H－7. Environmental Evaluation

It is recognized through the IEE and the EIA carried out in this study that this improvement project will have some components which will impact on the environmental condition, however the most severe impact was already caused by the initial construction of this system, while the impact of the proposed works will be relatively minor.

Therefore this project is ranked as Category "B" project by the World Bank's Operational Directive which defines 3 environmental categories for projects, in which Category "A" project has the highest potential impact and Category "C" lowest, the implication of Category "B" ranking of this project is that although a full environmental analysis is not required, sufficient environmental analysis is needed to define the important issues and to develop the appropriate mitigation plan.

H-7.1 Negative Impacts associated with the implementation of this project

There is the possibility that the implementation of this project may induce negative impacts as follows.

(1) Environmental Impacts Associated with Change of Water Management

Assuming that the existing water management is changed without consideration, environmental impacts upon every aspect as mentioned in the IEE and this time EIA may come out. Particularly it is important to consider the influences which may be caused by the change of water management such as setting ordinary drainage water level, drainage network, irrigation network. For instance, from the viewpoint of large size machinery workability and rotational cropping in future, lowering water level of drainage canal that is changed by down of drainage canal bed and pumping drainage in the term of ordinary drainage is desirable for the non-irrigation period or upland cropping. While from not only economical viewpoint such as increase of construction and management cost, increase of water requirements, but also environmental viewpoint as mentioned in the IEE and this time EIA, lowering water level of drainage canal is not favourable in the Project Area.

Judging from the result of the IEE and the EIA in this study, the most effective countermeasure for the environmental impacts is that the change of the existing water management ought to be minimized and phased out, and that

taking such a concept and influences on environment into consideration, adequate plan and design ought to be prepared. In addition to this, the improvement and strengthening of existing water control and management organization is recommended.

As it turns out, since the concept of plan mentioned above was already adopted in this study, It is reasonable to suppose that the impacts on environment associated with the change of water management, namely associated with the improvement of existing irrigation and drainage system, will be minimized.

(2) Negative Influence Associated with Local Economic Activities

The progress of agricultural development and/or urbanization may cause not only positive influences but also negative influences in the Study Area.

It is recognized that since the progress of intensive agriculture will cause the increase of agrochemicals use in the area, there is possibility that disorderly agrochemicals use will give influences upon the ecosystem. Moreover there is possibility that the progress of intensive agriculture will tend to cause deterioration of soil fertility by crop planting, failure in soil management, and so on.

The most effective mitigation measure for the impacts mentioned above is that for preventing excess use of agrochemicals, the propagation and enlightenment scheme of proper agrochemicals use (including conservation of soil fertility) ought to be prepared by organization of research and extension. Moreover an overall environmental management plan ought to be proposed as a link in the chain of the EIA in the detail design stage, in order to ensure that such a scheme will be planed and will be implemented effectively.

At the same time, the implementation of this project will induce the activation of local economic through the development of agriculture in the Project Area, moreover the growth of capital Hanoi City will induce urbanization in and around the Project Area. Such a progress of local economic activities and urbanization may cause the increase of domestic waste water and waste of every kind, that may cause the deterioration of water quality and ecosystem.

It may be beyond the scope of this project to provide any means of

solutions. Never the less, it is important to recognize the dependance of this project upon the surrounding area and to suggest mechanisms which can be used to track the situation, if not to rectify it.

From the viewpoint above, monitoring system ought to be set up by organization concerned in order to check on the deterioration of environmental conditions caused by the progress of local economic activities and to make promptly a plan of mitigation measure even if influence will come out. Such a scheme of monitoring ought to be proposed as a link in the chain of the overall environmental management plan in the detail design stage.

(3) Environmental Impacts Associated with Implementation of Construction

There is possibility that the construction activities will give impacts on the environmental condition in the Project Area. The results of assessment for the each possibility of impact, and mitigation measures are as follows.

1) Influences on Downstream Area and/or Downstream Channel

The new pumping station will not give influences on the downstream and/or downstream channel because pumping drainage will be controlled by warning water level of the rivers, moreover there is no comparison in the scale between the discharge of the rivers and the increasing discharge of pumping drainage from the project area in flood season.

2) Influences on Residential Environment Associated with the Establishment of New Pumping Station

The new pumping station will not give influences on the residential environment because the site is located more than about 300m from the nearest settlement, and land acquisition for new pumping station and related facilities will be small scale. Moreover, the site of new pumping station is used as mediocre paddy field, in where endangered species of flora and fauna do not inhabit.

3) land Acquisition for New Pumping Station and Related Facilities

The notice concerning compensation for acquiring land in the project is as follows:

- Keeping their means of living more than the present condition at least.
- Acquiring substitutive land in the same elementary settlement if possible.

4) Construction Impacts of Every Kind

There is possibility that the construction activities will give Impact of every kind on surrounding environment as follows:

- Occurrence of construction waste of every kind
- Occurrence of erosion and/or Sediment because of bare land after excavation at borrow pit and/or quarry
- Influences on worker's health and environmental condition such as water quality, noise, dust, and so on

Such construction impacts mentioned above will be avoidable by means of taking countermeasures as previously mentioned in this time EIA. Further details of these countermeasures ought to be proposed as a link in the chain of the EIA in the detail design stage.

Judging from the above, it is reasonable to suppose that although this improvement project will have some components which will impact on the environmental condition, the implementation and operation of this project will be not restricted, and will be promoted, by means of taking proper environmental countermeasures against such impacts.

H-7.2 Positive impacts associated with the implementation of this project

It is recognized that this project may give not only the negative impacts mentioned above, but also the positive impacts, which are divided 2 categories, direct effects and indirect effects.

(1) Direct Effects

Direct effects generated from the project implementation are as follows:

- Increase of agricultural production and/or inland fishery production
- Benefit effects reduced by improvement of irrigation and drainage system

In consequence, farmer's income will be increasing and be stabilized.

Usually, such effects are countable as benefits, and are used as parameters of the economic evaluation of the project.

(2) Indirect Effects

While indirect effects, namely social effects generated from the project implementaion, are usually uncountable as benefits.

Resulting from the project implementation, the indirect effects may be come out in the Project Area as follows:

- Improvement of residential environmental condition in rainy season
- In relation to this, improvement of public health condition

- Improvement of convenience of transportation
- Increase of employment chance through construction of this project and the progress of intensive agriculture

Moreover, resulting from the progress of local economic activities promoted by the project implementation, the indirect effects will be come out in the Project Area as follows:

- Improvement of standard living conditions
- Creation of new jobs
- In relation to this, increase of employment chance

H-7.3 Conclusion

Although this project will have some components which will give negative impacts upon the environment in the Project Area, the impacts will not be absolute restrictive factors for the implementation of this project by means of taking proper countermeasures. While the implementation of this project will induce much positive impacts, not only countable benefits but also uncountable effects of every aspect, and will contribute to the sustainable development of the Project Area.

From what has been mentioned above, in conclusion, the implementation of this project should be proposed, on the premise that the proper countermeasures against negative environmental impacts will be taken.

APPENDIX I

AGRO-SOCIO ECONOMY AND PROJECT EVALUATION

APPENDIX I

AGRO-SOCIO ECONOMY AND PROJECT EVALUATION

CONTENTS

I-1. Socio-Economy

I-1.1. Socio-Economy of Viet Nam

According to the National Census 1989, the total population of the country is 64,411,713, and an annual population growth rate is 2.10% since 1979. Average population density is 195 persons per km^2. The population distributes 20.11% in urban area and 79.89% in rural area. Population structure by age group is as follows: 39.0% (14 years and below), 53.8% (15 years to 59 years) and 7.2% (60 years and above). Economically active population (in Vietnam people older than 13 years are taken into account) is estimated at 74.2% (about 47,793 thousand) of the total. Unemployment rate is 5.8% in national level (urban area: 13.2%, rural area: 4.0%). (see Table I-1.1 to 1.5)

By institute new economic policy (renovation of economic management mechanism, i.e., introduction of market economy) under the National Economic Construction and Development 5-Year Plan (1986-1990) which made a historical changing point on the national economy, Viet Nam's gross domestic products (GDP) had been increased 26.4% (annual average of 4.8%) during this period. In medium term plan up to the year 2000 established by the government, annual growth rate from 1991 to 1995 is set up 7.2%.

Referring to the national statistics 1992, the structure of GDP by industrial sector is in order as agriculture and forestry (34.5%), manufacture (22.6%), commerce and trade (12.3%), and public services (10.1%). Viewing average annual growth rate from 1990 to 1992, the sectors which attained high growth rate are; finance and insurance (26.0%), manufacture (11.8%), individual services (9.8%), and public services (9.3%). The growth rate of agriculture and forestry, as an important sector of the GDP, remains 4.3% of which figure is lower than the GDP's average rate of 7.4%. (see Table I-1.6)

Viet Nam's external trade is represented by agriculture and

mining goods (coal, crude oil, rice, rubber, etc.) as export and petrochemical products, materials for agriculture (fertilizer, agrochemicals), vehicles, iron and steel, etc. Owing to growth and diversification of exports have been notable success of economic reform program, the trade balance gained profit of US$63 million in 1992, as against a deficit of US$1,366.1 million in 1986. The most contributed export products in that year were crude oil (US$790 million) and rice (US$420 million).
(see Table I-1.7 to 1.9)

The balance of payments has been compiled on an accrual basis, and this amount reflects what Vietnam should have paid to service its external debt (debts from Russia and Eastern European countries). The government, however, has not been able to fully service the debt and continued to accumulate external arrears at a rate of around US$300 million per year. As a part of its cooperation with the International Monetary Fund (IMF), the government is trying to settle its arrears and reschedule official debt with the Paris Club. Although the balance continued in a deficit until 1991, it was in surplus by US$268 million in 1992 due to the trade balance remained good.
(see Table I-1.11)

The unification and devaluation of the exchange rate in 1989 had an immediate positive impact on the country's export environments and consequently on the avaiilability of foreign exchange. The nominal exchange rate has tended to follow inflation fairly closely in recent years. The State Bank intervened in the foreign exchange market in the second half of the year to prevent nominal appreciation. The exchange rate as of August, 1994 was US$1.00 =10,996 VND (Vietnam Dong). (see Table I-1.10 and Fig. I-1.1)

As Viet Nam's trade partner, Japan is biggest partner. According to the statistics 1992, the share of its trade occupies 34.7% of exports and 9.4% of imports. The export trade partners follow to Japan come Singapore, Russia and France in that order, on the othe hand, as import partners are Singapore, Japan, France and

Taiwan (China).

The impressive economic development and high investment brought about hyperinflation. In recent years, inflation was proceeding at an annual rate of about 70% (67.5% in 1990, 67.6% in 1991). But, under control by the Vietnamese authorities, its rate declined to 17% in 1992. Further the inflation was running at an annual rate of less than 10% in 1993. Interest rate of bank loan in the monetary policy is set up rather high because of the roots of inflation have not been eradicated. The rates of 31% per annum (short term) and 20% (long term) are maxima.

The situation of the government finances is detriorating by low tax revenue and increase in capital disposition, though the reviewing of expenditure and reduction of subsidies by new policy are conducted. In 1992, the budget deficit attained 3,845 billion VND, and it accounts for 3.8% of the DNP. (see Table I-1.12 and 13)

The renovation (doi moi) program began in 1986 and accelerated in 1989. Its main features were:

- Rural reforms
- Price liberalization
- Devaluation
- Interest rate reforms
- Fiscal reforms
- Promotion of the private sector
- Openness to direct foreign investment
- Reform of foreign trade
- Social costs of adjustment

I-1.2 Socio-Economy of Ha Bac Province

The study area extends a great part of Ha Bac Province in the north region, adjoining to the Hanoi Capital, also a part of two districts of Hanoi City. The whole area of Ha Bac Province is 4,616 km^2, and divided into three distinct regions; mountainous region, midland region and plain region.

Ha Bac Province is located at favorable condition of communication and transport: the national railway network linked with the Hanoi Capital, provinces of Lang Son, Bac Thai and Quang Ninh; the national road 1A passes through the length of province; the navigation network with existing many large rivers, i.e., Duong river, Cau river, Thuong river and Luc Nam river, that leads to Red river delta as well as to Haiphong and Quang Ninh seaports.

Plain region of the province, formed by alluvium deposit of the above mentioned rivers, is a fertile land which is appropriate to cultivate paddy and vegetables. Agriculture dominates in the region, besides, animal husbandry and inland fishery are active. In the midland region which occupies 23 percent of the province, industrial crops and fruits are cultivated. In mountainous region which occupies 59 percent of the province, fruit growing and forestry are performed.

According to the Census 1989, the total population of Ha Bac province is 2,061,280 (rural area: 95.0%, urban area: 5.0%) with 445,787 households and its average family member is 4.555 persons. The annual growth rate of population is 2.92% in the past decade (from 1979 to 1989). This figure is higher than that of national level (2.10%). Economically active population is about 1,035,800 and 86.2% (820,600 persons) of working population engage in agriculture.

The Report of World Bank shows that GDP of 1992 in the province is 1,758.8 billion VND (current price) and account for 1.7% of

the country. The agriculture and forestry sector occupies 57.8% and it performs key industry. According to agricultural statistics 1991, agricultural production in Ha Bac province is as follows:

- Paddy 5,268 thousand tons (2.4% of the national production)
- Maize 16 thousand ton (2.1% of the national production)
- Soybean 5.7 thousand tons (7.1% of the national production)
- Groundnut 8.4 thousand tons (3.7% of the national production)
- Sweet potao 193 thousand tons
- Cassava 93 thousand tons
- Vegetables and fruits are several thousand tons

As animal husbandry,
- Baffalo 172 thousand head
- Cattle 76.3 thousand head
- Pig 600 thousand head
- Poultry 8 million

The production of freshwater fishes is 2,812 tons.

Food production (equivalent to paddy) of the province is 665,700 tons (2.7% of the country), i.e., 299.6kg per capita. This figure shows low productivity compared with the national average of 349.4kg per capita.

As the industry (8.5% of provincial GDP) of Ha Bac province, there are the Ha Bac Urea Fertilizer Plant (with the capacity of 100,000 tons per year), the Dap Cau Glass Factory (with the capacity of 1 million m^2 per year), the Melting Phosphorus Fertilizer Factory, Tabacco Factory, and other small- and medium-scale factories. On the other hand, in the countryside of the province exist a lot of traditional handicrafts such as: Tho Ha Ceramic, Dinh Bang Lacquer Painting, Van village Wine, Dong Ky Furniture, Tang Tien Wattled Bamboo, Kim Thien Wooden Sculpture, Phong Khe Mulberry Paper, Dong Ho Painting, etc.

A part of agricultural products produced in the province, as vegetables, fruits and freshwater fishes, is shipped to the southern part of China. The traditional handicrafts are exporting to foreign countries and its amount is annually more than US$50,000.

Table I-1.1 Population and Growth Rate
1979 - 1989

	Census 1979	Census 1989	Average annual growth rate
Whole country	52,741,766	64,411,713	2.10
Ha Noi	2,546,928	3,056,549	2.30
Ha Bac	1,562,642	2,061,280	2.92

Source: Census 1989, General Statistical Office.

Table I-1.2 Area and Density
1979 - 1989

	Area(km^2)	Density 1979	Density 1989
Whole country	330,036	160	195
Ha Noi	2,141	1,148	1,428
Ha Bac	4,616	339	447

Source: Census 1989, General Statistical Office.

Table I-1.3 Population by Urban and Rural Areas
1979 - 1989

		Population(000')		Percentage(%)	
Year	Total	Urban	Rural	Urban	Rural
1979	47,638	10,242	37,396	21.50	78.50
1989	63,367	12,740	50,627	20.11	79.89

Source: Census 1989, General Statistical Office.

Table I-1.4 Proportion of Employed Population in Various Industries, 1979 - 1989

Category	1979	1989
I.Material production sector	93.6	93.8
1.Industry	11.1	11.7
2.Construction	3.1	2.0
3.Agriculture	72.8	71.1
4.Forestry/lumber	0.6	0.3
5.Transport	1.8	1.9
6.Communication	0.2	0.1
7.Trade	3.9	6.6
8.Other producdtion	0.1	0.1
II.Non-material production sector	6.4	6.2
9.Tourism/services	0.7	0.7
10.Science	0.3	0.1
11.Education	2.6	2.6
12.Art/culture	0.2	0.2
13.Public health,sport, social services	0.9	0.9
14.Financial,credit, insurance	0.2	0.3
15.Government management	1.2	1.1
16.Without production	0.3	0.3
Employed population	20,785,967	28,745,201

Source: Census 1989, General Statistical Office.

Table I-1.5 Economic Activity Rates, 1989

	Economic activity rates			Unemployment rates		
	Total	Male	Female	Total	Male	Female
Whole country	74.2	77.5	71.3	5.8	6.2	5.4
Urban area	66.4	73.3	60.4	13.2	13.2	13.1
Rural area	76.4	78.7	74.4	4.0	4.4	3.7

Source: Census 1989, General Statistical Office.

Note: Economically active population; older than 13 years

Table I-1.6 Gross Domestic Product
(at constant prices of 1989)

Unit: billion VND

	1990	1991	1992	1993 scheduled
Total	27,014	28,623	30,988	33,164
Material producing branches	17,206	18,001	19,449	20,482
Industry	5,058	5,557	6,256	6,875
Basic construction	1,027	1,080	1,125	1,288
Agriculture, forestry	10,898	11,135	11,832	12,071
Other material branches	223	229	236	248
Service branches	9,808	10,622	11,539	12,682
Transportation-post	632	674	711	741
Trade	3,226	3,383	3,589	3,801
Finance, insurance, bank	469	571	713	757
State management	2,862	3,095	3,394	3,964
Other service branches	2,619	2,899	3,132	3,419

Source: Viet Nam Socio-Economy 1991-1992 and the first half of the 1993, Statistical Publishing House

Table I-1.7 Export Value

Unit: million Rubble and US$

	1990	1991	1992	1993 (6months)
Total value	2,404.0	2,087.1	2,475.0	1,260.0
Heavy industry products and minerals	617.0	697.1	969.2	-
Light industry products and handicraft	635.8	300.1	272.0	-
Farm products and processed farm products	783.2	628.0	741.3	
Forest products	126.5	175.5	116.1	
Sea products	239.0	285.4	305.0	
Book,newspaper and cultural products-services	2.5	1.0	71.4	

Source: Viet Nam Socio-Economy 1991-1992 and the first half of the 1993, Statistical Publishing House

Table I-1.8 Main Exported Products

	1990	1991	1992	1993 (6months)
Peanuts-tons	70,705	78,925	70,449	43,406
Rubber -tons	75,875	62,947	75,000	32,545
Coffee -tons	89,583	93,471	98,000	59,037
Tea -tons	16,076	7,953	12,508	3,794
Processed meat -tons	16,156	25,019	11,800	6,562
Rice -thousand tons	1,624	1,033	1,950	880
Cinnamon-tons	2,097	2,885	2,221	-
Vegetables-fruits (processed products included) million US$	52.3	33.2	14.0	7.6
Ready wear-million US$	248.8	164.7	160.9	79.5
Small industry and handicrafts-million US$	150.2	66.5	36.3	19.1
Aquatic products -tons	239.1	285.4	305.0	160.0
Wormsilk -tons	40	206	410	278
Coal -thousand tons	780	1,173	1,568	667
Tin -tons	1,808	3,440	3,727	1,539
Crude oil -thousand tons	2,617	3,917	5,400	2,756

Source: Viet Nam Socio-Economy 1991-1992 and the first half of the 1993, Statistical Publishing House

Table I-1.9 Import Value

Unit: million Rubble and US$

	1990	1991	1992	1993 (6 months)
Total value	2,752.4	2,338.1	2,582.1	1,276.4
Production means	2,342.6	2,012.9	2,237.1	
Complete equipment	439.1	318.6	191.3	100.0
Separate equipment	179.4	119.6	101.2	
Tool and spare part	134.5	71.0	93.7	
Raw material and fuel	1,589.6	1,503.7	1,850.9	
Consumer products	409.8	325.2	345.0	

Source: Viet Nam Socio-Economy 1991-1992 and the first half of the 1993, Statistical Publishing House

Table I-1.10 Inflation Rate of Retail Sale and Service
(%increase compared with the previous month)

Unit: percent

Month	1989	1990	1991	1992	1993
January	7.4	2.9	13.2	4.4	1.7
February	9.2	3.8	8.7	5.5	1.9
March	5.4	1.9	0.5	0.5	- 0.5
April	3.5	2.5	2.2	0.9	- 0.2
May	- 0.2	2.6	3.0	1.3	1.5
June	- 2.9	2.1	1.7	0.1	- 0.3
July	- 1.5	3.6	2.5	0.3	- 0.2
August	0.2	5.8	3.4	0.3	
September	1.6	4.7	3.7	0.0	
October	2.5	6.4	2.8	- 0.2	
November	2.6	7.8	5.6	2.0	
December	3.0	8.9	6.1	1.4	
Monthly average	2.5	4.4	4.4	1.3	
Yearly	34.6	67.5	67.6	17.4	

Source: Viet Nam Socio-Economy 1991-1992 and the first half of the 1993, Statistical Publishing House

Table I-1.11 Balance of Payments, 1990-1992

Unit: million US$

	1990	1991	1992
Exports Total	1,731	2,042	2,475
Convertible Area	1,256	2,010	2,475
Non-Convertible Area	475	32	..
Imports Total	- 1,772	- 2,105	- 2,535
Convertible Area	- 1,208	- 2,218	- 2,535
Non-Convertible Area	- 564	113	..
Trade Balance	- 41	- 64	- 61
Convertible Area	97	- 208	- 61
Non-Convertible Area	- 89	145	..
Services and Transfers	- 218	- 70	52
Interest Payments	- 238	- 231	..
Imputed Interest on Arrears	-	-	..
Private Remittances	34	67	..
Freight and Insurance	-	-	..
Official Transfers	127	110	..
Others	- 141	- 16	..
Current Account Balance	- 259	- 133	- 8
Convertible Area	- 121	- 278	..
Non-Convertible Area	- 77	145	..
Capital Account Balance	122	- 60	271
Disbursements	233	65	487
Convertible Area	..	..	..
Non-Convertible Area	..	..	..
Scheduled Amortizations	- 279	- 256	- 435
Convertible Area	..	..	..
Non-Convertible Area	..	..	..
Amortization of Debt Relief	..	..	..
Short Term Loans (Net)	48	- 89	- 41
Direct Foreign Investment	120	220	260
Errors and Omissions	- 5	143	6
Overall Balance	- 142	- 50	268
Financing:	142	50	- 268
Change in NFA (excl.IMF)	- 159	- 276	- 464

IMF Credit (Net)	3	- 6	-
Gold Revaluation	-	-	-
Debt Rescheduling	-	-	-
Change in Arrears	298	332	196
Memorandum Items:			
Transferable Rubles per US$	2.40	2.40	-
Current Account Balance Exports (%)			
Total	- 15	- 7	0
Convertible Area	- 10	-	-

Source: IMF and World Bank, from data provided by the Vietnamese authorities.

Table I-1.12 Summary of Budgetary Operations, 1990-1992

Unit: billion VND

	1990	1991	1992
Revenue	6,513.0	10,353.0	18,970.0
Tax Revenue	1,698.0	2,814.0	4,995.0
Transfers from State Enterprises	2,460.0	6,189.0	10,965.0
Other Non-Tax Revenue	1,995.0	1,080.0	2,440.0
Grants		270.0	570.0
Current Expenditure(excl.interest)	6,156.0	3,723.0	15,005.0
Wages and Salaries	1,538.0	1,618.0	-
Subsidies	-	-	-
Other	4,613.0	7,110.0	-
Operation and Maintenance	256.0	346.0	-
Capital Expenditure	2,124.0	2,135.0	5,710.0
Overall Primary Balance	- 2,127.0	- 510.0	- 1,745.0
Interest	906.0	1,218.0	2,100.0
Overall Balance	- 3,033.0	- 1,728.0	- 3,845.0
Financing	3,033.0	1,728.0	3,845.0
Foreign Grants and Loans (Net)	1,860.0	1,335.0	2,845.0
Non-Convertible (Net)	-	-	-
Utilization	-	-	-
Short-Term	-	-	-
Medium- and Long-Term	-	-	-

Amortization	-	-	-
Convertible (Net)	-	-	-
Utilization	-	-	-
Short-Term	-	-	-
Medium- and Long-Term	-	-	-
Amortization	-	-	-
Domestic Loans (Net)	1,173.0	393.0	1,000.0
State Bank (Net)	1,173.0	-	-
Government Securities (Net)	-	-	-
Gross Issue	-	-	-
Amortization	-	-	-
Arrears	-	-	-
(Percent of GDP)			
Revenue	16.1	14.8	18.6
Tax Revenue	4.4	4.0	4.9
Transfers from State Enterprises	6.4	8.8	10.8
Other Non-Tax Revenue	5.2	1.5	2.4
Current Expenditure(excl.interest)	16.1	12.5	14.7
Wages and Salaries	4.0	2.3	0.0
Subsidies	0.0	0.0	0.0
Other	12.1	10.2	0.0
Operation and Maintenance	0.7	0.5	0.0
Capital Expenditure	5.6	3.1	5.6
Overall Primary Balance	- 5.6	- 0.7	- 1.7
Interest	2.4	1.7	2.1
Overall Balance	- 7.9	- 2.5	- 3.8
Financing	7.9	2.5	3.8
Foreign Grants and Loans (Net)	4.9	1.9	2.8
Domestic Loans (Net)	3.1	0.6	1.0
State Bank (Net)	3.1	-	-
Government Securities (Net)	-	-	-
Arrears	-	-	-

Source: Ministry of Finance and World Bank

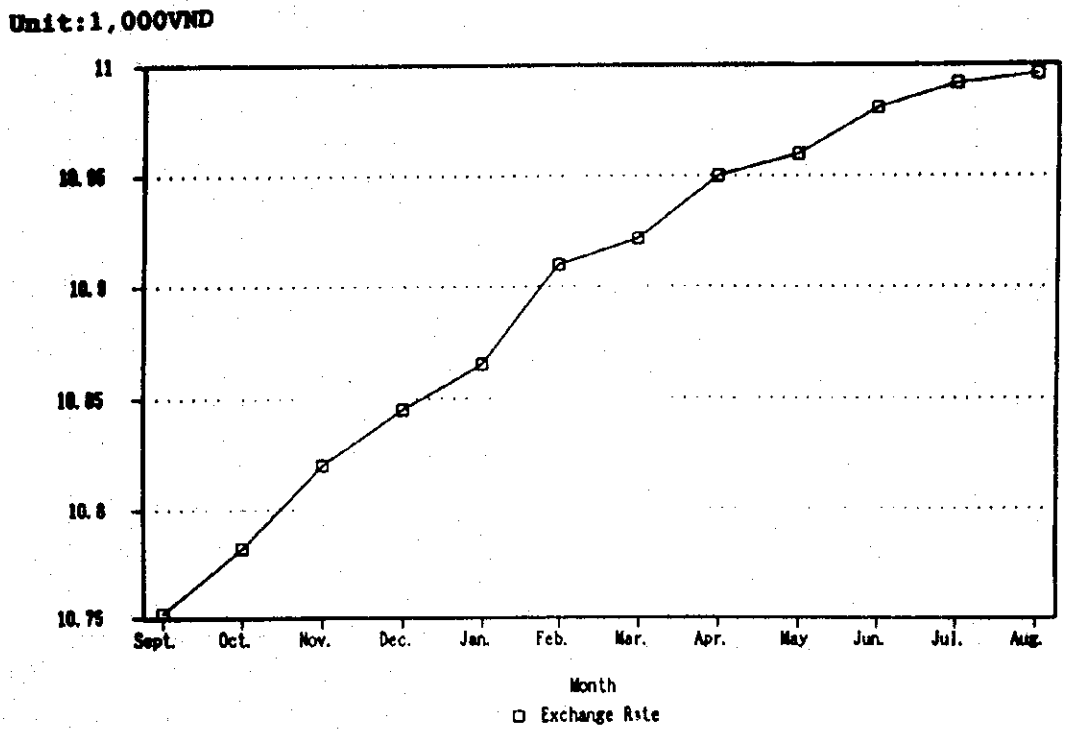
Table I-1.13 Government Capital Expenditures, 1990-1992

Unit: million VND

	1989	1990	1991
Industry and Construction	766,000	745,760	48,938
Agriculture and Forestry	68,140	112,787	70,342
Irrigation	130,860	243,573	244,127
Transportation and Communication	197,000	323,320	335,313
Commerce and Services	47,000	90,860	22,656
Non-Productive Sector a/	410,000	424,800	367,031
Contingency Fund b/	0	177,000	135,938
Other	7,000	5,900	566,344
Unallocated	-	-	344,313
Total Capital Expenditure	1,626,000	2,124,000	2,135,000
(Percent of DNP)			
Industry and Construction	3.2	2.0	0.1
Agriculture and Forestry	0.3	0.3	0.1
Irrigation	0.5	0.6	0.3
Transportation and Communication	0.8	0.8	0.5
Commerce and Services	0.2	0.2	0.0
Non-Productive Sector a/	1.7	1.1	0.5
Contingency Fund b/	0.0	0.5	0.2
Other	0.0	0.0	0.8
Unallocated	-	-	-
Total Capital Expenditure	6.7	5.6	3.1

Note: a/ Includes education, health, culture, finance and government.

b/ Stockpiling of key commodities and materials.



(from September,1993 to August,1994)

Figure I-1.1 Trends of Exchange Rate

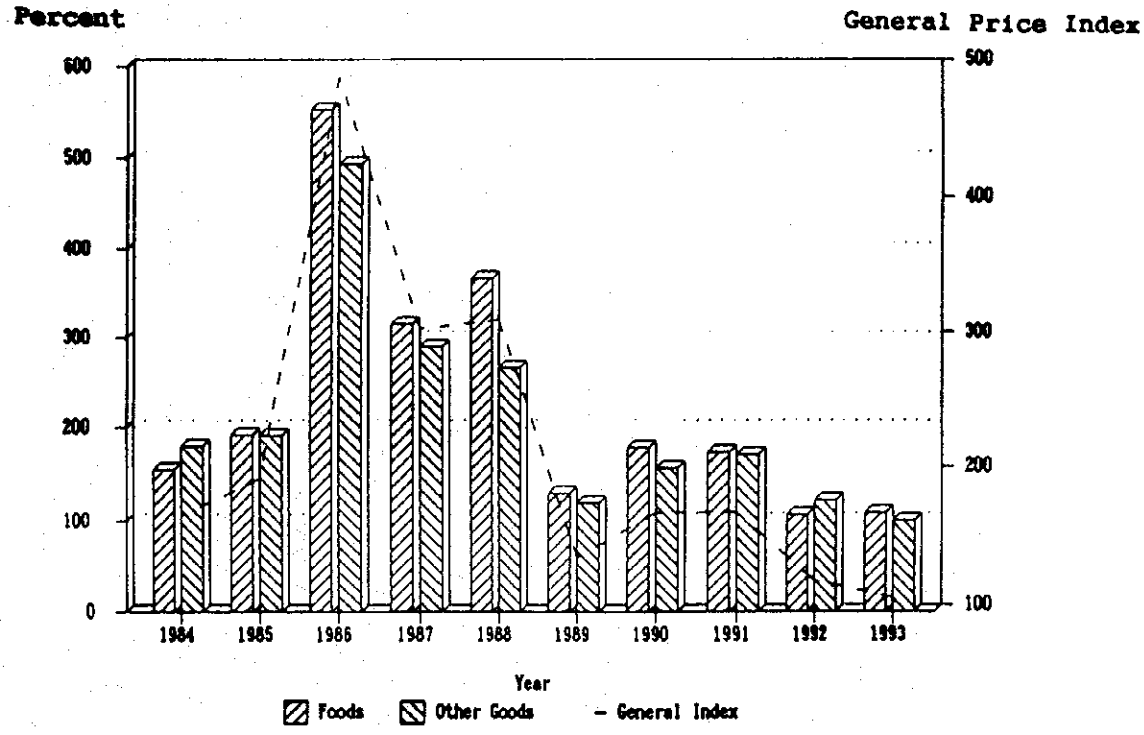
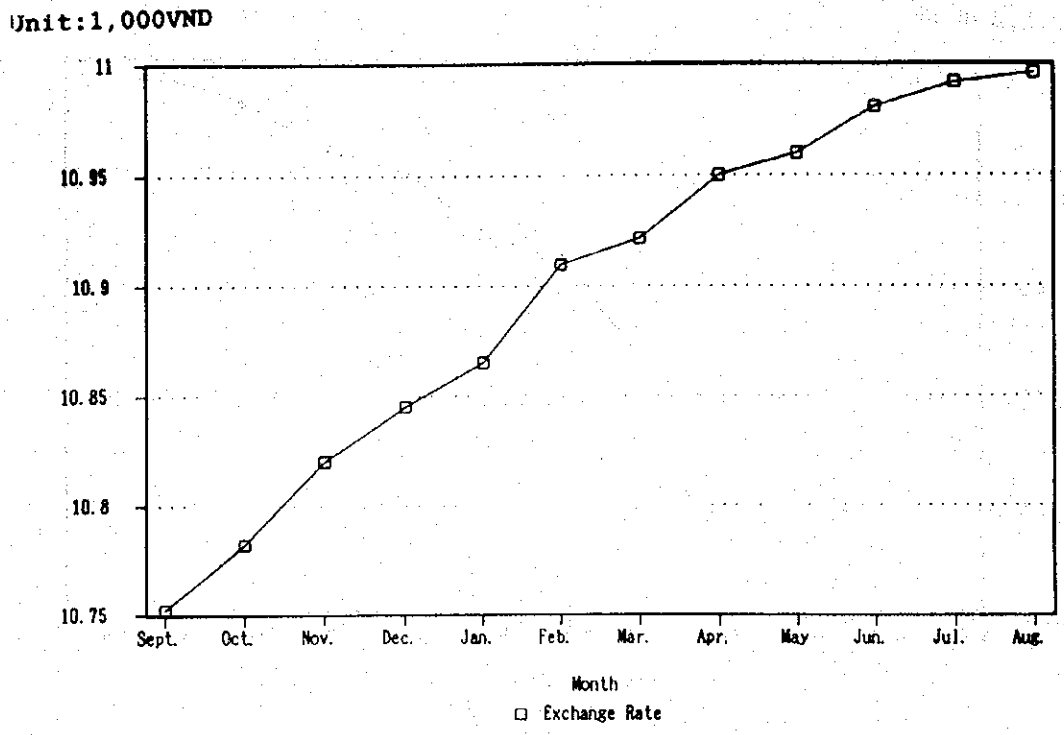


Figure I-1.2 Trends of Retail Price Index



(from September,1993 to August,1994)

Figure I-1.1 Trends of Exchange Rate

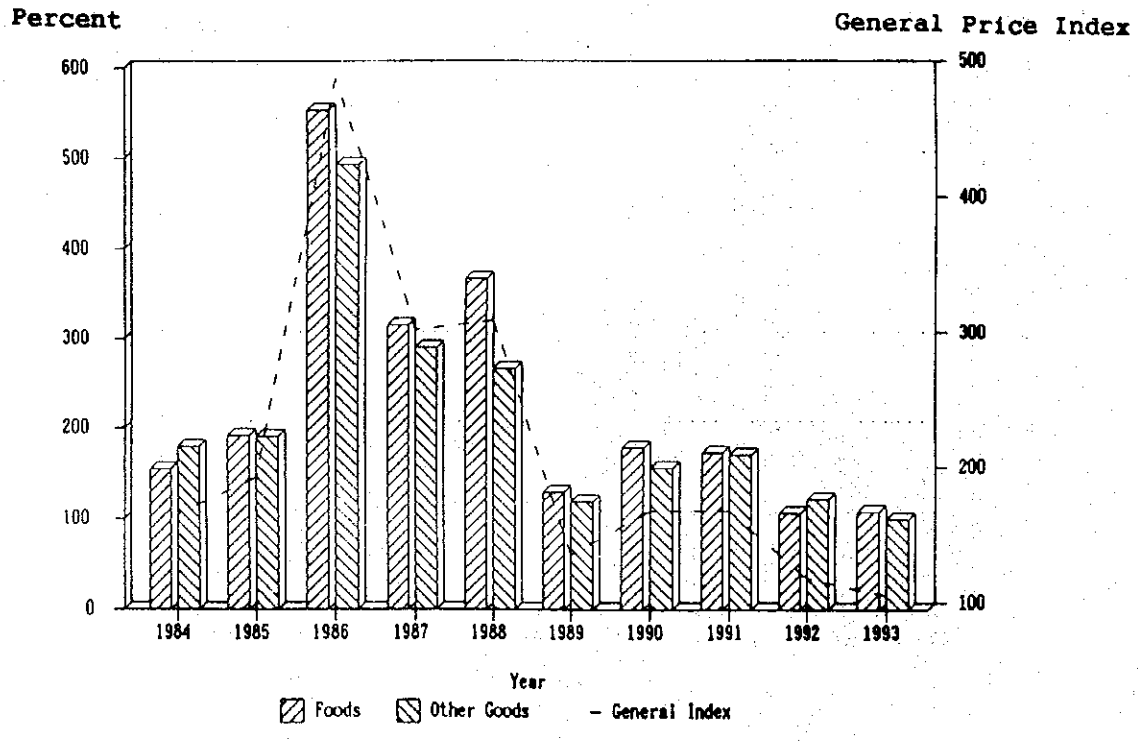


Figure I-1.2 Trends of Retail Price Index

I-2. Agricultural Economy in the Study Area

I-2.1. Population and Labor Force

According to the Census 1989, the total population of Ha Bac province is 2,061,280 (rural area: 95.0%, urban area: 5.0%) with 445,787 households and its average family member is 4.555 persons. The annual growth rate of population is 2.92% in the past decade (from 1979 to 1989). This figure is higher than that of national level (2.10%). Economically active population is about 1,035 thousand and 86.2% (820,600 persons) of working population engage in agriculture.

Population in the study area is about 473,000 with 103,230 households and its density is 1,202 persons per square kilometer. Average households size is 4.58. Economically active population is about 237,000 (50.25% of total population) and 83.5% (198,400 persons) of working population engage in agriculture.
(see Table I-2.1 to 2)

In the area, farmland extends about 26,400 ha so that the land per capita estimates less than 500 m^2 (around 400 m^2). According to farm survey, average area of farmland per households is 0.24ha and this is lower than that of national level (0.33ha). Consequently, farm households labor force is remarkably surplus due to lower cropping intensity (1.93).

According to LSMS(Living Standard Measurement Survey) conducted by the government of Viet Nam, total number of working time per one laborer in rural areas was 180 days (156-159 days in Red River and Mekong River Deltas). However, it is assumed that working time per one laborer in the area is lower than those of either national and the both Deltas' level because of limited small farmland.

I-2.2. Farm Household Economy

(1) Farm Income

Major crops produced in the study is paddy rice, and maize, sweet potato, potatoes, groundnut, soybean and vegetables are cultivated in a part of the area. As for fruit tree crop, banana is grown around farmer's house in the same.

Income (net) per hectare obtained from crop production is roughly estimated on the basis of farmgate price and the production cost prepared by NIAPP (National Institute for Agricultural Planning and Projection) and the results of farming survey, as paddy-spring crop; 3,408,960 VND, paddy-autumn crop; 3,627,720 VND, maize; 1,416,420 VND, sweet potato; 2,033,100 VND, potatoes; 8,055,800 VND, groundnut; 3,152,500 VND, soybeans; 1,231,600 VND, and vegetables; 11,201,100 VND. (see Table I-2.3)

Although paddy is a dominant crop in the area, its income appears fairly low (3.4 ton/ha) as compared to that on the national level of 4,010 kg/ha (spring crop). Neverthless the production costs (input) are relatively high, such low productivity is assumed by severe natural disasters (inundation and water shortage). In the case of paddy production , the net income shows very low although human labor cost (non cash) is excluded, i.e., its production is facilitated by manpower.

(2) Farm Household Economy

As described in the preceding paragraph, the low income from paddy production entails low farm income of farmers, and is reflected in the poverty of farmer.

In order to grasp the actual situation of farm household economy in the study area, farm household economy survey with interview in typical farmers by farming scale which are selected by agricultural section of the District People's Committee related

to the area have been carried out. As the results of the analysis are as follows:

Case-1: Poor farmer is unable to maintain production costs and living expenses based only on farm income (472 thousand VND), therefore, this farmer depends on off-farm income (1 million VND) from working wages earned in the other provincial labor markets during the off-season for farming. Namely, a proportion of off-farm income, among gross family income, reaches about 68 percent.

Case-2: Moderate (average) farmer, it cannot produce the surplus income, though production costs and living expenses at the lowest can be maintained by farm income (4,965 thousand VND) including income from animal husbandry. Accordingly, a member of this family engages in business as a village merchant.

Case-3 and 4: Progressive farmers, i.e., rich and richest farmers, have high educational background. They can afford to manage the farming sufficiently and to maintain their living only in agriculture. Its surplus income obtains ranging between 4,551 thousand VND and 7,666 thousand VND. In this case, it seems that farmers have high consciousness for farming and their land conditions are also favorable to farming. In fact, these conditions bring about a high yield of paddy, an option of crops and income gap. (see Table I-2.4)

Viewing the above mentioned, it seems that the income gap of farmers produces a greatly effect on the area of farmland. Among sample farmers, the income from secondary crop in winter season accounts for ranging from 7 percent to 75 percent. This income depends on a kind of plant crop. Generally, secondary crop cultivates for the purpose of self-consumption and/or feed for animals. In case of progressive farmer, he selected a cash crop as tomato for markets.

However, every sample farmers have a severe problem on farming such as crop damage and low yield by water logging, and water shortage in drought season.

(3) Income Distribution

Presently, the Vietnamese government is carrying out the Living Standard Measurement Survey (LSMS) 1992-1993 under the cooperation of World Bank. According to the preliminary report on present situation of agricultural land and paddy production of farmer households, average allocated area of agricultural land in the national level is 3,282m² (0.3282ha). In the Red River Delta, it is considerably small as 2,183m² (0.2183ha), that is say, about 66% of the national level. As mentioned above, this condition reflects to farm household economy. The results of the detailed analysis of LSMS is scheduled for the second half of 1994.

Concerning the poverty, the provincial authorities set forth the poverty line as annual income of 1 million VND and below. According to the annual report of Ha Bac Province People's Committee, poverty group of the rural area occupies 17.2% of the province. The income distribution in study area is 18.3% and this incidence shows high as compared with the rural area in the province. (see Table I-2.5)

Through the farm survey and interviewed with farmers, it becomes clear that the majority of the farmers in village belongs to moderate group and below.

In order to poverty eradication in the area, the improvement of agricultural conditions such as a stabilized supply of water for agriculture in drought season, inundation prevention in rainy season, creation of job opportunities through integrated farming and so on, are needed. Farmers wish to secure the surplus income from secondary crop cultivation , obtaining the stable farm income produced by double cropping of paddy, and they are anxious for escape from poor group by realize these circumstances.

I-2.3. Marketing and Distribution System

(1) Demand and Supply

Major crop in the study area is paddy rice which is most important basic food of the people of Vietnam. Also, it is greatly contributed to the national economy as an agricultural product for export. Rice produced in Ha Bac province which occupies the majority of the study area is mainly consumed within the province. Its surplus is shipped to the Hanoi Capital and surrounding provinces (northern mountainous areas which are a deficient in rice), also for export.

According to the 5-Year Plan 1991-1995, food production per capita in average is indicated as below:

Unit: kg/man/year

Zone	1990	1995
Whole country	322	340
North region	249	259
Red river delta (including Hanoi City)	282	297
Midland	246	257
Mountainous area	232	235
4th Zone (old)	212	216

In the task of agricultural-rural development up to the year of 2000, further the Vietnamese government sets to strives for productive level per capita with 350-380 kg of food.

According to the preliminary report of Living Standard Measurement Survey, rice consumption per capita of the poor group in rural area is 147.5 kg annually, e.i., 12.3 kg/month. However, the results of farm household economy survey is 15 kg/man/month at moderate (average) group, on the contrary, the caloric intake of poor group depends on mainly rice, that is to say, this group shows high consumption of rice.

On the assumption that the average rice consumption in the study area is 180 kg per capita annually, the demand of rice in the area is estimated at 90,000 tons. Rice production in the area is assumed approximately 220,000 tons annually by calculating based on the figures of "General Report of the Project of Water Resources Planning for Bac Duong Area" prepared by Institute of Water Resources Planning and Management. Therefore, it seems that the surplus of rice is shipped to surrounding provinces through the provincial market.

According to the Census 1989, the annual growth rate of population in Ha Bac province is 2.9 percent, i.e., its figure is higher than that of national average. Assuming that this figure will contine the same as it is, the demand of rice in the province will arise more 30% increase at the year of 2000.

(2) Marketing and Distribution

The introduction of market economy gives at strong impact to marketing and distribution of agricultural products as well as commodities produced in another industrial sectors. It brings about actualization of agricultural products market.

1) Prices of agricultural products

As a general rule, the price of paddy is controled by the Government Pricing Committee on the basis of the international market price. A farmgate price base of paddy is equivalent to rural free market price. Rural free market opens in the center of urban area of each District, also in the center of each Commune. Present farmgate price of paddy in the area is ranging between 1,200 and 1,500 VND/kg.(see Figure I-2.5)

Prices of vegetables are completely free market price, and they fluctuate by the balance of demand and supply.
(see Table I-2.6)

2) Marketing system

Presently, there are no market forbidden policy as was applied in the past. There is only one free market to allow different localities. In free market, commercial transaction is in doing freely to a balance of demand and supply. The government encourages to promote the rural markets and export associations of regional markets.

Each agricultural product in the area has its own marketing system. In case of rice as major crop, its marketing channel is very simple as from rural free market to export organization including rice mill (Husking factory) through provincial marketing system. (see Fig. I-2.1)

Industrial crops such as soybean, groundnut, tobacco, etc., are made a deal with middleman. Middleman's activity is given considerable weight in this commercial transaction.
(see Fig. I-2.2)

Consuming area of vegetables produced in the area is mainly within the area. Farmers sell their products directly to consumer in rural free market. In the area belonging to Hanoi City, farmers ship their products to Hanoi market by themselves or sell to consumer on the road side in the City. Almost of tomato produced in the area are shipped to the markets of the south Vietnam and the south China by merchants (middlemen).
(see Fig. I-2.3)

In the area, animal husbandry is mainly pig breeding but it is not mass production in a large-scale facility. Generally, most of farmer of moderate (average) group or better-off group is raising some pigs in order to sell them when farmer needs fund for his living. Marketing of pig is made a deal with middleman.

The majority of freshwater fishes, tortoises, yellow snails, etc. is shipped to the markets of the south China by middlemen. A part

of them is shipped to the cities through rural free market and/or provincial markets.

Rural free markets in the area open every early morning, but its facility is insufficient. The administration system is not well-provided and weak. Consequently, the merit of market economy does not make full use in rural area.

(3) International and Domestic Marketings

As mentioned above, agricultural products produced in the area are shipped to local markets excepting some crops. However, due to Ha Bac province passes through the national road 1A linked with the Hanoi Capital and the border between China and Vietnam, where is a short distance away from the border, distribution of the commercial commodities of China is active in its movement.

Under these circumstances, the market-oriented zone of the area will be divided into two zones; one for Hanoi, the area belonging to Hanoi City and Tu Son, Tien Son District of Ha Bac province where is situated at the south part along the national road 1A and, another one for China, the rest belonging to Ha Bac province.

Consequently, most of agricultural products in the area intend to the markets of China. Major tradable commodities of agricultural products is represented tomato, and also freshwater fishes, tortoises, yellow snails, etc. In the area adjoining to Hanoi City, main tradable commodities of agriculture are vegetables.

I-2.4. Improvement of Marketing and Distribution System

I-2.4.1 Marketing

(1) Rice

As mentioned in the preceding article, major crop in the study area is rice paddy. Main markets of rice produced in the area are within Ha Bac province and its surrounding provinces. On the other hand, a small amount of rice produced in the province also destinates the markets of the southern China (annual exporting amount: 400 ton).

After the project implementation, rice paddy production in the area will be increased remarkably as 20,000 ton compared with present condition and its increased rice can be expected to place for export.

(2) Industrial Crops

Promotion of industrial crops production places emphasis on the national strategies of agricultural development. In particular some 40 percent of groundnut produced in Viet Nam is for export and this is predicted to continue. Although groundnut and soybeans is produced locally, domestic consumers prefer lard to vegetable oil. By-products of these crops processed will also be expected as the animal husbandry developed.

Processing industry in the province, Ha Bac Vegetable Oil Factory, has an extension plan of processing plant in conformity with the national policy. However, the factory faces difficulty to collect crops to be processed in the province caused by small production. Therefore, an increase of such crop production with the project is anticipated.

(3) Vegetables

Vegetables are able to expand the markets in the cities with improvement of living standards and development of agroindustry in future. Moreover, it is expected to reestabllish former relations with Russia and Eastern European countries on the export of agricultural products in the future.

As fresh tomatoes are already secured the markets in the south Viet Nam and south China. There is a possiblity of incorporating tomato proceccing to the existing factory in future.

I-2.4.2 Post-Harvest Facilities Improvement

There are no existing post-harvest facilities such as storage in the study area. Therefore, farmers have a difficulty in developing new markets even when surplus of some farm products have been produced by them. Farmers are forced to sell their products for low prices because they are unable to store it. No storage facilities also result in large losses due to wastage.

Under these circumstances, a collecting and shipping center of agricultural products as the post-harvest facilities furnished with drying and storing, in each commune, should be provided. By mutual consent of farmers benefited, the center is operated by existing farmer's cooperatives through the reorganization. In order to smooth operation and management of the center, an active support from the goverment departments and/or public institutions is indispensable.

I-2.4.3 Distribution System Setup

Under the market economy, present commercial transaction of agricultural products as individual dealings, would be brought the limits to develop rural economy, therefore, the rural economy has high potentialities to be left behind the development of another economic sectors.

From the viewpoint of the rural economy, its major needs exists on new markets, market forecasting, storage management, quality management, support from government departments, employee and emplyer relationship and so on. In the distribution system, its actual condition should be improved taking account into these matters. Furthermore, with the development of agricultural products exporting circumstances and the improvement of living standards of the people in the future, modernized distribution system will be required as a long-run plan.

The program in terms of distribution system of agricultural products would be proposed as the following items:

- To give a function of marketing and distribution, such as collecting, storing and shipping, to the existing farmers' cooperatives.
- To operate the function under the independent management by farmer.
- To organize the central marketing association as marketing information center in District unit.
- To inform the market information such as market trends and prices by publications or facsimile from the association to farmers' cooperatives.
- To establish the market for agricultural products with a provision of proper market administration in the cities.
- To promote the establishment of trade firms dealing in agricultural products, which have a modern collecting and shipping system and in good relationship with farmers' cooperatives without competition between farmers and traders.
- To provide market information network in national level.
- To provide and develop transportation system for agricultural products.

(see ~~Appendix I,~~ Fig. I-2.4)

With the realization of expected favorable circumstances in the future as mentioned above, the quality control, fixzation of

standards, standardization of pakage, formation of market administration and operation system are required. Hence these marketing bases should be prepared immediately by public institutions.

Table I-2.1 Population in the Study Area

District/Town	Area (km²)	Population	Density(p/km²)
Que Vo	171.6	126,129	735
Bac Ninh	26.4	64,150	2,430
Tien Son	150.4	195,380	1,299
Yen Phong	16.2	19,570	1,208
Gia Lam	42.4	53,839	1,270
Dong Anh	10.9	13,884	1,274
Total	421.5	472,952	1,369

Note: Based on Table G-2.1

Table I-2.2 Labor Force in the Study Area

(person)

District/Town	Population	PEA *1	Engeged Agriculture
Que Vo	126,129	63,380	61,289
Bac Ninh	64,150	32,235	12,701
Tien Son	195,380	98,178	85,513
Yen Phong	19,570	9,834	9,568
Gia Lam	53,839	27,054	23,320
Dong Anh	13,884	6,977	6,013
Total	472,952	237,658	198,404

Note: *1 PEA.. Economically active population
Economically active population is estimated based on the provincial indicator (Ha Bac).
Economically active population engaged of agriculture is estimated based on PC of districts relating to the area.

Table I-2.3 Net Income of Major Crops

Unit:1,000 VND

Crop	Yield	Farmgate Price	Gross Income	Variable Costs*1	Fixed Costs*2	Net Income
	(kg)	(kg/VND)				
Paddy-spring	3,400	1,500	5,100.0	1,305.7	385.0	3,409.0
Paddy-autumn	3,400	1,500	5,100.0	1,106.4	365.9	3,627.7
Maize	1,800	1,400	2,520.0	994.2	109.4	1,416.4
Sweet potato	8,700	300	2,610.0	467.5	109.4	2,033.1
Potatoes	11,100	1,000	11,100.0	2,934.8	109.4	8,055.8
Ground-nut	1,000	4,000	4,000.0	738.1	109.4	3,152.5
Soybeans	500	4,200	2,100.0	759.0	109.4	1,231.6
Vegetables	14,000	1,000	14,000.0	2,689.5	109.4	11,201.1

Source: NIAPP and field study

*1: Variable costs: Input materials excepting labor cost. Labor is considered as family labor.

*2: Fixed costs : Tax, water fee and insurance.

Table I-2.4. Income of Typical Farmers in the Study Area

Unit:VND

Item	Case-1	Case-2	Case-3	Case-4
Planted Area(ha)				
Paddy (spring)	0.057	0.360	0.419	0.580
Paddy (autumn)	0.057	0.360	0.419	0
Secondary crop	0.037	0.072	0.250	0.290
Income				
Farm income	472,000	3,545,000	6,814,000	15,515,000
Animal husbandry	0	1,420,000	4,320,000	0
Off-farm income	1,000,000	*2	0	0
Gross income	1,472,000	4,965,000	11,134,000	15,515,000
Expenditure				
Production cost*1	255,000	1,462,000	2,383,000	1,987,000
Living expenses	1,217,000	3,503,000	4,200,000	5,862,000
Net Income	0	0	4,551,000	7,666,000
Cropping Pattern	Paddy x2 Sweet potato	Paddy x2 Maize Sweet potato	Paddy x2 Maize Groundnut Sweet potato	Paddy x1 Tomato
Family member(person)	3.0	6.0	8.0	3.0
Labor Force(person)	1.5	3.0	3.0	2.5
Inundated Area in rainy season(ha)	0.029	0.050	0.021	0.58

Source: Farm household economy survey (May,1994)

*1: Excluding family labor costs and non-cash materials.

*2: Income from business as village merchant is unknown.

Table I-2.5 Income Distribution

Annual Income (1,000VND)	Rural (%)	Urban (%)	Study Area (%)
Less than 1,000 (poor group)	17.2	1.0	18.3
1,000-5,000 (moderate group)	70.5	28.0	55.7
5,000-10,000 (better-off group)	9.7	27.5	23.3
10,000 and over (wealthy group)	2.6	43.5	1.7

Source: Ha Bac Province People's Committee

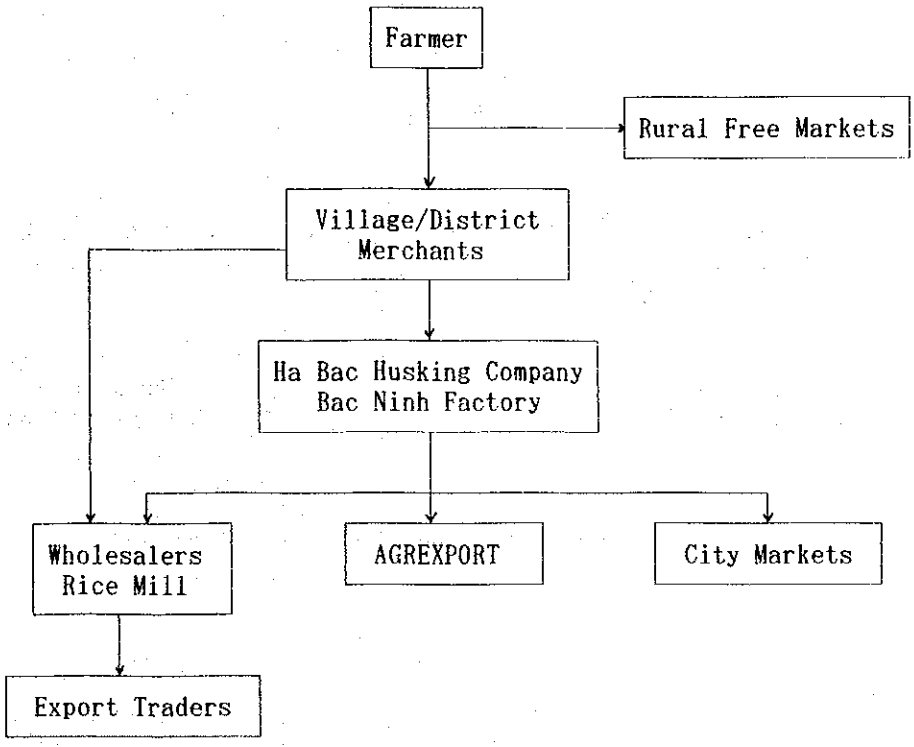


Fig. I-2.1 Marketing Channel of Rice in the Study Area

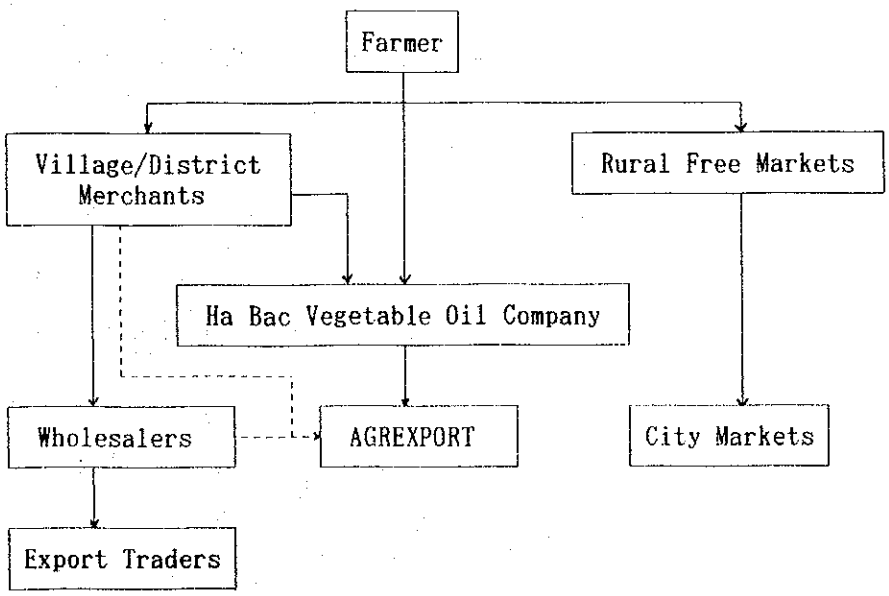


Fig. I-2.2 Marketing Channel of Industrial Crops in the Study Area

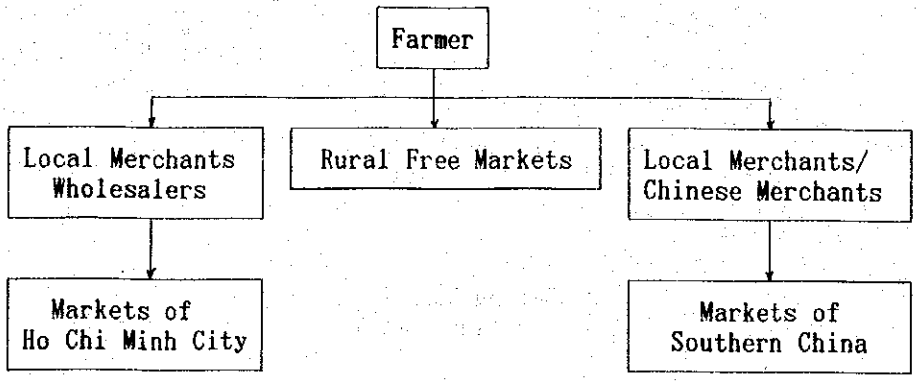


Fig. I-2.3 Marketing Channel of Fresh Tomatoes

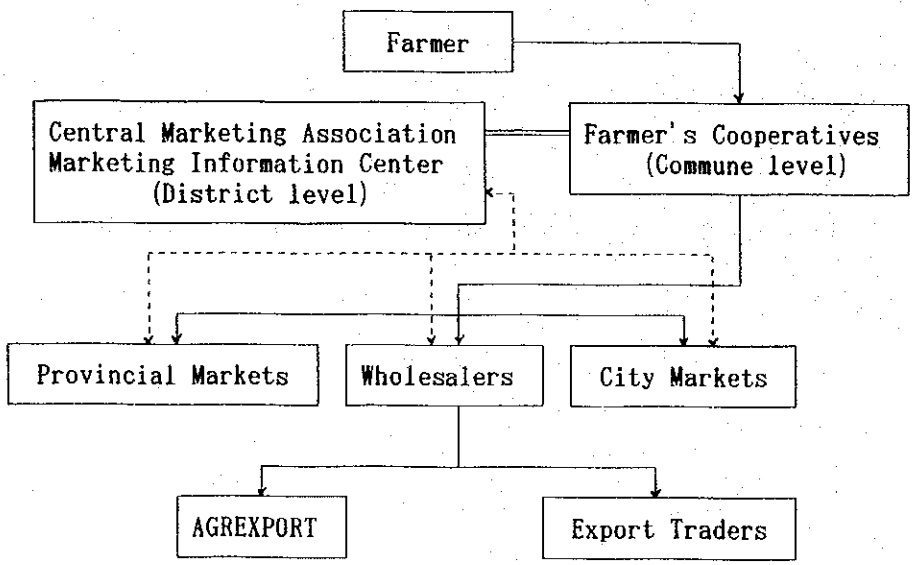
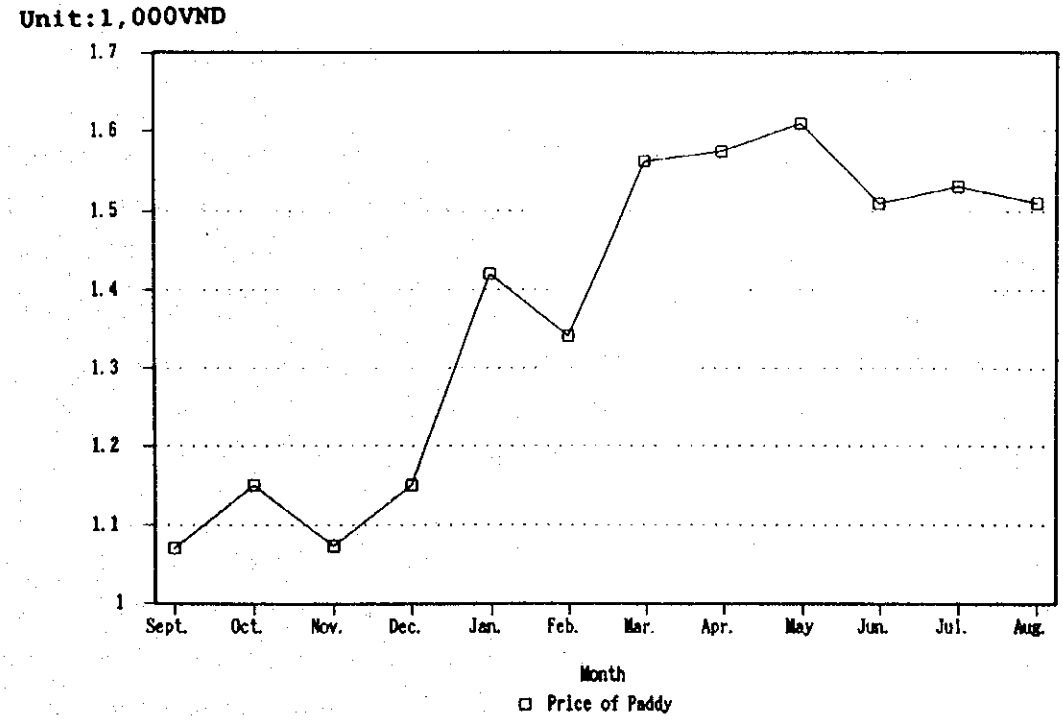


Fig. I-2.4 Proposed Marketing System in the Study Area



(from September,1993 to August,1994)

Figure I-2.5 Trends of Average Price of Paddy in Ha Bac Province

I-3. Agricultural Economy in the Priority Area

I-3.1. Farm Household Economy

I-3.1.1. Present Conditions of Farm Household Economy

In order to grasp the actual condition of farm household economy in the priority area, sample farmer to be surveyed was selected 100 farm households in the whole, after selected 15 villages from among 150 villages related to the area taking the geographical distribution into account. The survey have been carried out visit - hearing by surveyor contracted with the JICA Study Team. The method of survey was instructed by the Team.

The data and information obtained by the survey have been analysed by farming scale classified into three types such as small-scale (average farm size: 0.13ha, 39 households of 0.18ha or less), medium-scale (average farm size: 0.27ha, 49 households ranging from 0.19ha to 0.36ha), and large-scale (average farm size: 0.51ha, 12 households ranging from 0.37ha to 0.83ha). The results of the analysis are as follows:

(1) Small-scale farmer:

Small-scale farmer is unable to maintain production costs and living expenses based only on farm income. These conditions with difficulty is barely relieved by income from animal husbandry (pig raising) and non farm income, namely, a proportion of animal husbandry and off-farm income, among gross family income, reaches 16.2 percent and 30.0 percent respectively.

On the other hand, home consumption including animal feeds occupys about 78 percent of farm income. In a sense, this figure shows that selling quantity of products is extremely small. Viewing the

results of farm survey, number of farmer surveyed who sells paddy is only eight (20.5% of total farmer surveyed) and its average selling quantity is about 250 kg per households.

Furthermore, living expenses (family size: 3.7) including home consumption account for 82.6 percent of all expenditures. On that account it can be gathered that small amount of the farm material input has been applied.

(2) Medium-scale farmer:

Medium-scale farmer produces the surplus income (about 4,665 thousand VND) from agricultural production and animal husbandry (pig raising). But a proportion of animal husbandry income reaches about 39 percent. In addition, farmer earns off-farm income which accounts for about 8 percent among gross family income (about 5,092 thousand VND).

Home consumption accounts for about 78 percent of farm income in the same as small-scale farmer. However, eleven farmers surveyed in this group (49 households), i.e., 22.5 percent, sell their paddy to marketing system and its average selling quantity is about 770 kg per households.

Living expenses (family size: 5.5) including home consumption occupy 81 percent of all expenditures. On the other hand, in the viewpoint of farm household economy, its surplus shows in the same as small-scale farmer by reason of off-farm income.

(3) Large-scale farmer:

Large scale-farmer is large farmily with 6.5 and also produces the surplus income (about 1.5 million VND) from farming, animal husbandry and off-farm income. It can be seen even this farmer's

group earns off-farm income. However, farmer is able to maintain production costs and his living expenses by farm and animal husbandry income (6,106 thousand VND).

In this farmer, the rate of home consumption shows 43.6 percent of farm income, therefore, he can receive large amount of earnings from their products such as paddy, potatoes and vegetables.

Living expenses including home consumption account for 73 percent of all expenditures. It can be seen that farm household economy in this group is comparatively stable and has an improvement potential on farming.

Viewing the above mentioned, it seems that the income gap of farmers produces a greatly effect on the area of farmland. Among these farmers, the income from secondary crop in winter season occupies ranging from 5 percent to 12 percent, and the income from animal husbandry greatly contributes to the surplus of farm household economy. (see Table I-3.1)

I-3.1.2 Future Conditions of Farm Household Economy

As described in the preceding paragraph, the average farm of small-, medium-, and large-scale farmers is set up by the farm survey.

With the project implementation, an increase in crop yield and expansion of secondary crops, described in Agricultural Production Plan, will be expected with the improvement of drainage facilities, improvement of the farm management and strengthening of the agricultural extension activities.

On the basis of the said production plan, the future conditins of farm household economy of typical farmers have been analysed. As the results of the analysis are as follows;

(1) Small-scale farmer:

It is clear that an increase in agricultural production makes a great contribution to improve the farm household economy of this farmer, in addition to pig raising as animal husbandry. The growth rate of farm income shows 58 percent. Farmer can be gained the surplus income (556 thousand VND) without off-farm income even such small-scale farm and family labor force. The surplus income reaches nearly five times compared with the present situation.

Among gross family income, the proportions of farm and animal husbandry incomes are 64 percent and 36 percent respectively. Therefore, it can be said that animal husbandry occupies still an important position in his farming.

(2) Medium-scale farmer:

Farmer earns the surplus income (about 2.4 million VND) which shows four times as compared with the present situation though he does not obtained off-farm income. All the expenditure can be maintained on the farm income.

However, a proportion of animal husbandry income also reaches about 38 percent, among gross family income (about 8.4 million VND). On grounds that the farmers in the area have a pig raising-oriented , it is natural that the extension of animal husbandry contributes to the farm household economy of this farmer.

(3) Large-scale farmer:

Owing to considerable farm income (about 5 million VND), farmer can afford to perform the sufficient farming, and it will attracts and accelerates the improvement of the farming technology and the introduction of new crops. Consequently, the pervasive effects over

the area, generated from these situations will be anticipated.

As mentioned above, the remarkable increase in agricultural production and farm income in the area will be expected from the high productivity, the extension of secondary crop cultivation during winter season, and the prevention against waterlogging; these will be produced with the improvement of drainage facilities in Tan Chi area of the project. (see Table I-3.2)

As a result, it is possible that the benefited farmers, specially in small- and medium-scale farmer, in the area will be elevated from the low income group being ensured at the high income level by stable farming.

I-3.2. Marketing and Processing

I-3.2.1 Marketing

(1) Rice

According to the farm survey, marketing of rice paddy in the priority area is mainly dealing with local merchants such as village and district merchants. Number of merchant dealt with paddy or rice in the area is about 30. Paddy collected by the merchants ships to Bac Ninh factory of Ha Bac Husking Company. Farmer sells paddy of spring crop and autumn crop to merchant in the period from June to July and in the period from November to December, respectively. (see Fig. I-2.1)

(2) Industrial Crops

As industrial crops such as groundnut and soybeans are collected by local merchants in the area and then they ship to Ha Bac Vegetable Oil Factory in Bac Giang town, and large producers ship to the factory directly. Products of vegetable oil and oil cake are mainly consumed in the north Viet Nam. Marketing channel of these crops is already established in the area and region. (see Fig. I-2.2)

(3) Vegetables

There are six rural free markets in the area; Giau (Tu Son), Lim (Van Tuong), Ve (Tri Phuong), Son (Viet Doang), Va (Hap Linh) and Ho (Tan Chi). Rural free merkets in the area are daily open from early morning to noon but few markets are the whole daytime. Farmer sells their products (mainly vegetables) directly to the consumer. In the market, price decision makes by mouth-to-mouth among farmers who sell their products. They have no marketing information network. (see Table I-3.3 , I-3.4 and Figure I-3.1)

In the rural free markets, there are many problems; space for

dealings, ordering, storage place, security, fire prevention, communication, sanitation and environment.

I-3.2.2 Processing

Agricultural products produced in the area, specially rice paddy and industrial crops as groundnut and soybeans, are shipped to the processing factories in Ha Bac province. These processing factories are concentrated at Bac Giang, capital town of the province. A husking factory is in Bac Ninh town which is commercial center of the area. All of these factories belong to state-run enterprises.

Besides, there are many private small-scale rice mill in the area and these mills are operated by richest group farmer in village. The home food industry of rice noodle exists widely in rural area.

(1) Rice

Ha Bac Husking Company belonging to Ministry of Agriculture and Food Industry is established in Bac Giang town and has two husking factories in Bac Giang town and Bac Ninh town. Husking capacity of each factory is 90 ton/day and storage capacity is 4,000 ton for paddy and 3,000 ton for white rice. The husking rate of these factories is 67-69%, and the rates of white rice and its broken are 45% and 35% respectively. They have two operation seasons annually; one is from January to April and another one is from September to December.

Paddy is collected from cooperatives and local merchants and is sold to wholesalers in Quan Ninh, Hai Phong, Bac Thai and Lang Son provinces, and Nanning and Guanzhuo, China.

(2) Industrial crops

Ha Bac Vegetable Oil Factory belonging to Ministry of Light Industry is established in Bac Giang town and this is only one processing factory in the north Viet Nam. The factory operates mainly vegetable oil manufacture extracting from groundnut and

soybeans, on the other hand, instant noodle, bottling mashroom and fish sauce are produced. Annual operating capacity of vegetable oil is 3,000 ton and 5,000 ton of extractions (cake).

Groundnut and soybeans are collected from large-scale farmers and local merchants in mainly Ha Bac province, but collecting amount is shortage. Therefore, the factory is buying from Hanoi City, and some provinces of Ha Nam, Hai Hung, Bac Thai, Vin Phu, Thanh Hoa, and Nghe An. Consuming area of the products is in the north Viet Nam. On the other hand, after selecting colleted groundnut, high quality one is a destination for export.

At present, this factory is planning an expansion of its operation scale.

I-3.3. Improvement of Marketing and Distribution System

Agricultural products produced in the priority area is mainly dealing with local merchants. Moreover, the commercial transaction scale of such merchant is small and weak. However, marketing activities of merchants have a strong weight in rural economy.

After completion of the project implementation, improvement of marketing system to cope with an increase of agricultural production is an urgent theme.

Accordingly, as described in the preceding, collecting and shipping center, and post-harvest facilities with drying and storing will be provided at each commune under the support of District People's Committee and authorities concerned. Through the provision of these facilities, farmers can avoid the disadvantages in the market of agricultural products by gaining an advantage over the existing marketing system.

Furthermore, central marketing association with marketing information center will be established at commercial center (Tu Son) of District. (see Fig. I-2.4)

On the other hand, existing rural free markets in the area are insanitary to deal foodstuff due to incompleted facilities, and there are many problems on market administration and management. Consequently, formation of administration and management system of the market including marketing information network should be set up.

With a view to realize this plan, the participation of beneficiaries of said farmers' organization and facilities and the support by authorities concerned including official financing institutions are indispensable.

Table I-3.1 Income of Typical Farmers in the Priority Area

Unit:VND

Item	Small-Scale	Medium-Scale	Large-Scale
Farmland(ha)	0.1300	0.2700	0.5100
Planted Area(ha)	0.3144	0.5650	0.9700
Paddy (spring)	0.1300	0.2700	0.5100
Paddy (autumn)	0.1300	0.2600	0.4200
Secondary crop	0.0544	0.0350	0.0400
Income(VND)			
Farm income	1,510,420	2,844,910	5,059,200
Animal husbandry	455,000	1,820,000	1,046,500
Off-farm income	842,000	427,000	342,000
Gross income	2,807,420	5,091,910	6,447,700
Expenditure(VND)			
Production cost*1	413,690	796,580	1,294,150
Home consumption	1,183,200	2,225,400	2,205,350
Living expenses*2	995,600	1,499,400	1,796,700
Net Income	214,930	570,530	1,151,500
Cropping Pattern	Paddy x2 Groundnut Soybeans Maize Sweet potato Potatoes Vegetables	Paddy x2 Groundnut Soybeans Maize Sweet potato Potatoes Vegetables	Paddy x2 Groundnut Maize Potatoes Vegetables
Family member(person)	3.7	5.5	6.5
Labor Force(person)	2.1	3.3	3.5
Paddy damaged by water logging in 1985 (%)*3	65	70	75

Source: Farm survey (August,1994)

*1: Excluding family labor costs and non-cash materials. Including purchasing cost of piglet for raising.

*2: Including land tax and water fee.

*3: Almost all the secondary crop suffer great losses by water shortage every year.

Table I-3.2 Income of Typical Farmers
in the Priority Area
- With Project -

Unit:VND

Item	Small-Scale	Medium-Scale	Large-Scale
Farmland(ha)	0.1300	0.2700	0.5100
Planted Area(ha)	0.3169	0.6760	1.2270
Paddy (spring)	0.1300	0.2100	0.4000
Paddy (autumn)	0.1300	0.2600	0.4200
Secondary crop	0.0569	0.2060	0.4070
Income(VND)			
Farm income	2,477,900	5,535,500	10,073,100
Animal husbandry	1,365,000	3,185,000	2,866,500
Off-farm income	0	0	0
Gross income	3,842,900	8,720,500	12,939,600
Expenditure(VND)			
Production cost*1	575,720	1,201,050	2,031,400
Home consumption	1,258,480	2,453,790	2,684,150
Living expenses*2	1,018,400	1,546,100	1,877,100
Net Income	990,300	3,519,560	6,346,950
Cropping Pattern	Paddy x2 Soybeans Maize Sweet Potato Potatoes Vegetables	Paddy x2 Groundnut Soybeans Maize Sweet potato Potatoes Vegetables	Paddy x2 Groundnut Soybeans Maize Sweet Potato Potatoes Vegetables
Family member(person)	3.7	5.5	6.5
Labor Force(person)	2.1	3.3	3.5

Source: Based on Agricultural Development Plan

*1: Excluding family labor costs and non-cash materials.
Including purchasing cost of piglet for raising.

*2: Including land tax, water fee and crop insurance.

Table I-3.3 Rural Free Markets in the Priority Area

Name of Market	Commune	Shop/Merchant (number)	Area (ha)	Installation
1. Giau	Tu Son	300	1.5	Brick wall, roof with tile
2. Lim	Van Tuong	50	0.7	Brick wall, roof with tile
3. Ve	Tri Phuong	50	0.6	Canvas tent
4. Son	Viet Doang	100	1.0	Brick wall, roof with tile
5. Va	Hap Linh	40	1.0	Canvas tent
6. Ho	Tan Chi	0*1	0.5	Brick wall, roof with tile

Note: *1 Only farmer deals with their farm products.

Table I-3.4 Marketing Season of Agricultural Products in the Priority Area

Month/Crop	Paddy	Groundnut	Soybeans	Maize	Vegetables
January			x		x*
February				x	x*
March				x	x*
April					
May					
June	x		x		
July	x	x	x		
August		x			
September					
October					x*
November	x				x*
December	x				x*

Note: * Vegetables and Tomatoes.

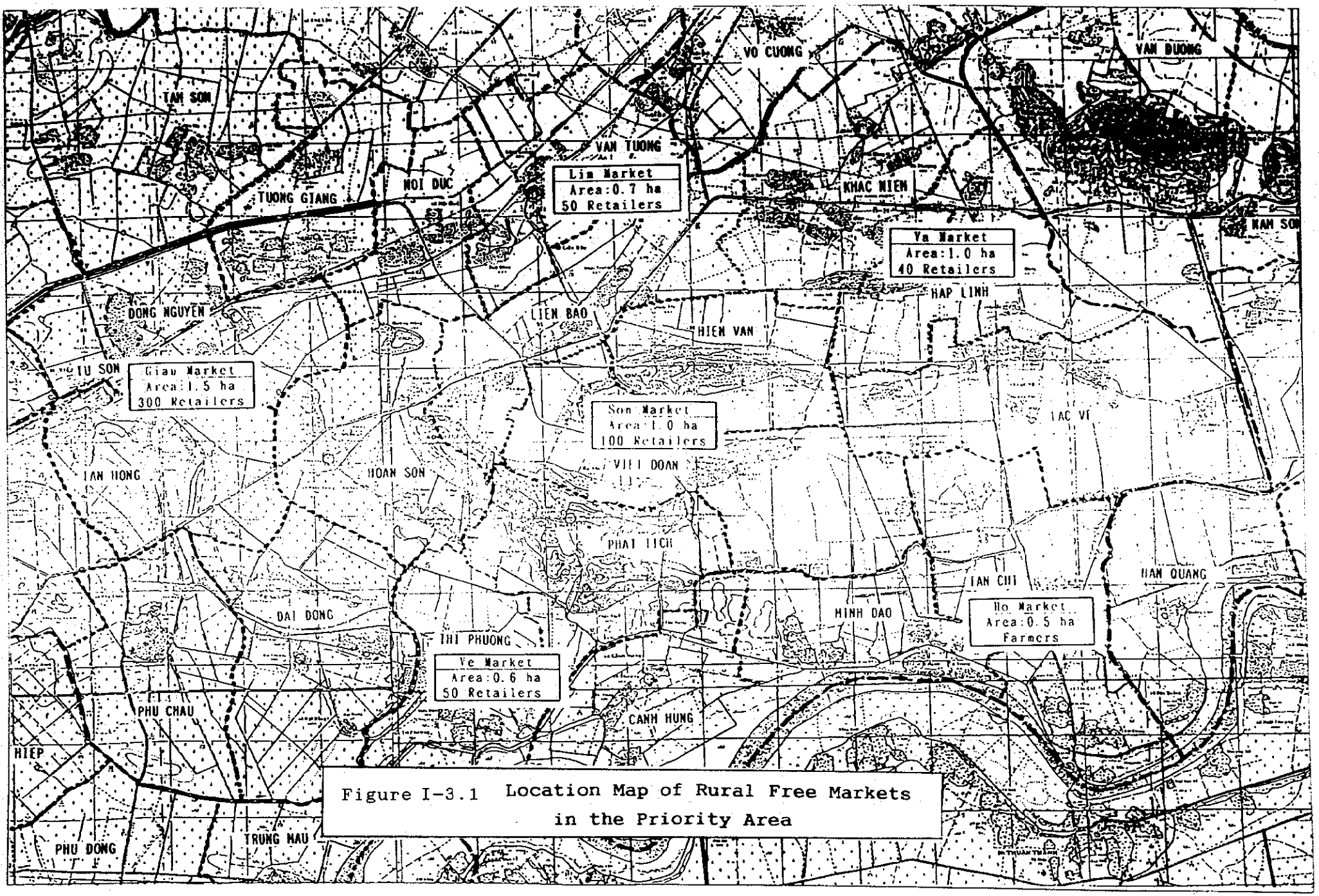


Figure I-3.1 Location Map of Rural Free Markets in the Priority Area

I-4 PROJECT EVALUATION

The master plan study area covered by the Bac Duong drainage system is situated in the south Bac Duong area. This area has an unfavorable condition of farming and unstable agricultural production caused by heavily rainfall concentrated in rainy season and occurence of flood in the rivers. Therefore, the living standards of farmers who live within the area is low and the area has a high poverty distribution compared with in Ha Bac province and its surrounding provinces. The priority area which needs urgently implementation of drainage projects was set up by the master plan study.

With the project implementation in the priority area, drainage facilities for prevent flood and waterlogged damages are to be provided in the area. As a result, increase in crop yield of paddy rice-autumn crop and expansion of its planted area will be expected. In addition, increase in crop yield of paddy rice-spring crop and extension of winter crop cultivation area will also be anticipated through rearrengement of existing irrigation system with the project. Moreover, the projects would bring about the development of inland fishery in the area.

In the area, poverty eradication by improvement of farm income and contribution to the regional economy can be expected.

I-4.1 Orientations of Evaluation

The economic evaluation will be carried out for the project evaluation, and the economic internal rate of return (EIRR) is used as the main indicatior.

In terms of the evaluation of the priority area the EIRR as the main indicator is calculated the both Cropping Pattern Type B (the

pattern which puts emphasis on crop diversification) and Type A (the pattern which puts emphasis on paddy cultivation). As the results of economic calculation, it is concluded that the Type B which is in line with national policy is better than the Type A, for economic justification.

Accordingly, the calculation of economic evaluation will be made on the basis of the Type B, two cases; option 1 (Tan Chi Area) and Option 2 (Whole Area) with of Vietnam made pump and of foreign made pump. (see Table I-4.17(1)-(8))

I-4.2 Evaluation Criteria

(1) Evaluation Criteria

The economic evaluation will be adopted on the basis of the following criteria.

1) Economic and benefits and costs of the project are expressed in monetary terms.
2) On the assumption that the project life is 50 years after completion of the project and that both benefits and costs in annual form over the project life are converted to the respective present worth value.
3) The benefits and costs are evaluated with incremental value based on the difference between without and with the project implementation.
4) The economic prices valued at border price are applied.
5) An appropriate standard conversion factor (SCF) for Viet Nam is not agreed yet. Hence and implicit SCF 1.0 is used for the evaluation.
6) Economic internal rate of return (EIRR) is used as the main indicator for economic evaluation.

(2) Economic Prices of Commodities

The economic prices used in the evaluation will be adopted based on the following criteria.

1) The value of traded/tradable goods is measured by border prices in Viet Nam Dong.
2) As for a forecast of commodity prices, "Price Prospects for Major Primary Commodities, 1990-2005" evaluated by the World Bank is used.
3) The official exchang rate to be used for the evaluation is adopted US$1.00 = 10,996 VND, the average rate of August, 1994.
4) Economic farmgate prices for farm products are as follows;

- Rice

The economic price of paddy at the farm level based on the estimated 2000 f.o.b. international price at Hai Phong port, projected by World Bank, is estimated at 1,785,900 VND/ton. (see Table I-4.2)

- Soybeans

Since, CIF Rotterdam soybeans are projected at US$300/ton in the year 2000, the farmgate price for this crop is estimated at 4,348,000 VND/ton. (see Table I-4.4)

- Groundnuts

Owing to shelled groundnuts, the economic price is calculated multiplying the World Bank's "Weighted Index of Commodity Prices" for actual export price. The farmgate price for this crop is estimated at 5,295,000 VND/ton. (see Table I-4.3)

- Maize

Since, FOB Gulf maize, No.2, Yellow is projected at US$139 in the year 2000, the farmgate price for this crop is estimated at 2,354,000 VND/ton. (see Table I-4.5)

- Other crops

The economic prices of potatoes, sweet potato, vegetables (represented by onion) and others (represented by taro) are estimated based on the results of the field survey. Economic prices of these crops are shown as below.

Potatoes	1,000,000 VND/ton
Sweet potato	300,000 VND/ton
Vegetables	1,000,000 VND/ton
Others	1,200,000 VND/ton

5) Economic Prices of Fertilizers

Fertilizers are currently imported and economic prices are estimated as follows, using the projected price in the year 2000 by World Bank. (see Table I-4.6)

Urea	3,200,000 VND/ton
DAP	3,200,000 VND/ton
TSP	2,800,000 VND/ton
Phosphate Chloride	2,500,000 VND/ton

6) Economic Prices of Agro-chemicals

The market prices of pesticide, insecticide and herbicide are obtained from the field survey. The economic prices for these chemicals are converted by a factor of 1.0.

7) Economic Prices of Farm Labor

Pricing of farm labor is the assessment of opportunity costs. The opportunity costs of farm labor are estimated at 2,344 VND using the general criteria of the opportunity for off-farm employment in the off-season of farming and farm wage in the farming season and outside labor market. An average farm labor wage in the area is 10,000 VND per day.

(see Table I-4.7)

8) Economic Prices of Electricity

The prices of electricity used for pumping is 450 VND/kwh

in day time and 180 VND/kwh in night time, but this current tariff reflects a subsidy of 30 percent of long run marginal cost. Therefore, a base subsidy adjustment of 30 percent is used.The economic prices of electricity are estimated at 315 VND/kwh in day time and 126 VND/kwh in night time.

I-4.3 Project Benefits

The project benefits generated from the project implementation in the area are made up of three categories of benefits; farm production, inland fishery, and other (prevention effects against flooding and water logging damages).

In crop benefits, the goal of full development will be set up at three year after completion of the project implementation. Fishery benefits will be set up at first year after completion of the project implementation. Prevention effects against flood and waterlogging will be corresponded to the reduction of damaged area.

(1) Farm Production Benefits (Crop Benefits)

Crop benefits are constituted by incremental net agricultural production values brought about by the prevention against flooding and water logging, supply of irrigation water and supporting services to the farmers. After completion of the project, agricultural production based on cropping pattern described on the agricultural development plan will be carried out. The incremental benefits are estimated at 34,404 million VND (Option 1) and 42,326 million VND. (see Table I-4.9(1)-(2))

(2) Inland Fishery Benefits

Inland fishery benefits can be expected through aquaculture in the

ponds. Annual incremental benefits are estimated at 596 million VND (Option 1) and 921 million VND (Option 2).

(3) Other Benefit

Prevention effects against flood and waterlogging damages are estimated by paddy rice (autumn crop) damaged by these disasters. Annual anticipated effects is estimated at 4,802 million VND (Option 1) and 6,500 million VND (Option 2). (see Table I-4.12)

I-4.4 Project Costs

Project costs are comprised of construction works, project administration, consulting servises, and physical and price contingencies, but taxes and price contingency are excluded from the costs.

(1) Project Costs

Project construction costs will be estimated on the basis of 1994 price levels. Since the main construction works are scheduled to be completed within five years, changes in future price relationships are not considered. For the evaluation, all construction costs are broken down into two components; foreign costs (foreign currency) and local costs (local currency).

The project costs are estimated at; 149,406 million VND (Option 1-of Vietnam made pump), 305,279 million VND (Option 1-of foreign made pump), 219,154 million VND (Option 2-of Vietnam made pump) and 433,918 million VND (Option 2-of foreign made pump).
(see Table I-4.14)

(2) Operation and Maintenance Costs

Operation and maintenance costs comprise administrative and general expenditure including salary and wage, costs of equipment repair and maintenance, and electricity tariff and office maintenance. Economic costs (annually) of operation and maintenance are estimated at 1,111 million VND (Option 1) and 1,424 million VND (Option 2). (see Table I-4.15)

(3) Replacement Costs

On the basis of the following lifespans of pumps installed by the project, the replacement costs are estimated.

- Drainage Pump : 30 years
- Machinery for O/M : 15 years

I-4.5 Economic Justification

I-4.5.1 Economic Internal Rate of Return

The project justification is mainly appraised based on the calculation of economic internal rate of return (EIRR). Additionally, the net present value (NPV) and benefit/cost ratio (B/C ratio) are also taken as economic indicators. The net present value and benefit/cost ratio are calculated using the discount rate.

The results of calculation of EIRR are; 26.9% (Option 1-of Vietnam made pump), 11.1% (Option 1-of foreign made pump), 21.2% (Option 2-of Vietnam made pump) and 9.4% (Option 2-of foreign made pump). (see Table I-4.17(1)-(4))

Judging from the EIRR calculated as above mentioned, the drainage project plan in either case is economically feasible. In this project plan, the case which uses of Vietnam made pump can be

obtained over 20% of the EIRR. In case of foreign made pump, it shows that the project is also feasible, though the EIRR of low percent. Therefore, in order to improve depressed agricultural and rural circumstances, and to increase agricultural productivity and income of rural people, and to vitalize regional economy, by the improvement of drainage facilities in the area, the project plan is recommended to be implemented in the early stage.

I-4.5.2 Sensitivity Analysis

Sensitivity analysis is made in the event of variatins in prices of farm products and crop yields and escalation of construction costs. The results are shown as follows;

Results of Sensitivity Analysis

Option 2 (Whole Area):

Case	EIRR	
	Vietnam made	Foreign made
1. Original (EIRR)	21.2%	9.4%
2. Price/Yield of Farm Products		
10% of decline/decrease	18.8	8.3
3. Production Costs		
10% of increase	20.7	9.2
4. Construction Costs		
10% of increase	19.1	8.5
5. Delay of Production Target		
1 year	17.6	8.5
2 year	15.3	7.8
3 year	13.7	7.2
6. Combination with 2 and 4		
Each 10%	17.0	7.3

I-4.6 Financial Analysis of Typical Farmer

In order to justify financial viability of the project at farm level, financial analysis (profit and loss, and cash flow) of typical farmers (average scale of farming) in the priority area was made. These typical farmers are determined on the basis of the results of the farm survey. The cropping pattern with the project situation of the farmers was set up considering the improvement of a drainage scheme based on the current farming pattern. (see Table I-4.19 and Table I-4.20(1)-(3))

Taking all this into consideration, substantial improvement of farm household economy in the area can be expected as a result of the project implementation.

Calculation of the farm household economy of typical farmers was made on the basis of the following conditions.

1) Farm income is estimated based on farmgate prices of farm products and crop yield obtained by the farm survey. Off-farm income is excluded from gross fam income.
2) Production costs are expressed by financial prices.
3) Family labor is excluded from production costs.
4) For production costs, the loan conditions of Agricultural Bank are applied. Borrowing period sets up six months for annual crops. Monthly interest is 1.8% for small-scale farmer, and 2.5% for medium- and large-scale farmer.
5) Production value with the project is estimated by the target yield.
6) Payment of interest concerns only the loan interest for production costs.
7) Water charge is applied the current price.

Table I-4.1 Farmgate Prices of Agricultural Input and Output

Item		Unit	Financial Price	Economic Price
1. Input				
1) Seeds	a. Paddy	VND/kg	2,343	2,343
	b. Groundnut	VND/kg	3,000	3,000
	c. Soybean	VND/kg	4,750	4,750
	d. Maize	VND/kg	1,380	1,380
	e. Potatoes	VND/kg	1,780	1,780
	f. Sweet Potato	VND/kg	300	300
	g. Vegetables *1	VND/kg	10,000	10,000
2) Fertilizer				
	a. N	VND/kg	2,500	3,200
	b. P	VND/kg	700	3,200
	c. K	VND/kg	2,000	2,450
	d. Manure	VND/kg	10	10
3) Agrochemicals		VND/g	15	15
2. Output				
	a. Paddy	VND/kg	1,500	1,790
	b. Groundnut	VND/kg	4,000	5,300
	c. Soybean	VND/kg	4,200	4,350
	d. Maize	VND/kg	1,400	2,350
	e. Potatoes	VND/kg	1,000	1,000
	f. Sweet Potato	VND/kg	300	300
	g. Vegetables *1	VND/kg	1,000	1,000
3. Others				
	a. Pig (live)	VND/kg	6,500	6,500
	b. Freshwater Fish	VND/kg	5,500	5,500

Note: *1 Represented by onion.

Table I-4.2 Economic Price of Rice Paddy

Description	Unit	Economic Price
IBRD Projection Price in 1990-2005 in 2000 current price (White rice, 5% broken, FOB Hai Phong)	US$/MT	336
Converted to Vietnam Dong (US$1.00=10,996VND)		3,694,656
Port Charges		62,809
Exporter's margin		157,023
Transport (Port-Bac Ninh)		70,000
Ex-mill price		2,850,626
Processing (%)		67
Miller's margin		142,531
Mill-gate price		1,895,666
Local merchant's margin		94,783
Transport (Farm-Mill)		15,000
Farmgate price		1,785,883
Economic price		1,786,000

Note: *1 Grade differential of average esported rice from non-glutinous white rice 5% broken is assumed at 85%.

Table I-4.3 Economic Price of Groundnut

Description	Unit	Economic Price
IBRD Projection Price in 1990-2005 in 2000 current price (Groundnut, FOB Hai Phong) *1	US$/MT	805
Converted to Vietnam Dong (US$1.00=10,996VND)		8,851,780
Port Charges		177,036
Exporter's margin		8,852
Transport (Port-Bac Giang)		70,000
Shelled nut price		8,595,893
Unshelled nut price		6,017,125
Shelling cost		137,377
Shelling factory's margin		300,856
Shelling factory-gate price		5,578,892
Local merchant's margin		278,945
Transport (Farm-Merchant)		5,000
Farmgate price		5,294,947
Economic price		5,300,000

Note: *1 Price is estimated by multiply the IBRD's weighted index of commodity prices for actual export price.

Table I-4.4 Economic Price of Soybeans

Description	Unit	Economic Price
IBRD Projection Price in 1990-2005 in 2000 current price (Soybeans, CIF Rotterdam)	US$/MT	300
Ocean freight and Insurance		45
CIF Hai Phong		345
Converted to Vietnam Dong (US$1.00=10,996VND)		3,793,620
Port Charges		75,872
Importer's margin		7,587
Wholesaler's margin		7,587
Wholesale price		3,884,667
Transport (Port-Priority area)		70,000
Local merchant's margin		388,467
Transport (Farm-Merchant)		5,000
Farmgate price		4,348,134
Economic price		4,350,000

Table I-4.5 Economic Price of Maize

Description	Unit	Economic Price
IBRD Projection Price in 1990-2005 in 2000 current price (Maize No.2, Yellow, FOB Gulf)	US$/MT	139
Ocean freight and Insurance		45
CIF Hai Phong		184
Converted to Vietnam Dong (US$1.00=10,996VND)		2,023,264
Port Charges		40,465
Importer's margin		4,047
Wholesaler's margin		4,047
Wholesale price		2,071,822
Transport (Port-Priority area)		70,000
Local merchant's margin		207,182
Transport (Farm-Merchant)		5,000
Farmgate price		2,354,005
Economic price		2,350,000

Table I-4.6 Economic Price of Fertilizers

Description	Unit	Urea	TSP	DAP	P. Chl. *1
IBRD Projection Price in 1990-2005 in 2000 current price	US$/MT	232	172	203	147
Ocean freight and Insurance		20	50	50	45
CIF Hai Phong		252	222	253	192
Converted to Vietnam Dong (US$1.00=10,996VND)		2,770,992	2,441,112	2,781,988	2,111,232
Port Charges		55,420	48,822	55,640	42,225
Importer's margin		5,542	4,882	5,564	4,222
Wholesaler's margin		5,542	4,882	5,564	4,222
Wholesale price		2,837,496	2,499,699	2,848,756	2,161,902
Transport (Port-Priority area)		70,000	70,000	70,000	70,000
Local merchant's margin		283,750	249,970	284,876	216,190
Transport (Farm-Merchant)		5,000	5,000	5,000	5,000
Farmgate price		3,196,245	2,824,669	3,208,631	2,453,092
Economic price		3,200,000	2,800,000	3,200,000	2,450,000

Note: *1 Phosphate Chloride

Table I-4.7 Economic Labor Wage

1. Monthly farm labor requirement per ha *1

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Total requirement	657	279	249	0	73	503	142	100	163	855	322	77

2. Total monthly requirement per farm *2

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Total requirement	20.67	16.2	16.2	0	17.8	26.04	34.54	24.35	8.15	21.08	9.42	6.69

3. Percentage of potential full employment (Monthly labor supply *3=100)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
28.9	22.7	22.7	0.0	24.9	36.4	48.3	34.1	11.4	29.5	13.2	9.4

4. Economic wage rate (VND/man-day)

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
2,891	2,266	2,266	0	2,490	3,642	4,831	3,406	1,140	2,948	1,317	936

Average 2,344

Note: *1 Farm survey in the project area
*2 Average sample farm in the project area
*3 Monthly labor supply of the farm is considered 71.5 man-day

Age class	Person	Day/Month	Total man-day
13 - 15	0.4	10	4.0
16 - 60	2.7	25	67.5
			71.5

- Present farm labor wage (average): 10,000 VND

Table I-4.8 Crop Budget per Hectare (Economic)

Without Project

Crop	Yield (kg/ha)	U/Price (VND/kg)	G. Income (A)	Production Cost						N.P.V. (B)	B/A
				Seeds	Fertil.	Chem.	Labor	Others	Total		
Paddy-spring	3,400	1,790	6,086,000	304,590	1,748,000	21,000	731,328	280,492	3,085,410	3,000,590	49%
Paddy-autumn	3,400	1,790	6,086,000	304,590	1,411,400	21,000	675,072	241,206	2,653,268	3,432,732	56%
Groundnut	1,000	5,300	5,300,000	300,000	886,500	30,000	900,096	211,660	2,328,256	2,971,744	56%
Soybeans	500	4,350	2,175,000	285,000	928,000	30,000	703,200	194,620	2,140,820	34,180	2%
Maize	1,800	2,350	4,230,000	82,800	1,699,600	15,000	768,832	256,623	2,822,855	1,407,145	33%
Potatoes	11,100	1,000	11,100,000	1,068,000	2,438,000	30,000	750,080	428,608	4,714,688	6,385,312	58%
Sweet Potato	8,700	300	2,610,000	15,000	1,202,000	0	937,600	215,460	2,370,060	239,940	9%
Vegetables	14,000	1,000	14,000,000	1,700,000	1,347,000	30,000	843,840	392,184	4,313,024	9,686,976	69%
Others	6,000	1,200	7,200,000	120,000	1,202,000	0	937,600	225,960	2,485,560	4,714,440	65%

Note: Vegetables are represented by onion.
Others are represented by taro.

With Project

Crop	Yield (kg/ha)	U/Price (VND/kg)	G. Income (A)	Production Cost						N.P.V. (B)	B/A
				Seeds	Fertil.	Chem.	Labor	Others	Total		
Paddy-spring	5,000	1,790	8,950,000	304,590	1,588,000	30,000	773,520	269,611	2,965,721	5,984,279	67%
Paddy-autumn	5,000	1,790	8,950,000	304,590	1,556,000	30,000	726,640	261,723	2,878,953	6,071,047	68%
Groundnut	1,300	5,300	6,890,000	300,000	524,400	6,300	918,380	174,908	1,923,988	4,966,012	72%
Soybeans	1,000	4,350	4,350,000	285,000	423,420	6,300	752,420	146,714	1,613,854	2,736,146	63%
Maize	2,500	2,350	5,875,000	82,800	265,950	9,000	780,790	113,854	1,252,394	4,622,606	79%
Potatoes	12,000	1,000	12,000,000	1,068,000	278,400	9,000	771,180	212,658	2,339,238	9,660,762	81%
Sweet Potato	10,300	300	3,090,000	15,000	509,880	4,500	951,660	148,104	1,629,144	1,460,856	47%
Vegetables	14,300	1,000	14,300,000	1,700,000	731,400	9,000	854,390	329,479	3,624,269	10,675,731	75%
Others	6,000	1,200	7,200,000	120,000	1,202,000	0	937,600	225,960	2,485,560	4,714,440	65%

Note: Vegetables are represented by onion.
Others are represented by taro.

Table I-4.9(1) Benefits from Crop Production (Economic)
- Cropping Pattern Type B -

Option 1 (Tan Chi Area)

Without Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	3,094	18,830,084	9,546,259	9,283,825
Paddy-autumn	3,514	21,386,204	9,323,584	12,062,620
Groundnut	304	1,611,200	707,790	903,410
Soybeans	56	121,800	119,886	1,914
Maize	365	1,543,950	1,030,342	513,608
Potatoes	237	2,630,700	1,117,381	1,513,319
Sweet Potato	548	1,430,280	1,298,793	131,487
Vegetables	325	4,550,000	1,401,733	3,148,267
Others	39	280,800	96,937	183,863
Total	8,482	52,385,018	24,642,704	27,742,314

With Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	3,052	27,315,400	9,051,380	18,264,020
Paddy-autumn	3,211	28,738,450	9,244,318	19,494,132
Groundnut	746	5,139,940	1,656,906	3,483,034
Soybeans	603	2,623,050	1,218,440	1,404,610
Maize	745	4,376,875	1,758,889	2,617,986
Potatoes	738	8,856,000	2,965,505	5,890,495
Sweet Potato	908	2,805,720	1,960,019	845,701
Vegetables	898	12,841,400	3,694,777	9,146,623
Others	212	1,526,400	526,939	999,461
Total	11,113	94,223,235	32,077,174	62,146,061

Table I-4.9(2) Benefits from Crop Production (Economic)
- Cropping Pattern Type B -

Option 2 (Whole Area)

Without Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	4,055	24,678,730	12,511,338	12,167,392
Paddy-autumn	4,377	26,638,422	11,613,354	15,025,068
Groundnut	367	1,945,100	854,470	1,090,630
Soybeans	65	141,375	139,153	2,222
Maize	490	2,072,700	1,383,199	689,501
Potatoes	257	2,852,700	1,211,675	1,641,025
Sweet Potato	634	1,654,740	1,502,618	152,122
Vegetables	397	5,558,000	1,712,271	3,845,729
Others	40	288,000	99,422	188,578
Total	10,682	65,829,767	31,027,500	34,802,267

With Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	4,000	35,800,000	11,862,884	23,937,116
Paddy-autumn	4,000	35,800,000	11,515,812	24,284,188
Groundnut	900	6,201,000	1,998,949	4,202,051
Soybeans	700	3,045,000	1,414,441	1,630,559
Maize	1,000	5,875,000	2,360,925	3,514,076
Potatoes	800	9,600,000	3,214,640	6,385,360
Sweet Potato	1,050	3,244,500	2,266,542	977,958
Vegetables	1,097	15,687,100	4,513,553	11,173,547
Others	217	1,562,400	539,367	1,023,033
Total	13,764	116,815,000	39,687,111	77,127,889

Table I-4.9(3) Benefits from Crop Production (Economic)
- Cropping Pattern Type A -

Option 1 (Tan Chi Area)

Without Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	3,094	18,830,084	9,546,259	9,283,825
Paddy-autumn	3,514	21,386,204	9,323,584	12,062,620
Groundnut	304	1,611,200	707,790	903,410
Soybeans	56	121,800	119,886	1,914
Maize	365	1,543,950	1,030,342	513,608
Potatoes	237	2,630,700	1,117,381	1,513,319
Sweet Potato	548	1,430,280	1,298,793	131,487
Vegetables	325	4,550,000	1,401,733	3,148,267
Others	39	280,800	96,937	183,863
Total	8,482	52,385,018	24,642,704	27,742,314

With Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	3879	34,717,050	11,504,032	23,213,018
Paddy-autumn	4251	38,046,450	12,238,429	25,808,021
Groundnut	378	2,604,420	727,267	1,877,153
Soybeans	86	374,100	138,791	235,309
Maize	447	2,626,125	559,820	2,066,305
Potatoes	277	3,324,000	647,969	2,676,031
Sweet Potato	519	1,603,710	845,526	758,184
Vegetables	389	5,562,700	1,409,841	4,152,859
Others	30	216,000	74,567	141,433
Total	10,256	89,074,555	28,146,242	60,928,313

Table I-4.9(4) Benefits from Crop Production (Economic)
- Cropping Pattern Type A -

Option 2 (Whole Area)

Without Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	4,055	24,678,730	12,511,338	12,167,392
Paddy-autumn	4,377	26,638,422	11,613,354	15,025,068
Groundnut	367	1,945,100	854,470	1,090,630
Soybeans	65	141,375	139,153	2,222
Maize	490	2,072,700	1,383,199	689,501
Potatoes	257	2,852,700	1,211,675	1,641,025
Sweet Potato	634	1,654,740	1,502,618	152,122
Vegetables	397	5,558,000	1,712,271	3,845,729
Others	180	1,296,000	447,401	848,599
Total	10,822	66,837,767	31,375,478	35,462,289

With Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	5,084	45,501,800	15,077,726	30,424,074
Paddy-autumn	5,295	47,390,250	15,244,056	32,146,194
Groundnut	456	3,141,840	877,339	2,264,501
Soybeans	100	435,000	161,385	273,615
Maize	600	3,525,000	751,436	2,773,564
Potatoes	300	3,600,000	701,771	2,898,229
Sweet Potato	600	1,854,000	977,486	876,514
Vegetables	475	6,792,500	1,721,528	5,070,972
Others	140	1,008,000	347,978	660,022
Total	13,050	113,248,390	35,860,706	77,387,684

Table I-4.10 Benefits from Crop Production (Economic)

Study Area

Without Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	21,472	130,678,592	66,249,924	64,428,668
Paddy-autumn	16,534	100,625,924	43,869,133	56,756,791
Groundnut	1,265	6,704,500	2,945,244	3,759,256
Soybeans	451	980,925	965,510	15,415
Maize	2,062	8,722,260	5,820,727	2,901,533
Potatoes	935	10,378,500	4,408,233	5,970,267
Sweet Potato	3,715	9,696,150	8,804,773	891,377
Vegetables	2,894	40,516,000	12,481,891	28,034,109
Others	1,545	11,124,000	3,840,190	7,283,810
Total	50,873	319,426,851	149,385,625	170,041,226

With Project

Crop	Planted Area (ha)	Production Value (1000VND)	Production Cost (1000VND)	Net Value (1000VND)
Paddy-spring	19,909	178,185,550	59,044,539	119,141,011
Paddy-autumn	18,362	164,339,900	52,863,335	111,476,565
Groundnut	1,800	12,402,000	3,463,178	8,938,822
Soybeans	800	3,480,000	1,291,083	2,188,917
Maize	2,300	13,512,500	2,880,506	10,631,994
Potatoes	1,000	12,000,000	2,339,238	9,660,762
Sweet Potato	4,000	12,360,000	6,516,576	5,843,424
Vegetables	3,800	54,340,000	13,772,222	40,567,778
Others	1,283	9,237,600	3,188,973	6,048,627
Total	53,254	459,857,550	145,359,652	314,497,898

Table I-4.11 Benefits from Freshwater Fish Culture

Description			Economic Price (VND)
(1) Cost of fry:			
265,177 VND x 1 ha *1			265,177
(2) Labor cost:			
4 man-day x 2,344 VND			9,376
- Receiving fry: 1 day x 2 persons			
- Transplanting: 1 day x 2 persons			
(3) Production cost per ha: (VND/ha) *1			1,356,000
(4) Production value per ha:			
200 kg/ha x 5,500VND/kg			11,000,000
- Yield: 2000 kg/ha			
(5) Net production value per ha:			9,369,447
(6) Materials:			
3 fishing nets/ha x 200,000 VND			600,000
Depreciation 0.05			
(7) Benefits			8,769,450
		(ha)	(1000 VND)
Option 1(Tan Chi) :	Benefits	68	596,323
Option 2(Whole Area):	Benefits	105	920,792

Note: *1 Based on Aquaculture Development Programme in Bac Duong area, Research Institute for Aquaculture No. 1 (RIA No.1)

Table I-4.12 Benefits derived from Flood/Waterlogging Damages
(Economic)

Option 1 (Tan Chi Area)

(Unit:1000 VND)

Return Period(yr.)	1.04	5	10	25	50
Rate	0.043	0.246	0.302	0.357	0.4
Crop Damaged Area(ha) - Autumn Paddy	185	1,059	1,300	1,536	1,721
Production Costs up to the time damaged	199,171	1,140,120	1,399,581	1,653,659	1,852,830
Gross Value of Production	14,771,046	14,771,046	14,771,046	14,771,046	14,771,046
Production Costs	11,417,012	11,417,012	11,417,012	11,417,012	11,417,012
Crop Damages	3,553,205	4,494,154	4,753,615	5,007,693	5,206,864
Average Annual Flood/Waterlogging Damage:			4,802,118		

Option 2 (Whole Area)

(Unit:1000 VND)

Return Period(yr.)	1.04	5	10	25	50
Rate	0.098	0.271	0.317	0.367	0.404
Crop Damaged Area(ha) - Autumn Paddy	564	1,560	1,824	2,112	2,325
Production Costs up to the time damaged	607,203	1,679,493	1,963,720	2,273,781	2,503,097
Gross Value of Production	19,755,373	19,755,373	19,755,373	19,755,373	19,755,373
Production Costs	15,269,557	15,269,557	15,269,557	15,269,557	15,269,557
Crop Damages	5,093,019	6,165,309	6,449,536	6,759,597	6,988,913
Average Annual Flood/Waterlogging Damage:			6,499,573		

Table I-4.13 Incremental Benefits

Option 1(Tan Chi Area)

Unit: million VND

Year	Crop Benefits	Fishery Benefits	Other Benefits	Incremental Benefits
1	11,028	573	420	12,022
2	22,166	579	424	23,169
3	33,412	585	428	34,425
4	33,740	591	432	34,763
5	34,071	596	437	35,104
6	34,292	596	437	35,325
7	34,404	596	437	35,437

Option 2(Whole Area)

Unit: million VND

Year	Crop Benefits	Fishery Benefits	Other Benefits	Incremental Benefits
1	13,577	886	569	15,031
2	27,286	895	574	28,755
3	41,127	904	580	42,611
4	41,524	912	586	43,022
5	41,923	921	591	43,435
6	42,190	921	591	43,702
7	42,326	921	591	43,838

Table I-4.14 Project Cost

Option 1(Tan Chi Area)
- Pump of Vietnam Made — Unit: million VND

Description	F/C	L/C	Total
1. Construction Cost			
a. Pump Station	29,972	9,107	39,079
b. Drainage Canal	22,688	20,338	43,026
c. Irrigation Canal	3,542	15,364	18,906
d. Pond	2,573	286	2,859
2. Association Cost			
a. Construction Machines	13,745	2,062	15,807
b. Land Aquisition		660	660
c. Consulting Service	5,877	4,511	10,388
d. Project Administration	588	4,511	5,099
3. Physical Contingency	7,899	5,683	13,582
Total	86,884	62,522	149,406

Option 1(Tan Chi Area)
- Pump of Foreign Made — Unit: million VND

Description	F/C	L/C	Total
1. Construction Cost			
a. Pump Station	146,195	19,692	165,887
b. Drainage Canal	22,688	20,338	43,026
c. Irrigation Canal	3,542	15,364	18,906
d. Pond	2,573	286	2,859
2. Association Cost			
a. Construction Machines	13,745	2,062	15,807
b. Land Aquisition		660	660
c. Consulting Service	17,500	5,565	23,065
d. Project Administration	1,751	5,565	7,316
3. Physical Contingency	20,800	6,952	27,752
Total	228,794	76,484	305,278

Option 2(Whole Area)
- Pump of Vietnam Made — Unit: million VND

Description	F/C	L/C	Total
1. Construction Cost			
a. Pump Station	34,046	17,183	51,229
b. Drainage Canal	25,901	23,977	49,878
c. Irrigation Canal	3,564	15,426	18,990
d. Pond	2,573	2,573	5,146
e. Transmission Line	13,195	19,793	32,988
2. Association Cost			
a. Construction Machines	13,745	2,062	15,807
b. Land Aquisition		682	682
c. Consulting Service	7,927	7,897	15,824
d. Project Administration	792	7,897	8,689
3. Physical Contingency	10,171	9,750	19,921
Total	111,914	107,240	219,154

Option 2(Whole Area)
- Pump of Foreign Made — Unit: million VND

Description	F/C	L/C	Total
1. Construction Cost			
a. Pump Station	199,585	26,762	226,347
b. Drainage Canal	25,901	23,977	49,878
c. Irrigation Canal	3,564	15,426	18,990
d. Pond	2,573	2,573	5,146
e. Transmission Line	13,195	19,793	32,988
2. Association Cost			
a. Construction Machines	13,745	2,062	15,807
b. Land Aquisition		682	682
c. Consulting Service	24,481	8,852	33,333
d. Project Administration	2,449	8,852	11,301
3. Physical Contingency	28,550	10,896	39,446
Total	314,043	119,875	433,918

Table I-4.15 Operation and Maintenance Cost

Option 1(Tan Chi Area)

Unit: million VND

Description	Annual Cost (million VND)
1. Salary, wage and insurance	115
2. Electricity tariff	583
3. Repair and maintenance costs of structure	140
4. Repair and maintenance costs of electric equipment	128
5. Other costs	145
Total	1,111

Option 2(Whole Area)

Unit: million VND

Description	Annual Cost (million VND)
1. Salary, wage and insurance	205
2. Electricity tariff	806
3. Repair and maintenance costs of structure	140
4. Repair and maintenance costs of electric equipment	128
5. Other costs	145
Total	1,424

Table I-4.16 Disbursement Schedule of the Project Cost

Option 1(Tan Chi Area)
- of Vietnam made pump

Unit: million VND

Year	F/C	L/C	Total
1st year	3,556	1,417	4,973
2nd year	5,076	3,145	8,221
3rd year	52,892	17,678	70,570
4th year	8,052	8,828	16,880
5th year	4,871	14,321	19,192
6th year	5,801	11,307	17,109
7th year	6,636	5,825	12,461
Total	86,885	62,521	149,406

Option 1(Tan Chi Area)
- of foreign made pump

Unit: million VND

Year	F/C	L/C	Total
1st year	10,587	1,749	12,336
2nd year	21,375	4,641	26,017
3rd year	171,469	28,487	199,957
4th year	8,052	9,159	17,211
5th year	4,871	14,652	19,523
6th year	5,801	11,639	17,441
7th year	6,636	6,157	12,793
Total	228,793	76,485	305,278

Option 2(Whole Area)
- of Vietnam made pump

Unit: million VND

Year	F/C	L/C	Total
1st year	4,796	2,482	7,278
2nd year	6,142	5,123	11,265
3rd year	75,593	52,511	128,104
4th year	8,052	9,892	17,944
5th year	4,871	15,386	20,257
6th year	5,825	12,441	18,265
7th year	6,634	9,405	16,039
Total	111,914	107,240	219,154

Option 2(Whole Area)
- of foreign made pump

Unit: million VND

Year	F/C	L/C	Total
1st year	14,812	2,782	17,594
2nd year	29,360	6,476	35,836
3rd year	244,486	62,295	306,781
4th year	8,052	10,191	18,243
5th year	4,871	15,686	20,557
6th year	5,825	12,741	18,566
7th year	6,636	9,705	16,341
Total	314,042	119,875	433,918

Table I-4.17(1) Estimation of EIRR(of Vietnam made pump)
- Cropping Pattern Type B -

Option 1 (Tan Chi Area) Unit: million VND

No	Year	Project Cost				Incremental	Return
		Capital	O/M Cost	Replace.Cost	Total	Benefits	
1	1995	4,973			4,973		-4,973
2	1996	8,221			8,221		-8,221
3	1997	70,570	1,111		71,681	12,022	-59,659
4	1998	16,880	1,111		17,991	23,169	5,178
5	1999	19,192	1,111		20,303	34,425	14,122
6	2000	17,109	1,111		18,220	34,763	16,543
7	2001	12,461	1,111		13,572	35,104	21,532
8	2002		1,111		1,111	35,325	34,214
9	2003		1,111		1,111	35,437	34,326
10	2004		1,111		1,111	35,437	34,326
11	2005		1,111		1,111	35,437	34,326
12	2006		1,111		1,111	35,437	34,326
13	2007		1,111		1,111	35,437	34,326
14	2008		1,111		1,111	35,437	34,326
15	2009		1,111		1,111	35,437	34,326
16	2010		1,111		1,111	35,437	34,326
17	2011		1,111		1,111	35,437	34,326
18	2012		1,111	12,645	13,756	35,437	21,681
19	2013		1,111		1,111	35,437	34,326
20	2014		1,111		1,111	35,437	34,326
21	2015		1,111		1,111	35,437	34,326
22	2016		1,111		1,111	35,437	34,326
23	2017		1,111		1,111	35,437	34,326
24	2018		1,111		1,111	35,437	34,326
25	2019		1,111		1,111	35,437	34,326
26	2020		1,111		1,111	35,437	34,326
27	2021		1,111		1,111	35,437	34,326
28	2022		1,111		1,111	35,437	34,326
29	2023		1,111		1,111	35,437	34,326
30	2024		1,111		1,111	35,437	34,326
31	2025		1,111		1,111	35,437	34,326
32	2026		1,111		1,111	35,437	34,326
33	2027		1,111	29,311	30,422	35,437	5,015
34	2028		1,111		1,111	35,437	34,326
35	2029		1,111		1,111	35,437	34,326
36	2030		1,111		1,111	35,437	34,326
37	2031		1,111		1,111	35,437	34,326
38	2032		1,111		1,111	35,437	34,326
39	2033		1,111		1,111	35,437	34,326
40	2034		1,111		1,111	35,437	34,326
41	2035		1,111		1,111	35,437	34,326
42	2036		1,111		1,111	35,437	34,326
43	2037		1,111		1,111	35,437	34,326
44	2038		1,111		1,111	35,437	34,326
45	2039		1,111		1,111	35,437	34,326
46	2040		1,111		1,111	35,437	34,326
47	2041		1,111		1,111	35,437	34,326
48	2042		1,111	12,645	13,756	35,437	21,681
49	2043		1,111		1,111	35,437	34,326
50	2044		1,111		1,111	35,437	34,326
51	2045		1,111		1,111	35,437	34,326
52	2046		1,111		1,111	35,437	34,326
53	2047		1,111		1,111	35,437	34,326
54	2048		1,111		1,111	35,437	34,326
55	2049		1,111		1,111	35,437	34,326
	Total	149,406	58,883	54,601	262,890	1,840,346	1,577,456
						EIRR =	26.9%

Table I-4.17(2) Estimation of EIRR(of foreign made pump)
- Cropping Pattern Type B -

Option 1 (Tan Chi Area) Unit: million VND

No	Year	Project Cost				Incremental	Return
		Capital	O/M Cost	Replace. Cost	Total	Benefits	
1	1995	12,336			12,336		-12,336
2	1996	26,017			26,017		-26,017
3	1997	199,957	1,111		201,068	12,022	-189,046
4	1998	17,211	1,111		18,322	23,169	4,847
5	1999	19,523	1,111		20,634	34,425	13,791
6	2000	17,441	1,111		18,552	34,763	16,211
7	2001	12,793	1,111		13,904	35,104	21,200
8	2002		1,111		1,111	35,325	34,214
9	2003		1,111		1,111	35,437	34,326
10	2004		1,111		1,111	35,437	34,326
11	2005		1,111		1,111	35,437	34,326
12	2006		1,111		1,111	35,437	34,326
13	2007		1,111		1,111	35,437	34,326
14	2008		1,111		1,111	35,437	34,326
15	2009		1,111		1,111	35,437	34,326
16	2010		1,111		1,111	35,437	34,326
17	2011		1,111		1,111	35,437	34,326
18	2012		1,111	12,645	13,756	35,437	21,681
19	2013		1,111		1,111	35,437	34,326
20	2014		1,111		1,111	35,437	34,326
21	2015		1,111		1,111	35,437	34,326
22	2016		1,111		1,111	35,437	34,326
23	2017		1,111		1,111	35,437	34,326
24	2018		1,111		1,111	35,437	34,326
25	2019		1,111		1,111	35,437	34,326
26	2020		1,111		1,111	35,437	34,326
27	2021		1,111		1,111	35,437	34,326
28	2022		1,111		1,111	35,437	34,326
29	2023		1,111		1,111	35,437	34,326
30	2024		1,111		1,111	35,437	34,326
31	2025		1,111		1,111	35,437	34,326
32	2026		1,111		1,111	35,437	34,326
33	2027		1,111	154,752	155,863	35,437	-120,426
34	2028		1,111		1,111	35,437	34,326
35	2029		1,111		1,111	35,437	34,326
36	2030		1,111		1,111	35,437	34,326
37	2031		1,111		1,111	35,437	34,326
38	2032		1,111		1,111	35,437	34,326
39	2033		1,111		1,111	35,437	34,326
40	2034		1,111		1,111	35,437	34,326
41	2035		1,111		1,111	35,437	34,326
42	2036		1,111		1,111	35,437	34,326
43	2037		1,111		1,111	35,437	34,326
44	2038		1,111		1,111	35,437	34,326
45	2039		1,111		1,111	35,437	34,326
46	2040		1,111		1,111	35,437	34,326
47	2041		1,111		1,111	35,437	34,326
48	2042		1,111	12,645	13,756	35,437	21,681
49	2043		1,111		1,111	35,437	34,326
50	2044		1,111		1,111	35,437	34,326
51	2045		1,111		1,111	35,437	34,326
52	2046		1,111		1,111	35,437	34,326
53	2047		1,111		1,111	35,437	34,326
54	2048		1,111		1,111	35,437	34,326
55	2049		1,111		1,111	35,437	34,326
	Total	305,278	58,883	180,042	544,203	1,840,346	1,296,143
						EIRR =	11.1%

Table I-4.17(3) Estimation of EIRR(of Vietnam made pump)
- Cropping Pattern Type B -

Option 2 (Whole Area) Unit: million VND

No	Year	Project Cost				Incremental	Return
		Capital	O/M Cost	Replace.Cost	Total	Benefits	
1	1995	7,278			7,278		-7,278
2	1996	11,265			11,265		-11,265
3	1997	128,104	1,424		129,528	15,031	-114,497
4	1998	17,944	1,424		19,368	28,755	9,387
5	1999	20,257	1,424		21,681	42,611	20,930
6	2000	18,265	1,424		19,689	43,022	23,333
7	2001	16,041	1,424		17,465	43,435	25,970
8	2002		1,424		1,424	43,702	42,278
9	2003		1,424		1,424	43,838	42,414
10	2004		1,424		1,424	43,838	42,414
11	2005		1,424		1,424	43,838	42,414
12	2006		1,424		1,424	43,838	42,414
13	2007		1,424		1,424	43,838	42,414
14	2008		1,424		1,424	43,838	42,414
15	2009		1,424		1,424	43,838	42,414
16	2010		1,424		1,424	43,838	42,414
17	2011		1,424		1,424	43,838	42,414
18	2012		1,424	12,645	14,069	43,838	29,769
19	2013		1,424		1,424	43,838	42,414
20	2014		1,424		1,424	43,838	42,414
21	2015		1,424		1,424	43,838	42,414
22	2016		1,424		1,424	43,838	42,414
23	2017		1,424		1,424	43,838	42,414
24	2018		1,424		1,424	43,838	42,414
25	2019		1,424		1,424	43,838	42,414
26	2020		1,424		1,424	43,838	42,414
27	2021		1,424		1,424	43,838	42,414
28	2022		1,424		1,424	43,838	42,414
29	2023		1,424		1,424	43,838	42,414
30	2024		1,424		1,424	43,838	42,414
31	2025		1,424		1,424	43,838	42,414
32	2026		1,424		1,424	43,838	42,414
33	2027		1,424	31,517	32,941	43,838	10,897
34	2028		1,424		1,424	43,838	42,414
35	2029		1,424		1,424	43,838	42,414
36	2030		1,424		1,424	43,838	42,414
37	2031		1,424		1,424	43,838	42,414
38	2032		1,424		1,424	43,838	42,414
39	2033		1,424		1,424	43,838	42,414
40	2034		1,424		1,424	43,838	42,414
41	2035		1,424		1,424	43,838	42,414
42	2036		1,424		1,424	43,838	42,414
43	2037		1,424		1,424	43,838	42,414
44	2038		1,424		1,424	43,838	42,414
45	2039		1,424		1,424	43,838	42,414
46	2040		1,424		1,424	43,838	42,414
47	2041		1,424		1,424	43,838	42,414
48	2042		1,424	12,645	14,069	43,838	29,769
49	2043		1,424		1,424	43,838	42,414
50	2044		1,424		1,424	43,838	42,414
51	2045		1,424		1,424	43,838	42,414
52	2046		1,424		1,424	43,838	42,414
53	2047		1,424		1,424	43,838	42,414
54	2048		1,424		1,424	43,838	42,414
55	2049		1,424		1,424	43,838	42,414
	Total	219,154	75,472	56,807	351,433	2,276,942	1,925,509
						EIRR =	21.2%

Table I-4.17(4) Estimation of EIRR(of foreign made pump)
- Cropping Pattern Type B -

Option 2 (Whole Area) Unit: million VND

No	Year	Project Cost				Incremental Benefits	Return
		Capital	O/M Cost	Replace. Cost	Total		
1	1995	17,594			17,594		-17,594
2	1996	35,836			35,836		-35,836
3	1997	306,781	1,424		308,205	15,031	-293,174
4	1998	18,243	1,424		19,667	28,755	9,088
5	1999	20,557	1,424		21,981	42,611	20,630
6	2000	18,566	1,424		19,990	43,022	23,032
7	2001	16,341	1,424		17,765	43,435	25,670
8	2002		1,424		1,424	43,702	42,278
9	2003		1,424		1,424	43,838	42,414
10	2004		1,424		1,424	43,838	42,414
11	2005		1,424		1,424	43,838	42,414
12	2006		1,424		1,424	43,838	42,414
13	2007		1,424		1,424	43,838	42,414
14	2008		1,424		1,424	43,838	42,414
15	2009		1,424		1,424	43,838	42,414
16	2010		1,424		1,424	43,838	42,414
17	2011		1,424		1,424	43,838	42,414
18	2012		1,424	12,645	14,069	43,838	29,769
19	2013		1,424		1,424	43,838	42,414
20	2014		1,424		1,424	43,838	42,414
21	2015		1,424		1,424	43,838	42,414
22	2016		1,424		1,424	43,838	42,414
23	2017		1,424		1,424	43,838	42,414
24	2018		1,424		1,424	43,838	42,414
25	2019		1,424		1,424	43,838	42,414
26	2020		1,424		1,424	43,838	42,414
27	2021		1,424		1,424	43,838	42,414
28	2022		1,424		1,424	43,838	42,414
29	2023		1,424		1,424	43,838	42,414
30	2024		1,424		1,424	43,838	42,414
31	2025		1,424		1,424	43,838	42,414
32	2026		1,424		1,424	43,838	42,414
33	2027		1,424	202,545	203,969	43,838	-160,131
34	2028		1,424		1,424	43,838	42,414
35	2029		1,424		1,424	43,838	42,414
36	2030		1,424		1,424	43,838	42,414
37	2031		1,424		1,424	43,838	42,414
38	2032		1,424		1,424	43,838	42,414
39	2033		1,424		1,424	43,838	42,414
40	2034		1,424		1,424	43,838	42,414
41	2035		1,424		1,424	43,838	42,414
42	2036		1,424		1,424	43,838	42,414
43	2037		1,424		1,424	43,838	42,414
44	2038		1,424		1,424	43,838	42,414
45	2039		1,424		1,424	43,838	42,414
46	2040		1,424		1,424	43,838	42,414
47	2041		1,424		1,424	43,838	42,414
48	2042		1,424	12,645	14,069	43,838	29,769
49	2043		1,424		1,424	43,838	42,414
50	2044		1,424		1,424	43,838	42,414
51	2045		1,424		1,424	43,838	42,414
52	2046		1,424		1,424	43,838	42,414
53	2047		1,424		1,424	43,838	42,414
54	2048		1,424		1,424	43,838	42,414
55	2049		1,424		1,424	43,838	42,414
	Total	433,918	75,472	227,835	737,225	2,276,942	1,539,717
						EIRR =	9.4%

Table I-4.17(5) Estimation of EIRR(of Vietnam made pump)
- Cropping Pattern Type A -

Option 1 (Tan Chi Area) Unit: million VND

No	Year	Project Cost				Incremental	Return
		Capital	O/M Cost	Replace. Cost	Total	Benefits	
1	1995	4,973			4,973		-4,973
2	1996	8,221			8,221		-8,221
3	1997	70,570	1,111		71,681	11,058	-60,623
4	1998	16,880	1,111		17,991	21,805	3,814
5	1999	19,192	1,111		20,303	32,658	12,355
6	2000	17,109	1,111		18,220	32,978	14,758
7	2001	12,461	1,111		13,572	33,300	19,728
8	2002		1,111		1,111	33,513	32,402
9	2003		1,111		1,111	33,623	32,512
10	2004		1,111		1,111	33,623	32,512
11	2005		1,111		1,111	33,623	32,512
12	2006		1,111		1,111	33,623	32,512
13	2007		1,111		1,111	33,623	32,512
14	2008		1,111		1,111	33,623	32,512
15	2009		1,111		1,111	33,623	32,512
16	2010		1,111		1,111	33,623	32,512
17	2011		1,111		1,111	33,623	32,512
18	2012		1,111	12,645	13,756	33,623	19,867
19	2013		1,111		1,111	33,623	32,512
20	2014		1,111		1,111	33,623	32,512
21	2015		1,111		1,111	33,623	32,512
22	2016		1,111		1,111	33,623	32,512
23	2017		1,111		1,111	33,623	32,512
24	2018		1,111		1,111	33,623	32,512
25	2019		1,111		1,111	33,623	32,512
26	2020		1,111		1,111	33,623	32,512
27	2021		1,111		1,111	33,623	32,512
28	2022		1,111		1,111	33,623	32,512
29	2023		1,111		1,111	33,623	32,512
30	2024		1,111		1,111	33,623	32,512
31	2025		1,111		1,111	33,623	32,512
32	2026		1,111		1,111	33,623	32,512
33	2027		1,111	29,311	30,422	33,623	3,201
34	2028		1,111		1,111	33,623	32,512
35	2029		1,111		1,111	33,623	32,512
36	2030		1,111		1,111	33,623	32,512
37	2031		1,111		1,111	33,623	32,512
38	2032		1,111		1,111	33,623	32,512
39	2033		1,111		1,111	33,623	32,512
40	2034		1,111		1,111	33,623	32,512
41	2035		1,111		1,111	33,623	32,512
42	2036		1,111		1,111	33,623	32,512
43	2037		1,111		1,111	33,623	32,512
44	2038		1,111		1,111	33,623	32,512
45	2039		1,111		1,111	33,623	32,512
46	2040		1,111		1,111	33,623	32,512
47	2041		1,111		1,111	33,623	32,512
48	2042		1,111	12,645	13,756	33,623	19,867
49	2043		1,111		1,111	33,623	32,512
50	2044		1,111		1,111	33,623	32,512
51	2045		1,111		1,111	33,623	32,512
52	2046		1,111		1,111	33,623	32,512
53	2047		1,111		1,111	33,623	32,512
54	2048		1,111		1,111	33,623	32,512
55	2049		1,111		1,111	33,623	32,512
	Total	149,406	58,883	54,601	262,890	1,745,593	1,482,703
						EIRR =	25.1%

Table I-4.17(6) Estimation of EIRR(of foreign made pump)
- Cropping Pattern Type A -

Option 1 (Tan Chi Area) Unit: million VND

No	Year	Project Cost				Incremental	Return
		Capital	O/M Cost	Replace.Cost	Total	Benefits	
1	1995	12,336			12,336		-12,336
2	1996	26,017			26,017		-26,017
3	1997	199,957	1,111		201,068	11,058	-190,010
4	1998	17,211	1,111		18,322	21,805	3,483
5	1999	19,523	1,111		20,634	32,658	12,024
6	2000	17,441	1,111		18,552	32,978	14,426
7	2001	12,793	1,111		13,904	33,300	19,396
8	2002		1,111		1,111	33,513	32,402
9	2003		1,111		1,111	33,623	32,512
10	2004		1,111		1,111	33,623	32,512
11	2005		1,111		1,111	33,623	32,512
12	2006		1,111		1,111	33,623	32,512
13	2007		1,111		1,111	33,623	32,512
14	2008		1,111		1,111	33,623	32,512
15	2009		1,111		1,111	33,623	32,512
16	2010		1,111		1,111	33,623	32,512
17	2011		1,111		1,111	33,623	32,512
18	2012		1,111	12,645	13,756	33,623	19,867
19	2013		1,111		1,111	33,623	32,512
20	2014		1,111		1,111	33,623	32,512
21	2015		1,111		1,111	33,623	32,512
22	2016		1,111		1,111	33,623	32,512
23	2017		1,111		1,111	33,623	32,512
24	2018		1,111		1,111	33,623	32,512
25	2019		1,111		1,111	33,623	32,512
26	2020		1,111		1,111	33,623	32,512
27	2021		1,111		1,111	33,623	32,512
28	2022		1,111		1,111	33,623	32,512
29	2023		1,111		1,111	33,623	32,512
30	2024		1,111		1,111	33,623	32,512
31	2025		1,111		1,111	33,623	32,512
32	2026		1,111		1,111	33,623	32,512
33	2027		1,111	154,752	155,863	33,623	-122,240
34	2028		1,111		1,111	33,623	32,512
35	2029		1,111		1,111	33,623	32,512
36	2030		1,111		1,111	33,623	32,512
37	2031		1,111		1,111	33,623	32,512
38	2032		1,111		1,111	33,623	32,512
39	2033		1,111		1,111	33,623	32,512
40	2034		1,111		1,111	33,623	32,512
41	2035		1,111		1,111	33,623	32,512
42	2036		1,111		1,111	33,623	32,512
43	2037		1,111		1,111	33,623	32,512
44	2038		1,111		1,111	33,623	32,512
45	2039		1,111		1,111	33,623	32,512
46	2040		1,111		1,111	33,623	32,512
47	2041		1,111		1,111	33,623	32,512
48	2042		1,111	12,645	13,756	33,623	19,867
49	2043		1,111		1,111	33,623	32,512
50	2044		1,111		1,111	33,623	32,512
51	2045		1,111		1,111	33,623	32,512
52	2046		1,111		1,111	33,623	32,512
53	2047		1,111		1,111	33,623	32,512
54	2048		1,111		1,111	33,623	32,512
55	2049		1,111		1,111	33,623	32,512
	Total	305,278	58,883	180,042	544,203	1,745,593	1,201,390
						EIRR =	10.4%

Table I-4.17(7) Estimation of EIRR(of Vietnam made pump)
- Cropping Pattern Type A -

Option 2 (Whole Area) Unit: million VND

No	Year	Project Cost				Incremental	Return
		Capital	O/M Cost	Replace.Cost	Total	Benefits	
1	1995	7,278			7,278		-7,278
2	1996	11,265			11,265		-11,265
3	1997	128,104	1,424		129,528	14,017	-115,511
4	1998	17,944	1,424		19,368	27,602	8,234
5	1999	20,257	1,424		21,681	41,318	19,637
6	2000	18,265	1,424		19,689	41,718	22,029
7	2001	16,039	1,424		17,463	42,119	24,656
8	2002		1,424		1,424	42,384	40,960
9	2003		1,424		1,424	42,517	41,093
10	2004		1,424		1,424	42,517	41,093
11	2005		1,424		1,424	42,517	41,093
12	2006		1,424		1,424	42,517	41,093
13	2007		1,424		1,424	42,517	41,093
14	2008		1,424		1,424	42,517	41,093
15	2009		1,424		1,424	42,517	41,093
16	2010		1,424		1,424	42,517	41,093
17	2011		1,424		1,424	42,517	41,093
18	2012		1,424	12,645	14,069	42,517	28,448
19	2013		1,424		1,424	42,517	41,093
20	2014		1,424		1,424	42,517	41,093
21	2015		1,424		1,424	42,517	41,093
22	2016		1,424		1,424	42,517	41,093
23	2017		1,424		1,424	42,517	41,093
24	2018		1,424		1,424	42,517	41,093
25	2019		1,424		1,424	42,517	41,093
26	2020		1,424		1,424	42,517	41,093
27	2021		1,424		1,424	42,517	41,093
28	2022		1,424		1,424	42,517	41,093
29	2023		1,424		1,424	42,517	41,093
30	2024		1,424		1,424	42,517	41,093
31	2025		1,424		1,424	42,517	41,093
32	2026		1,424		1,424	42,517	41,093
33	2027		1,424	31,517	32,941	42,517	9,576
34	2028		1,424		1,424	42,517	41,093
35	2029		1,424		1,424	42,517	41,093
36	2030		1,424		1,424	42,517	41,093
37	2031		1,424		1,424	42,517	41,093
38	2032		1,424		1,424	42,517	41,093
39	2033		1,424		1,424	42,517	41,093
40	2034		1,424		1,424	42,517	41,093
41	2035		1,424		1,424	42,517	41,093
42	2036		1,424		1,424	42,517	41,093
43	2037		1,424		1,424	42,517	41,093
44	2038		1,424		1,424	42,517	41,093
45	2039		1,424		1,424	42,517	41,093
46	2040		1,424		1,424	42,517	41,093
47	2041		1,424		1,424	42,517	41,093
48	2042		1,424	12,645	14,069	42,517	28,448
49	2043		1,424		1,424	42,517	41,093
50	2044		1,424		1,424	42,517	41,093
51	2045		1,424		1,424	42,517	41,093
52	2046		1,424		1,424	42,517	41,093
53	2047		1,424		1,424	42,517	41,093
54	2048		1,424		1,424	42,517	41,093
55	2049		1,424		1,424	42,517	41,093
	Total	219,152	75,472	56,807	351,431	2,207,457	1,856,026

EIRR = 20.4%

Table I-4.17(8) Estimation of EIRR(of foreign made pump)
- Cropping Pattern Type A -

Option 2 (Whole Area) Unit: million VND

No	Year	Project Cost				Incremental Benefits	Return
		Capital	O/M Cost	Replace. Cost	Total		
1	1995	17,594			17,594		-17,594
2	1996	35,836			35,836		-35,836
3	1997	306,781	1,424		308,205	14,017	-294,188
4	1998	18,243	1,424		19,667	27,602	7,935
5	1999	20,257	1,424		21,681	41,318	19,637
6	2000	18,265	1,424		19,689	41,718	22,029
7	2001	16,039	1,424		17,463	42,119	24,656
8	2002		1,424		1,424	42,384	40,960
9	2003		1,424		1,424	42,517	41,093
10	2004		1,424		1,424	42,517	41,093
11	2005		1,424		1,424	42,517	41,093
12	2006		1,424		1,424	42,517	41,093
13	2007		1,424		1,424	42,517	41,093
14	2008		1,424		1,424	42,517	41,093
15	2009		1,424		1,424	42,517	41,093
16	2010		1,424		1,424	42,517	41,093
17	2011		1,424		1,424	42,517	41,093
18	2012		1,424	12,645	14,069	42,517	28,448
19	2013		1,424		1,424	42,517	41,093
20	2014		1,424		1,424	42,517	41,093
21	2015		1,424		1,424	42,517	41,093
22	2016		1,424		1,424	42,517	41,093
23	2017		1,424		1,424	42,517	41,093
24	2018		1,424		1,424	42,517	41,093
25	2019		1,424		1,424	42,517	41,093
26	2020		1,424		1,424	42,517	41,093
27	2021		1,424		1,424	42,517	41,093
28	2022		1,424		1,424	42,517	41,093
29	2023		1,424		1,424	42,517	41,093
30	2024		1,424		1,424	42,517	41,093
31	2025		1,424		1,424	42,517	41,093
32	2026		1,424		1,424	42,517	41,093
33	2027		1,424	202,545	203,969	42,517	-161,452
34	2028		1,424		1,424	42,517	41,093
35	2029		1,424		1,424	42,517	41,093
36	2030		1,424		1,424	42,517	41,093
37	2031		1,424		1,424	42,517	41,093
38	2032		1,424		1,424	42,517	41,093
39	2033		1,424		1,424	42,517	41,093
40	2034		1,424		1,424	42,517	41,093
41	2035		1,424		1,424	42,517	41,093
42	2036		1,424		1,424	42,517	41,093
43	2037		1,424		1,424	42,517	41,093
44	2038		1,424		1,424	42,517	41,093
45	2039		1,424		1,424	42,517	41,093
46	2040		1,424		1,424	42,517	41,093
47	2041		1,424		1,424	42,517	41,093
48	2042		1,424	12,645	14,069	42,517	28,448
49	2043		1,424		1,424	42,517	41,093
50	2044		1,424		1,424	42,517	41,093
51	2045		1,424		1,424	42,517	41,093
52	2046		1,424		1,424	42,517	41,093
53	2047		1,424		1,424	42,517	41,093
54	2048		1,424		1,424	42,517	41,093
55	2049		1,424		1,424	42,517	41,093
	Total	433,015	75,472	227,835	736,322	2,207,457	1,471,135
						EIRR =	9.1%

Table I-4.18 Benefits from Animal Husbandry

Description			Financial Price (VND)
(1) Purchasing cost of piglet:			
1 head x 10 kg x 10,000 VND			100,000
(2) Labor cost per head:			
2 man-day x 10,000 VND			20,000
(3) Raising cost per head:			
Feedstuff and others			43,600
(4) Raising value per head:			
70 kg/head x 6,500 VND			455,000
Yield - 70 kg			
(5) Net raising value:			306,712
(6) Materials:			
Depreciation of pigsty			500
(7) Benefits per head:			306,200
		(head)	(1000 VND)
Option 1:	Without Project	31,800	9,737,160
	With Project	41,340	12,658,308
	Incremental Benefits	9,540	2,921,148
Option 2:	Without Project	38,300	11,727,460
	With Project	49,790	15,245,698
	Incremental Benefits	11,490	3,518,238

Table I-4.19 Estimation of Profit and Loss Statement of Typical Farmers

Unit: 1,000 VND

Description	Small-Scale		Medium-Scale		Large-Scale	
	Without	With	Without	With	Without	With
Cultivated Area (ha)	0.3144	0.3169	0.5650	0.6760	0.9700	1.2270
Income						
Farm Income	1,510.4	2,391.6	2,844.9	5,186.0	5,059.2	9,341.0
Animal Husbandry Income	455.0	1,365.0	1,820.0	3,185.0	1,046.5	3,185.0
Off-Farm Income	842.0	0.0	427.0	0.0	342.0	0.0
Gross Family Income	2,807.4	3,756.6	5,091.9	8,371.0	6,447.7	12,526.0
Expenditure						
Production Costs *1	413.7	923.7	796.6	1,970.2	1,294.2	2,933.1
Living Expenses *2	2,141.5	2,216.8	3,649.9	3,878.3	3,888.9	4,367.7
Tax and Insurance	20.7	43.5	43.5	89.7	81.3	161.7
Coop. Fee	2.4	2.4	2.4	2.4	2.4	2.4
Water Charge	14.2	14.2	29.5	29.5	29.5	29.5
Total Expenditure	2,592.5	3,200.6	4,521.9	5,970.1	5,296.3	7,494.4
Return (Profit)	214.9	556.0	570.0	2,400.9	1,151.4	5,031.6

Note: - Farmland holding
Small-scale : 0.13 ha
Medium-scale: 0.27 ha
Large-scale : 0.51 ha
*1 Including animal husbandry cost
*2 Including home consumption

Table I-4.20(1) Estimation of Cash Flow of Typical Farmer

Small-Scale

Unit: 1,000 VND

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Initial Fund	0	-97	100	591	1,082	1,573	2,064	2,555	3,046	3,537
Farm Credit (Short)	270	270	270	270	270	270	270	270	270	270
Sub-total (A)	270	270	270	270	270	270	270	270	270	270
Required Fund (Stage I)										
Production Cost *2	420	420	420	420	420	420	420	420	420	420
Living Expenses *3	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108
Sub-total (B)	1,528	1,528	1,528	1,528	1,528	1,528	1,528	1,528	1,528	1,528
Farm Income *1	1,677	1,781	1,885	1,885	1,885	1,885	1,885	1,885	1,885	1,885
Sub-total (C)	1,677	1,781	1,885	1,885	1,885	1,885	1,885	1,885	1,885	1,885
Interest (Short) *4	29	29	29	29	29	29	29	29	29	29
Repayment (Short)	270	270	270	270	270	270	270	270	270	270
Sub-total (D)	299	299	299	299	299	299	299	299	299	299
Balanced Carried Forward	120	127	428	919	1,410	1,901	2,392	2,883	3,374	3,865
Farm Credit (Short)	353	353	353	353	353	353	353	353	353	353
Sub-total (E)	353	353	353	353	353	353	353	353	353	353
Required Fund (Stage II)										
Production Cost *2	503	503	503	503	503	503	503	503	503	503
Living Expenses *3	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108	1,108
Sub-total (F)	1,611	1,611	1,611	1,611	1,611	1,611	1,611	1,611	1,611	1,611
Farm Income *1	1,492	1,682	1,872	1,872	1,872	1,872	1,872	1,872	1,872	1,872
Sub-total (G)	1,492	1,682	1,872	1,872	1,872	1,872	1,872	1,872	1,872	1,872
Term-end Fund										
Water Charge	14	14	14	14	14	14	14	14	14	14
Coop. Fee	2	2	2	2	2	2	2	2	2	2
Tax and Insurance	44	44	44	44	44	44	44	44	44	44
Interest (Short) *4	38	38	38	38	38	38	38	38	38	38
Repayment (Short)	353	353	353	353	353	353	353	353	353	353
Sub-total (H)	451	451	451	451	451	451	451	451	451	451
Balanced Carried Forward	-97	100	591	1,082	1,573	2,064	2,555	3,046	3,537	4,028

Note: Stage I .... Wet Season
State II ... Dry Season

*1 Including animal husbandry income
*2 Including animal husbandry cost
*3 Including home consumption
*4 Interest rate : 1.8% monthly

Table I-4.20(2) Estimation of Cash Flow of Typical Farmer

Medium-Scale

Unit: 1,000 VND

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Initial Fund	0	586	1,953	4,100	6,247	8,394	10,541	12,688	14,835	16,982
Farm Credit (Short)	541	541	541	541	541	541	541	541	541	541
Sub-total (A)	541	541	541	541	541	541	541	541	541	541
Required Fund (Stage I)										
Production Cost *2	941	941	941	941	941	941	941	941	941	941
Living Expenses *3	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940
Sub-total (B)	2,881	2,881	2,881	2,881	2,881	2,881	2,881	2,881	2,881	2,881
Farm Income *1	3,354	3,562	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770
Sub-total (C)	3,354	3,562	3,770	3,770	3,770	3,770	3,770	3,770	3,770	3,770
Interest (Short) *4	141	141	141	141	141	141	141	141	141	141
Repayment (Short)	541	541	541	541	541	541	541	541	541	541
Sub-total (D)	682	682	682	682	682	682	682	682	682	682
Balanced Carried Forward	332	1,126	2,701	4,848	6,995	9,142	11,289	13,436	15,583	17,730
Farm Credit (Short)	730	730	730	730	730	730	730	730	730	730
Sub-total (E)	730	730	730	730	730	730	730	730	730	730
Required Fund (Stage II)										
Production Cost *2	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030	1,030
Living Expenses *3	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940	1,940
Sub-total (F)	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970	2,970
Farm Income *1	3,456	4,029	4,601	4,601	4,601	4,601	4,601	4,601	4,601	4,601
Sub-total (G)	3,456	4,029	4,601	4,601	4,601	4,601	4,601	4,601	4,601	4,601
Term-end Fund										
Water Charge	30	30	30	30	30	30	30	30	30	30
Coop. Fee	2	2	2	2	2	2	2	2	2	2
Tax and Insurance	90	90	90	90	90	90	90	90	90	90
Interest (Short) *4	110	110	110	110	110	110	110	110	110	110
Repayment (Short)	730	730	730	730	730	730	730	730	730	730
Sub-total (H)	962	962	962	962	962	962	962	962	962	962
Balanced Carried Forward	586	1,953	4,100	6,247	8,394	10,541	12,688	14,835	16,982	19,129

Note: Stage I .... Wet Season
State II ... Dry Season

*1 Including animal husbandry income
*2 Including animal husbandry cost
*3 Including home consumption
*4 Interest rate : 2.5% monthly

Table I-4.20(3) Estimation of Cash Flow of Typical Farmer

Large-Scale

Unit: 1,000 VND

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Initial Fund	0	1,858	5,144	9,857	14,570	19,283	23,996	28,709	33,422	38,135
Farm Credit (Short)	873	873	873	873	873	873	873	873	873	873
Sub-total (A)	873	873	873	873	873	873	873	873	873	873
Required Fund (Stage I)										
Production Cost *2	1,273	1,273	1,273	1,273	1,273	1,273	1,273	1,273	1,273	1,273
Living Expenses *3	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184
Sub-total (B)	3,457	3,457	3,457	3,457	3,457	3,457	3,457	3,457	3,457	3,457
Farm Income *1	4,298	4,634	4,970	4,970	4,970	4,970	4,970	4,970	4,970	4,970
Sub-total (C)	4,298	4,634	4,970	4,970	4,970	4,970	4,970	4,970	4,970	4,970
Interest (Short) *4	114	114	114	114	114	114	114	114	114	114
Repayment (Short)	873	873	873	873	873	873	873	873	873	873
Sub-total (D)	987	987	987	987	987	987	987	987	987	987
Balanced Carried Forward	727	2,921	6,543	11,256	15,969	20,682	25,395	30,108	34,821	39,534
Farm Credit (Short)	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360
Sub-total (E)	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360
Required Fund (Stage II)										
Production Cost *2	1,660	1,660	1,660	1,660	1,660	1,660	1,660	1,660	1,660	1,660
Living Expenses *3	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184	2,184
Sub-total (F)	3,844	3,844	3,844	3,844	3,844	3,844	3,844	3,844	3,844	3,844
Farm Income *1	5,373	6,465	7,556	7,556	7,556	7,556	7,556	7,556	7,556	7,556
Sub-total (G)	5,373	6,465	7,556	7,556	7,556	7,556	7,556	7,556	7,556	7,556
Term-end Fund										
Water Charge	30	30	30	30	30	30	30	30	30	30
Coop. Fee	2	2	2	2	2	2	2	2	2	2
Tax and Insurance	162	162	162	162	162	162	162	162	162	162
Interest (Short) *4	204	204	204	204	204	204	204	204	204	204
Repayment (Short)	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360	1,360
Sub-total (H)	1,758	1,758	1,758	1,758	1,758	1,758	1,758	1,758	1,758	1,758
Balanced Carried Forward	1,858	5,144	9,857	14,570	19,283	23,996	28,709	33,422	38,135	42,848

Note: Stage I .... Wet Season
State II ... Dry Season

*1 Including animal husbandry income
*2 Including animal husbandry cost
*3 Including home consumption
*4 Interest rate : 2.5% monthly