and 2) without bridge construction cost.

With bridge construction cost

Target Area	FIRR	FNPV	FB/C
Dike Plan* F/S area	10.1 %	-1,328million VND	0.96
Block-4	13.2 %	41,058 million VND	1.14
Block-8	9.9 %	-13,480 million VND	0.94
Pre-F/S area (Block-4& Block-8)	11.8 %	27,634 million VND	1.05

*Dike Plan: Small Dike System Improvement Plan

Without bridge construction cost

Area	FIRR	FNPV	FB/C
Dike Plan* F/S area	13.9 %	6,605 million VND	1.22
Block-4	18.3 %	132,185 million VND	1.56
Block-8	16.5 %	55,442 million VND	1.34
Pre-F/S area (Block-4& Block-8)	17.6 %	162,298 million VND	1.41

*Dike Plan: Small Dike System Improvement Plan

(2) Rice Production/Marketing Improvement Project

Financial index for the rice production/marketing improvement project is estimated in the same way of the economic evaluation. The result is as follows.

Area	FIRR	FNPV	FB/C
Rice Production Project**	18.4%	84,310 million VND	1.86

**Rice Production Project: Rice Production/Marketing Project

8.4.2 Sensitivity Analysis for Financial Evaluation

Sensitivity analyses were conducted as a part of Financial Analysis for the two projects under three different assumptions, 1) 10 % increase in Project Cost, 2) 10% decrease in Benefit and 3) Prolonged construction period for 1 year. It was confirmed that change in construction period has a larger influence on the overall valuation of the project.

Financial Sensitivity Analysis for the Small Dike System Improvement Plan (Pre-F/S area)

Item	FIRR	FNPV	FB/C
Standard Value	11.8 %	27,634 million VND	1.05
10% increment in Cost	10.2 %	-24,990 million VND	0.96
10% decrease in Benefit	10.2 %	-23,580 million VND	0.96
Prolonged construction period (1 year)	10.1 %	-30,547 million VND	0.94

Financial Sensitivity Analysis for the Rice Production/Marketing Improvement Project

Item	FIRR	FNPV	FB/C
Standard Value	18.4%	84,310 million VND	1.86
10% increment in Cost	17.0%	74,493 million VND	1.69
10% decrease in Benefit	17.0%	67,718 million VND	1.69
Prolonged construction period (1 year)	16.1%	64,662 million VND	1.66

In the analysis of the rice production/marketing improvement project, it is confirmed that variations in construction period have more remarkable influence than the other 2-factors.

8.4.3 Farm Household Economic Evaluation

Benefit is valued as follows,

- For the Small Dike System Improvement Plan

- Increased rice production which is achieved by introduction of triple rice cropping and by stabilizing S-A and A-W crop cultivation
- Increased production of domestic animal raising.
- Foregone benefit of fish production
- Decreased damage caused by recurrent inundation

- For the Rice Production/Marketing Improvement Project

Benefit of the project will be increase market value of paddy by improved quality.

Expected increase of net earnings for average farm household in the Block-4 and Block-8 are estimated. The result is shown in below table.

Block-4			Present 1999	Target 2010	Increment 1,000VND
Rice	Paddy	ha	1.13	1.13	3,802
	Cultivation area	ha	2.25	2.62	
	Production	ton	11.03	13.37	
	Yield	ton/ha	4.9	5.1	
	Cropping rate		2	2.3	
Livestock	Swine		0.45	0.63	190
Fishery	Haul	ton	0.11	0.09	-15
Total Amount					3,977

Block-8			Present 1999	Target 2010	Increment 1,000VND
Rice	Paddy	ha	1.18	1.18	3,046
	Cultivation area	ha	3.55	3.55	
	Production	ton	18.13	18.13	
	Yield	ton/ha	5.1	5.3	
	Cropping rate		3	3	
Fruit	Mango	ton	1.01	1.21	
	Coconut	ton	0.11	0.12	91
Livestock	Swine		1.84	2.20	
	Poultry		8.26	9.72	596
Total Amount					3,733

Accordingly, the net earnings for farm household will be increased about 4 million VND. This amount can sufficiently cover project cost and operation/maintenance cost to be borne by farmers. This improvement of farm household's net earnings is expected to contribute to poverty eradication.

8.5 Socio-Economic Evaluation

8.5.1 Improvement of living conditions

Living conditions will be significantly improved by improved road network.. This contributes not only to agricultural production but also to the better access to social amenities, such as school, medical care of the rural residents.

8.5.2 Increase in job opportunities

By the implementation of the project, additional job opportunities for construction works will be provided temporally. Further, expanded planting area, particularly for triple cropping calls for additional hired labor in farming

Currently, farmers hire seasonal labor in paddy farming mainly for harvesting. Average hired labor per ha in the area is assumed to be around 30 man /days. Additional hired labor requirement by increased triple cropping will be estimated as follows;

Pre-F/S Area	234,090 man days
F/S Area	18,090 man days

This will significantly contribute to the poverty reduction in the area providing job opportunities to landless and small scale farmers.

8.5.3 Poverty alleviation

By the implementation of the project, farmer's income will increase and thus contribute to the reduction of poverty in general. For those who are landless or small-scale farmers, expected increase in job opportunities will help to increase their income.

8.5.4 Contribution to the national food security

As the area is located in Mekong Delta, the granary of the country, stable and sustainable crop production, particularly of paddy in the area will contribute significantly to the national food security in a long term basis.

8.6. Conclusion of evaluation

As clarified by the above analyses, by implementation of the project, increased agricultural production with improved quality will be realized and farm income will be increased significantly. Further, living conditions will be improved by better road network. Intensification of agriculture will provide additional job opportunities, contributing to the poverty alleviation in the area. Therefore, the project is considered to contribute significantly to the economic development and social welfare of the area as well as of the country.

The implementation of the projects is justified based on the results of economic and financial evaluation, together with the socio-economic effects on poverty alleviation and increased job opportunities to be expected by the project.