Table IX-9 Direct Construction Costs of Irrigation & Drainage Facilities
(2,700 ha)

(Unit: US$ 1,000)

Works	Originally-planned Area	Extension Area	Total
1. Preparatory work	233	210	443
2. Major canals including concrete lining and farm roads			
- Headreach	5,600	-	5,600
- Main canals	970	767	1,737
- Secondary canals	942	167	1,109
Sub-total (2)	(7,512)	(934)	(8,446)
3. Major drains			
- Main drains	271	-	271
- Secondary drains	704	288	992
Sub-total (3)	(975)	(288)	(1,263)
4. Pump stations			
- Main pump station	2,118	1,516	3,634
- Booster pump stations	-	1,366	1,366
- Reguration pond	160	-	160
Sub-total (4)	(2,278)	(2,882)	(5,160)
5. On-farm development			
- Tertiary canals	1,974	1,274	3,248
- Tertiary drains	224	152	376
- Field canals	1,385	764	2,149
- Field drains	98	58	156
- Land clearing & levelling for forest land (880 ha)	303	916	1,219
Sub-total (5)	(3,984)	(3,164)	(7,148)
Total	14,982	7,478	22,460

Table IX-10 Direct Construction Costs of Irrigation & Drainage Facilities
(Originally-planned Area: 1,700 ha)

(Unit: US$ 1,000)

Works	Foreign Currency	Local Currency	Total
1. Preparatory work	126	107	233
2. Major canals including concrete lining and farm roads			
- Headreach	3,876	535	4,411
- Headreach structures	805	149	954
- Headreach gates	234	1	235
- Main canals	399	12	411
- Main canal structures	263	93	356
- Main canal gates	202	1	203
- Secondary canals	543	17	560
- Secondary canal structures	228	56	284
- Secondary canal gates	97	1	98
Sub-total (2)	(6,647)	(865)	(7,512)
3. Major drains			
- Main drains	148	4	152
- Main drain structures	96	23	119
- Secondary drains	324	8	332
- Secondary drain structures	305	67	372
Sub-total (3)	(873)	(102)	(975)
4. Pump stations			
- Main pump station	2,084	34	2,118
- Reguration pond	147	13	160
Sub-total (4)	(2,231)	(47)	(2,278)
5. On-farm development			
- Tertiary canals	612	12	624
- Tertiary canal structures	1,150	200	1,350
- Tertiary drains	97	2	99
- Tertiary drain structures	102	23	125
- Field canals	837	17	854
- Field canal structures	428	103	531
- Field drains	96	2	98
- Land clearing & levelling for forest land (170 ha)	296	7	303
Sub-total (5)	(3,618)	(366)	(3,984)
Total	13,495	1,487	14,982

Table IX-11 Direct Construction Costs of Irrigation & Drainage Facilities
(Extension Area: 1,000 ha)

(Unit: US$ 1,000)

Works	Foreign Currency	Local Currency	Total
1. Preparatory work	114	96	210
2. Major canals including concrete lining and farm roads			
- Main canals	398	12	410
- Main canal structures	107	28	135
- Main canal gates	220	2	222
- Secondary canals	93	3	96
- Secondary canal structures	18	7	25
- Secondary canal gates	45	1	46
Sub-total (2)	(881)	(53)	(934)
3. Major drains			
- Secondary drains	161	4	165
- Secondary drain structures	96	27	123
Sub-total (3)	(257)	(31)	(288)
4. Pump stations			
- Main pump station	1,497	19	1,516
- Booster pump stations	1,346	20	1,366
Sub-total (4)	(2,843)	(39)	(2,882)
5. On-farm development			
- Tertiary canals	430	8	438
- Tertiary canal structures	716	120	836
- Tertiary drains	84	2	86
- Tertiary drain structures	54	12	66
- Field canals	440	9	449
- Field canal structures	254	61	315
- Field drains	57	1	58
- Land clearing & levelling for forest land (710 ha)	895	21	916
Sub-total (5)	(2,930)	(234)	(3,164)
Total	7,025	453	7,478

Table IX-12 Direct Construction Costs of Rural Infrastructures

(Unit: US$ 1,000)

Works	Foreign Currency	Local Currency	Total
1. Rehabilitation of village road			
- Earth work	34	1	35
- Concrete work	10	1	11
- Concrete pipe work	35	2	37
- Miscellaneous work	8	1	9
Sub-total (1)	(87)	(5)	(92)
2. Extension work of existing water supply pipe line			
- PVC pipe work	35	1	36
- Valves	0.1	0.1	0.2
- Communal taps and washing place	4	1	5
- Miscellaneous work	3.9	0.9	4.8
Sub-total (2)	(43)	(3)	(46)
3. Drilling tubewells and construction of distribution pipe line			
- Drilling tubewell	16	2	18
- Pumps and motors	57	0.4	57.4
- Electrical work	25	0.2	25.2
- Regulation tank	8	3	11
- Elevated tank	25	3	28
- PVC pipe work	56	1	57
- Valves	0.2	0.1	0.3
- Communal taps and washing place	3	0.4	3.4
- Miscellaneous work	18.8	0.9	19.7
Sub-total (3)	(209)	(11)	(220)
Total	339	19	358

Table IX-13 Staffing for the Project Office

Construction Stage

Staffs	Required Number	Yearly Salary (US$)	
		Unit Rate /1	Amount
- Director	1	140	1,680
- Chief	5	130	7,800
- Engineer/officer	26	110	34,320
- Technician	24	90	25,920
- Administrative staff	8	65	6,240
Total	64		75,960

O & M Stage

Staffs	Required Number	Yearly Salary (US$)	
		Unit Rate /1	Amount
- Director	1	140	1,680
- Chief	4	130	6,240
- Engineer/officer	12	110	15,840
- Technician	29	90	31,320
- Administrative staff	8	65	6,240
Total	54		61,320

/1: Staff Appraisal Report by the World Bank, August, 1987

Table IX-14 Administration Expenses
(Construction Stage)

	Items	Quantity	Unit Price (US$)	Amount (US$)
1.	Staff Salary	1 year	75,960	75,960
2.	Labor Wage	300 M/M	54	16,200
3.	Office Expenses	12 Months	700	8,400
4.	Fuel	12 Months	500	6,000
5.	Equipment	L.S.	-	5,000
6.	Miscellaneous	L.S.	-	2,440
	Total			114,000

Table IX-15 Equipment for Operation and Maintenance

Equipment	Required Unit	Cost (US$)
1. Bulldozer, swamp type 10 t	1	76,400
2. Backhoe, 0.1 m^3	1	32,400
3. Wheel loader, 1.7 m^3	1	97,200
4. Dump truck, 6 t	2	98,100
5. Truck with crane, 6 t	1	41,600
6. Pick-up truck double cabine, 4 wheel-drive	3	31,600
7. Motor grader, 9 t	1	75,800
8. Plate compactor, 100 kg	2	2,700
9. Concrete mixer, 0.2 m^3	2	14,300
10. Submersible pump of 50 m	2	2,000
11. Diesel generator, 10 kVA	2	29,900
12. Motor cycle	6	6,500
13. Spareparts (20 %)		101,500
Total		610,000

Table IX-16 Cost of Farm Tractors

(Unit: US$)

Items	Nos.	Unit Price	Cost
1. Farm tractor (Four-wheel, 30 PS)	3	19,500	58,500
2. Attachment			
- Rotary tiller	3	2,900	8,700
- Disk harrow	3	3,000	9,000
- Disk plow	3	2,300	6,900
3. Spareparts (10 % of the above)	L.S.	-	7,900
Total			91,000

Table IX-17 Cost Estimate of Engineering Services
(1988 Price Level)

Items		Q'ty	Amount (US$)
1.	Detailed design stage		535,000
	1) Remuneration /1	25 M/M	400,000
	2) Perdiem /2	25 M/M	75,000
	3) Air fare /3	6 trips	15,000
	4) Documentation & other related costs		45,000
2.	Construction stage		1,244,000
	1) Remuneration /1	60 M/M	960,000
	2) Perdiem /2	60 M/M	180,000
	3) Air fare /3	10 trips	24,000
	4) Documentation & other related costs		80,000
	Total		1,779,000

/1 : US$ 16,000 per M/M on average
/2 : US$ 3,000 per M/M
/3 : US$ 2,372 per trip

Table IX-18 Price List of Basic Materials and Labor Wages

Items		Unit	Price in US$
I.	Materials		
1.	Gravel	m^3	5.0
2.	Sand	m^3	4.0
3.	Ordinary portland cement	ton	80.0
4.	Timber for form	m^3	144.0
II.	Fuel		
1.	Gasoline	lit	0.25
2.	Lubricating oil	lit	0.98
3.	Diesel engine oil	lit	0.26
4.	Grease	kg	2.00
III.	Labor		
1.	Common labor	Man-day	1.8
2.	Skilled labor	Man-day	2.1
3.	Concrete worker	Man-day	2.4
4.	Carpenter	Man-day	2.4
5.	Welder	Man-day	2.6
6.	Heavy equipment operator	Man-day	2.8
7.	Light equipment operator	Man-day	2.6
8.	Plasterer	Man-day	2.4

Table IX-19 Unit Prices for Major Work Items

(Unit: US$)

Work Items	Unit	Foreign Currency	Local Currency	Total
1. Stripping	m^3	0.81	0.01	0.82
2. Excavation				
- Excavation	m^3	1.22	0.04	1.26
- Excavation including disposal	m^3	1.58	0.04	1.62
3. Embankment				
- With excavated materials (L=30 m)	m^3	1.91	0.04	1.95
- Including excavation in borrow pit (L=30 m)	m^3	2.04	0.04	2.08
- Including excavation in borrow pit (L=2 km)	m^3	4.66	0.19	4.85
4. Backfill	m^3	1.02	0.15	1.17
5. Sod facing	m^2	1.41	0.04	1.45
6. Laterite pavement	m^3	4.58	0.12	4.70
7. Land clearing	ha	889.76	22.62	912.38
8. Land levelling				
- Rough levelling	m^3	2.10	0.05	2.15
- Final levelling	ha	434.51	36.52	471.03
9. Concrete				
- Concrete lining	m^2	17.90	4.90	22.80
- Concrete (1:2:4)	m^3	88.19	15.20	103.39
- Concrete (1:3:6)	m^3	73.84	12.00	85.84
10. Form	m^2	0.70	6.00	6.70
11. Reinforcement bar	ton	471.10	39.90	511.00
12. Concrete pipe				
- Dia. 300 mm	m	41.50	3.45	44.95
- Dia. 400 mm	m	58.03	3.54	61.57
- Dia. 600 mm	m	98.57	6.40	104.97
- Dia. 800 mm	m	139.79	8.55	148.34
- Dia. 1,000 mm	m	175.90	11.00	186.90
- Dia. 1,300 mm	m	255.28	16.30	271.58
- Dia. 1,500 mm	m	338.79	22.32	361.11
13. Slide gate				
- 500 mm x 500 mm	set	71.40	17.09	88.49
- 800 mm x 800 mm	set	7,094.70	20.76	7,115.46
- 1,100 mm x 1,100 mm	set	9,182.50	66.28	9,248.78
- 1,500 mm x 1,500 mm	set	11,702.50	79.15	11,781.65

Table IX-20 Annual Operation and Maintenance Cost

Items	Calculation	Cost (US$)
1. Salaries & Wages		
- Staff salaries		61,320
- Labor wages	200 M/M x US$54	10,800
2. Operation cost		
- Electric charge	9,000,000 kWh x 0.015 US$	135,000
- Fuel, etc. for vehicles & equipment	US$1,000/Month	12,000
3. Office Expenses	US$400/Month	4,800
4. Maintenance Cost		11,000
5. Miscellaneous		3,080
Total		238,000

Table IX-21 Replacement Cost and Useful Life
(Irrigation and Drainage Facilities)

Items	Useful Life (Years)	Replacement Cost (US$1,000)
1. O & M Equipment	10	610
2. Project Facilities		
- Pumps & motors	25	4,265
- Transmission lines	25	217
- Gates	25	522

Table IX-22 Annual Disbursement Schedule of Construction Cost

(Unit: US$1,000)

Items	Total		1989		1990		1991		1992		1993	
	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC	FC	LC
1. Preparatory work	240	203	-	-	126	107	114	96	-	-	-	-
2. Major irrigation and drainage facilities												
- Headreach	4,915	685	-	-	983	136	2,949	413	983	136	-	-
- Major canals	2,613	233	-	-	329	35	1,183	117	908	70	193	11
- Major drains	1,130	133	-	-	88	10	463	53	527	69	52	1
- Main pump station	3,581	53	-	-	1,038	17	1,038	17	502	6	1,003	13
- Regulation pond	147	13	-	-	48	4	99	9	-	-	-	-
- Booster pump stations	1,346	20	-	-	-	-	-	-	336	7	1,010	13
3. On-farm development												
- Tertiary canals	2,908	340	-	-	18	2	1,616	75	1,047	174	227	89
- Tertiary drains	337	39	-	-	20	2	105	13	184	22	28	2
- Field canals	1,959	190	-	-	-	-	1,008	96	811	80	140	14
- Field drains	153	3	-	-	-	-	48	1	77	1	28	1
- Land clearing and levelling	1,191	28	-	-	-	-	237	6	775	18	179	4
4. Rural infrastructures												
- Village road	87	5	-	-	29	2	58	3	-	-	-	-
- Water supply pipe line	43	3	-	-	-	-	14	1	29	2	-	-
- Drilling and distri. pipe line	209	11	-	-	-	-	70	4	139	7	-	-
5. Project office	-	154	-	51	-	103	-	-	-	-	-	-
6. Demonstration farm												
- Land consolidation	28	2	-	-	-	-	28	2	-	-	-	-
- Warehouse	38	88	-	-	-	-	38	88	-	-	-	-
7. O & M equipment	610	-	-	-	-	-	610	-	-	-	-	-
8. Farm tractors	91	-	-	-	-	-	91	-	-	-	-	-
9. Engineering services and admini. expenses	1,779	494	475	114	267	114	415	114	415	114	207	38
Sub-total (1+2+..+8+9)	(23,405)	(2,697)	(475)	(165)	(2,946)	(532)	(10,184)	(1,108)	(6,733)	(706)	(3,067)	(186)
10. Contingencies												
- Physical contingency	1,873	215	38	13	236	43	815	88	539	56	245	15
- Price contingency	801	86	5	2	59	11	308	34	273	29	156	10
Total	26,079	2,998	518	180	3,241	586	11,307	1,230	7,545	791	3,468	211

WORKS	1989												1990												1991												1992												1993											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
I PREPARATORY WORK																									Irrigation to Demonstration Farm												Irrigation to Stage I Area												Irrigation to Stage II Area											
1 Detailed Design and Preparation of Tender Documents																																																								
2 Prequalification and Tendering																																																								
(1) Prequalification																																																								
(2) Construction work																																																								
(3) Procurement of equipment																																																								
3 Building of Project Office																																																								
II MAIN IRRI. AND DRAINAGE FACILITIES																																																								
1 Mobilization and Preparatory Works																																																							
2 Irrigation Canals																																																								
(1) Main pump station																																																								
(2) Booster pump station no.1																																																								
(3) Booster pump station no.2																																																								
(4) Regulation pond																																																								
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1 Tertiary Canals																																																								
2 Tertiary Drains																																																								
3 Field Canals																																																								
4 Field Drains																																																								
5 Land Clearing and Levelling																																																								
(1) Originally-planned area																																																								
(2) Extension area																																																								
IV RURAL INFRASTRUCTURES																																																								
1 Village Roads																																																								
2 Potable Water Supply Facilities																																																								
V DEMONSTRATION FARM																																																								

—— Stage-I --- Stage-II

Fig. IX-1 CONSTRUCTION SCHEDULE

ANNEX X

PROJECT EVALUATION

ANNEX X

PROJECT EVALUATION

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1. General

The project evaluation is carried out to assess the effectiveness and viability of the proposed agricultural and rural development. The evaluation involves assessment of the impact on farm budget, financial statement of executing organization, project viability from the viewpoint of national economy and socioeconomic aspects.

The impact of the Project on farm budget of farmers and their capacity to pay for irrigation water charge are analyzed in the farm budget assessment. Financial inflow and outflow of executing organization including the repayment schedule of the project capital cost is forecasted in financial evaluation. The economic analysis examines the returns to investment of the Project using economic prices. The socioeconomic impacts from the implementation of the Project is briefly studied to evaluate broad aspects of the effects.

2. Economic Evaluation

2.1 Basic Assumptions

The economic evaluation from the viewpoint of the national economy is made on the following assumptions:

(1) The economic useful life of the Project is 50 years after construction.

(2) All prices are expressed in constant price as of 1988.

(3) The exchange rate of US$1.00 = Kip 450 = ¥130 as of October 1988 is used.

(4) The costs for rural development,and land consolidation and farm machinery for the demonstration farm are excluded from the capital cost because they can be regarded as social investments that are not directly related to the agricultural production.

2.2 Evaluation of Economic Prices

In the economic evaluation, all the costs and benefits are presented in economic prices which reflect value to the country as a whole. Economic prices for inputs and outputs of the Project are evaluated based on the following criteria:

(1) Direct transfer payment

Direct transfer payments are payments that represent the transfer of claims to real resources from a person or organization in the nation to another. The most common transfer payments are taxes and direct subsidies. All these payments are to be eliminated before the adjustment of financial price to economic price. Since the project cost is estimated under the condition of tax exemption, no direct transfer payment is included in the cost.

(2) Standard conversion factor (SCF)

All the domestic currency values are multiplied by this factor in order to adjust the distortion on domestic prices that arises as a result of national trade policies

such as tariff and subsidy. A SCF of 0.90 is adopted in this evaluation, referring to the appraisal of Rural Credit Project by IFAD in 1987 /1.

(3) Traded goods and services

Economic prices of traded goods and services are to be based on border prices. Border prices of farm inputs and outputs are estimated on the basis of the World Bank's projections of world market prices for the year of 2000. The World Bank forecasted prices in 1985 constant price are adjusted to 1988 constant price multiplying the factor of 1.403 derived from MUV index. Additional domestic charge from border is added to the price, and savable cost by import substitution and additional cost for export expansion are deducted in order to estimate import and export parity price at farm gate in the Project area.

(4) Opportunity cost of labor

Most of the farm labor requirement are generally met by family labor at present. Seasonal labors required for transplanting and harvesting are partly hired from neighbors at the wage of Kip 400/man-day. This wage is regarded as a wage reflected by opportunity cost of labor. On the contrary, farm work is scarce during the dry season. The economic farm labor cost is therefore estimated at Kip 400/man-day in the rainy season and Kip 100/man-day in the dry season. According to a study in the Vientiane area/1, in general labor is actively employed for about two thirds of a year. A shadow wage rate for construction labor is estimated at 0.37, which is derived from the ratio of weighted average of farm labor cost <(Kip 400 x 2 + Kip 100 x 1)/3> to estimated labor wage (Kip 810). Wage rate in the cost estimation includes a premium to attract labors.

2.3 Economic benefit

(1) Economic prices for agricultural outputs and inputs

Out of the proposed four crops, paddy and soybean are produced for import substitution, groundnut is for export and garlic is for domestic consumption. Therefore, the economic prices of rice and soybean are based on import parity prices and that of groundnut is based on export parity price. Though soybean is

/1 : IFAD, *Rural Credit Project Appraisal Report*, August 1987

actually imported as a form of milled cake, price as a form of bean is adopted since a processing plant is under construction and scheduled to start its operation soon. As regards price of garlic, present farm gate price(Kip 200/kg) is used.

Farm inputs such as fertilizer and agricultural chemicals are wholly imported from abroad and economic prices of them are therefore based on import parity prices.

Details of the derivation of import and export parity prices are given in Tables X-1 to X-6.

(2) Net agricultural production value

Irrigation benefits are derived from the incremental crop production attributable to a stable irrigation water supply. These benefits are estimated as the difference of the annual net crop production values under with and without project conditions.

Net agricultural production values are estimated by deducting production costs from gross production values. Economic production costs for proposed crops are given in Tables X-7 and X-8. Details of calculation of net economic production value are given in Table X-9, and the result is summarized as follows:

(Unit: Kip 1,000)

Crop	Without Project	With Project	Increment
Paddy	309,100	1,884,560	1,575,460
Soybean	0	80,480	80,480
Groundnut	0	33,240	33,240
Garlic	0	29,420	29,420
Total	309,100	2,027,700	1,718,600
(in US$)	686,890	4,506,000	3,819,110

The annual irrigation benefit at full development stage is estimated at Kip 1,718.6 million or US$3,819,100 equivalent.

(3) Accruement of benefit during build-up period

The irrigation benefits are expected to accrue from the start of irrigation and to increase year by year during the build-up period. It is assumed that the build-up period is five years after starting irrigation, during which unit yields of paddy increase as follows:

(Unit: ton/ha)

Year in Order	Demonstration Farm		Originally-planned Area		Extension Area	
	Rainy	Dry	Rainy	Dry	Rainy	Dry
1	-	-	-	-	-	-
2	-	-	-	-	-	-
3	-	-	-	-	-	-
4	3.0	3.5	3.0	-	-	-
5	3.4	4.0	3.4	3.5	3.0	-
6	3.8	4.5	3.8	4.0	3.4	3.5
7	4.1	5.0	4.1	4.5	3.8	4.0
8	4.5	5.5	4.5	5.0	4.1	4.5
9	4.5	5.5	4.5	5.5	4.5	5.0
10	4.5	5.5	4.5	5.5	4.5	5.5

Increase of unit yields of upland crops during the build-up period is assumed as follows:

(Unit: ton/ha)

Year from the start of irrigation	1st	2nd	3rd	4th	5th
Soybean	1.2	1.4	1.6	1.8	2.0
Groundnut	1.3	1.6	1.9	2.2	2.5
Garlic	5.0	5.5	6.0	6.5	7.0

As seen above, targeted production will be fully attained in tenth year after start of construction. The irrigation benefits during the build-up period are calculated as follows:

(Unit: US$1,000)

Year in Order	Originally-planned Area	Extension Area	Total
1	0	0	0
2	0	0	0
3	0	0	0
4	277.1	0	277.1
5	1,211.5	269.7	1,481.2
6	1,545.5	838.5	2,383.0
7	1,834.6	1,027.4	2,867.0
8	2,161.9	1,194.4	3,356.3
9	2,334.5	1,383.3	3,717.8
10	2,334.5	1,484.6	3,819.1

2.4 Economic Cost

The financial project cost estimated in Annex IX are converted into economic cost by the following procedures:

(1) The costs for rural development and for land consolidation and farm machinery for the demonstration farm are excluded from the capital cost.

(2) Contingency for price escalation is deducted from financial cost.

(3) All the costs are divided into foreign currency portion and local currency portion.

(4) Local currency portion is divided into unskilled labor cost and others.

(5) Unskilled labor cost is converted into opportunity cost by multiplying shadow wage rate of 0.37.

(6) Whole local currency portion is converted into economic price by multiplying SCF of 0.90 in order to adjust the distortion of local currency.

(7) Converted local currency portion is added to foreign currency portion.

The financial capital cost after deduction of non-productive investment and price contingency and its disbursement schedule is given in Table X-10. Out of the construction cost of local portion, 65% is classified into labor cost. All of the foreign currency portion is regarded as economic cost because it is already given in the form of border price. Derived economic cost is US$25,787,400 for capital cost, US$208,100 for annual operation cost, and US$610,000 and US$5,004,000 respectively for every ten and 25 years of equipment replacement. The flow of economic cost is indicated in Table X-11.

2.5 Result of Economic Evaluation

The cost and benefit stream during the useful life of the Project is shown in Table X-11. The economic internal rate of return (EIRR) is calculated at 11.1%. The net present value (NPV) at a discount rate of 8% is US$8,382,200.

In order to evaluate the soundness of the Project against possible changes in future economic conditions, sensitivity analysis is made for the following cases:

Case-1 : The project costs increase by 10% due to unexpected increase of material cost beyond the physical contingency accounted.

Case-2 : The project benefits decrease by 10% due to unexpected decrease in forecasted price of farm products or in crop yields.

Case-3 : The build-up period is prolonged by two years due to inefficient O&M management or agricultural extension service.

Case-4 : The completion of construction is delayed for two years due to unexpected inefficiency of contractors or for unforseen reasons.

The effects of these changes on EIRR and NPV (discounted at 8%) are summarized below:

Case	EIRR (%)	NPV 8% (US$ thousand)
Case-1	10.1	6,107.1
Case-2	10.0	5,268.9
Case-3	10.6	7,291.6
Case-4	10.2	6,256.6

As a consequence of the above evaluation, the Project can expect sufficient economic return to investment with 11.1% of EIRR and US$8,382,200 of NPV at the discount rate of 8%. The sensitivity analysis indicates that economic feasibility of the Project is rather insensitive to the possible changes in basic assumptions for the evaluation.

3. Impact on Farm Budget

3.1 Increase of Farmers' Disposable Income

To enhance farmers' living standard through increasing farm products is one of the main purposes of the Project. The farm budget analyses are made for three different sizes of farmers and two types of cropping patterns in order to evaluate the Project from income aspect of direct beneficiaries.

As described in detail in Annex VII, farm income and farmers' disposable income (before payment of irrigation water charge) are expected to increase significantly under the Project in each case as shown in Table X-12. The future annual disposable income is estimated to be 2.4 to 4.4 times larger than the present one, depending on farm size. Thus, living standard of the farmers in the Project area will be evidently enhanced by implementation of the Project.

3.2 Capacity to Pay for Irrigation Water Charge

The farmers' capacity to pay for irrigation water charge depends on the amount of incremental disposable income of farmers resulted from irrigated farming under the Project. In case the water charge is too high, it will seriously impair the farmers' volition to accept intensive cropping and modern farming technique proposed under the Project, and will eventually make it difficult to realize the increased agricultural production. In this view and also taking consideration of the practices in similar projects in the world, water charge for the Project is proposed to be about 30% of incremental disposable income of farmers. The following table shows the estimated incremental disposable income and proposed water charge for a farm with an average farm size of 1.6 ha.

Cropping Pattern	Incremental Disposable Income (Kip/1.6ha)	Annual Water Charge	
		per farm (Kip/1.6ha)	per ha (Kip/ha)
Paddy-Paddy	495,000	148,500	92,800
Paddy-Upland Crops	491,100	147,300	92,100

Based on the above unit charges, total amount of water charges to be collected from all the farmers in the Project area is estimated at Kip 250 million per annum, which will suffice to

cover the estimated annual operation, maintenance and replacement cost of the Project (equivalent to Kip 225 million/year). Since it is considered impracticable to include in the water charges allowances for amortization of the investment costs and payment of interest, they will have to be covered by the Government budget.

4. Financial Analysis

4.1 Financial Cost

The financial cost is estimated on the basis of the price level as of October 1988 using the exchange rate of US$1.00 = Kip 450 = ¥130.

The price contingency of 1% per annum for foreign currency portion is included in the estimate based on the forecast of Manufacturing Unit Value (MUV) by the World Bank/1. This rate is also adopted for the price escalation of local currency expressed in US$ assuming that price change will be absorbed into fluctuation of exchange rate. The estimated cost and its disbursement schedule are given in Annex IX.

4.2 Repayment of Project Cost

It is assumed that the capital cost required for the implementation of the Project will be arranged under the following conditions:

(1) Foreign currency portion of the capital cost is financed by a loan of international organization.

(2) Interest rate of the loan is 1.00% per annum and repayment period is 30 years including 10 years of grace period.

(3) Local currency portion of the capital cost is financed by the Government budget without repayment.

The repayment schedule for the foreign loan based on the above conditions is shown in Table X-2.

4.3 Financial Inflow and Outflow

The financial inflow and outflow of the executing organization are estimated assuming that the organization has an independent budget. The inflow is from the irrigation water charge collected from the Project beneficiaries. The outflow consists of whole the financial

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/1: The World Bank, *Half-Yearly Revision of Commodity Price Forecasts*, February 1988.

costs of the Project and the repayment of the loan. Estimated financial cash flow is given in Table X-13. As seen in the table, substantial subsidy from the Government will be needed.

5. Socioeconomic Impacts

In addition to the direct project benefit counted in the economic evaluation, various secondary and intangible benefits are expected from the implementation of the Project. The following are among the major secondary and intangible benefits:

(1) Enhancing economic and social activities

At present, the existing road network is not sufficient in both density and quality, impeding economic and social activities of village dwellers especially in the rainy season. The improved road system under the Project will contribute to brisking up economic activities through enhancing inter- and intra-regional accessibility and communication.

(2) Satisfaction of basic human needs

Potable water supply facilities will be provided under the Project in villages where inhabitants presently suffer from shortage of water. The sanitary condition in such villages will be improved substantially.

(3) Securing a stable food supply

The Project will contribute to securement of self-sufficiency in rice, which has been one of the main objectives of the national development plan. Sufficient supply of food will also make an important contribution to attainment of economic independence of Lao PDR.

(4) Increase of employment opportunity

Employment opportunity to local people will be increased by the project implementation, and a favorable impact will be given to the national economy through multiplication effect. Furthermore, employees will be able to gain experience, technical know-how, and skillfulness in various working fields. These accumulations could be applied to future development projects in the country.

(5) Foreign exchange saving

After completion of the Project, significant increase in rice production is expected. The increased marketable production is estimated at about 19,500 tons of paddy, which would largely reduce the import of rice and thereby contribute to the foreign exchange saving.

Table X-1 Import Parity Price of Rice in 2000

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1.	F.O.B. Bangkok(Thai 5 % broken)	US$	298.8
2.	Freight and Insurance (Bangkok - Thanaleng)	US$	+35.0
3.	Value C.I.F. Thanaleng	US$	333.8
	(exchange rate: US$ 1 = Kip 450)	Kip	150,210
4.	Port Handling Charge and Bagging	Kip	+800
5.	Transportation Cost from Thanaleng to Vientiane	Kip	+700
6.	Transportation Cost from Project Site to Vientiane	Kip	-280
7.	Price of Milled Rice at Rice Mill	Kip	151,430
8.	Conversion from Rice to Paddy in the Husk (recovery rate: 65%)	Kip	98,430
9.	Milling Charge	Kip	-1,250
10.	Value of Bran	Kip	+1,430
11.	Handling and Transportation Cost from Farm Gate to Rice Mill	Kip	-120
12.	Economic Farm Gate Price of Paddy	Kip	98,490

Sources: 1. IBRD, *Half-Yearly Revision of Commodity Price Forecasts*, February 1988. The IBRD estimated price in 1985 constant US$ is adjusted by a factor of 1.403(MUV) to 1988 constant price

2. Unit prices or costs are obtained from MAF.

Table X-2 Import Parity Price of Soybean in 2000

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1.	F.O.B. US Gulf	US$	280.6
2.	Freight and Insurance (US Gulf - Bangkok - Thanaleng)	US$	+60.0
3.	Value C.I.F. Thanaleng	US$	340.6
	(exchange rate: US$ 1 = Kip 450)	Kip	153,270
4.	Port Handling Charge and Bagging	Kip	+800
5.	Transportation Cost from Thanaleng to Feed Mill at Tha Ngon	Kip	+1,500
6.	Transportation Cost from Project Site to Feed Mill at Tha Ngon	Kip	-280
7.	Handling and Transportation Cost from Farm Gate to Market	Kip	-120
8.	Economic Farm Gate Price of Soybean	Kip	155,170

Sources: 1. IBRD, *Half-Yearly Revision of Commodity Price Forecasts*, February 1988. The IBRD estimated price in 1985 constant US$ is adjusted by a factor of 1.403(MUV) to 1988 constant price

2. Unit prices or costs are obtained from MAF

3. IFAD, *Rural Credit Project Appraisal Report*, August 1987

Table X-3 Export Parity Price of Groundnuts in 2000

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1.	F.O.B. US Gulf	US$	322.7
2.	Freight and Insurance (Thanaleng - Bangkok - US Gulf)	US$	-60.0
3.	Value F.O.B. Thanaleng (exchange rate: US$ 1 = Kip 450)	US$ Kip	262.7 118,270
4.	Port Handling Charge and Bagging	Kip	-800
5.	Transportation Cost from Project Site to Thanaleng	Kip	-980
6.	Handling and Transportation Cost from Farm Gate to Market	Kip	-120
7.	Economic Farm Gate Price of Groundnut	Kip	116,320

Sources: 1. IBRD, *Half-Yearly Revision of Commodity Price Forecasts*, February 1988. The IBRD estimated price in 1985 constant US$ is adjusted by a factor of 1.403(MUV) to 1988 constant price Since the price of groundnut is not given in IBRD forecast, a price more than 15 % of soybean was assumed as same way as the estimation of IFAD.

2. Unit prices or costs are obtained from MAF

3. IFAD, *Rural Credit Project Appraisal Report*, August 1987

Table X-4 Import Parity Price of Urea in 2000

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1.	F.O.B. US Gulf	US$	245.5
2.	Freight and Insurance (Palembang - Bangkok - Thanaleng)	US$	+44.0
3.	Value C.I.F. Thanaleng	US$	289.5
	(exchange rate: US$ 1 = Kip 450)	Kip	130,290
4.	Port Handling Charge and Bagging	Kip	+800
5.	Storage, Distribution and Handling	Kip	+1,500
6.	Transportation Cost from Vientiane to Project Site	Kip	+280
7.	Handling and Transportation Cost from Farm Gate to Market	Kip	+120
8.	Economic Farm Gate Price of Urea	Kip	132,990

Sources: 1. IBRD, *Half-Yearly Revision of Commodity Price Forecasts*, February 1988. The IBRD estimated price in 1985 constant US$ is adjusted by a factor of 1.403(MUV) to 1988 constant price

2. Unit prices or costs are obtained from MAF

3. IFAD, *Rural Credit Project Appraisal Report*, August 1987

Table X-5 Import Parity Price of Ammophos in 2000

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1.	F.O.B. Western Europe	US$	294.6
2.	Freight and Insurance (W. Europe - Bangkok - Thanaleng)	US$	+51.0
3.	Value C.I.F. Thanaleng	US$	345.6
	(exchange rate: US$ 1 = Kip 450)	Kip	155,520
4.	Port Handling Charge and Bagging	Kip	+800
5.	Storage, Distribution and Handling	Kip	+1,500
6.	Transportation Cost from Vientiane to Project Site	Kip	+280
7.	Handling and Transportation Cost from Farm Gate to Market	Kip	+120
8.	Economic Farm Gate Price of Ammophos	Kip	158,220

Sources: 1. IBRD, *Half-Yearly Revision of Commodity Price Forecasts*, February 1988. The IBRD estimated price in 1985 constant US$ is adjusted by a factor of 1.403(MUV) to 1988 constant price

2. Unit prices or costs are obtained from MAF

3. IFAD, *Rural Credit Project Appraisal Report*, August 1987

Table X-6 Import Parity Price of Diazinon in 2000

(Unit: forecasted price in 1988 constant term)

	Description	Currency	Value/ton
1.	Value C.I.F. Thanaleng (exchange rate: US$ 1 = Kip 450)	US$ Kip	2,300 1,035,000
4.	Port Handling Charge and Bagging	Kip	+800
5.	Storage, Distribution and Handling	Kip	+1,500
6.	Transportation Cost from Vientiane to Project Site	Kip	+280
7.	Handling and Transportation Cost from Farm Gate to Market	Kip	+120
8.	Economic Farm Gate Price of Urea	Kip	1,037,700

Sources: 1. Unit prices or costs are obtained from MAF.

2. Since the price of diazinon is not given in IBRD forecast, price at 1988 is used for estimation.

3. IFAD, *Rural Credit Project Appraisal Report*, August 1987

Table X-7 Economic Production Cost of Paddy under with and without Project Conditions

Description	Unit Price	Without Project				With Project			
		Rainy Season Paddy		Dry Season Paddy		Rainy Season Paddy		Dry Season Paddy	
		(Amount /ha)	(Kip /ha)	(Amount /ha)	(Kip /ha)	(Amount /ha)	(Kip /ha)	(Amount /ha)	(Kip /ha)
1. Farm Inputs									
Seed	49.5 Kip/kg	66 kg	3,300	102 kg	5,000	40 kg	2,000	40 kg	2,000
Fertilizers									
Urea	133 Kip/kg	7 kg	900	0 kg	0	100 kg	13,300	100 kg	13,300
Ammophos	158 Kip/kg	17 kg	2,700	104 kg	16,400	250 kg	39,500	250 kg	39,500
Farm chemicals									
Insecticide	1,038 Kip/kg	0 kg	0	2 kg	2,500	10 kg	10,400	10 kg	10,400
2. Labour cost	360 Kip/m.d./1 90 Kip/m.d./1 /2	127 m.d./1	45,700	153 m.d./1	13,800	152 m.d./1	54,700	155 m.d./1	14,000
3. Others									
Machinary	22,500 Kip/ha					20%	4,500	20%	4,500
Equipment etc.	5% of others		2,600		1,900		6,200		4,200
Total Cost			55,200		39,600		130,600		87,900

/1 : man-day
/2 : in dry season

Table X-8 Economic Production Cost of Upland Crops under with Project Conditions

Description	Unit Price	Soybean		Groundnut		Garlic	
		(Amount /ha)	(Kip /ha)	(Amount /ha)	(Kip /ha)	(Amount /ha)	(Kip /ha)
1. Farm Inputs							
Seed		60 kg	13,400	80 kg	17,900	1,000 kg	450,000
Fertilizers							
Urea	133 Kip/kg	60 kg	8,000	40 kg	5,300	75 kg	10,000
Ammophos	158 Kip/kg	200 kg	31,600	200 kg	31,600	150 kg	23,700
Farm chemicals							
Insecticide	1,038 Kip/kg	10 kg	10,400	10 kg	10,400	0 kg	0
2. Labour cost	90 Kip/man-day /1	97 man-day	8,700	104 man-day	9,400	126 man-day	11,300
3. Others							
Machinary	22,500 Kip/ha	20%	4,500	20%	4,500	20%	4,500
Equipment etc.	5% of others		3,800		4,000		25,000
Total Cost			80,400		83,100		524,500

/1 : in dry season

Table X-9 Calculation of Net Production Value in Economic Price (1/3)

Description	Originally-planned Area			Extension Area			Total Increment
	Without Project	With Project	Increment	Without Project	With Project	Increment	
1. Planted Area (ha)							
Irrigated Paddy							
- Rainy season paddy	0	1,700	1,700	0	1,000	1,000	2,700
- Dry season paddy	139	1,432	1,293	0	718	718	2,011
Rainfed Paddy							
- Rainy season paddy	2,259	400	-1,859	771	301	-470	-2,329
Upland Crops							
- Soybean	0	170	170	0	180	180	350
- Groundnut	0	78	78	0	82	82	160
- Garlic	0	20	20	0	20	20	40
2. Unit Yield (ton/ha)							
Irrigated Paddy							
- Rainy season paddy	-	4.5	-	-	4.5	-	-
- Dry season paddy	2.5	5.5	-	2.5	5.5	-	-
Rainfed Paddy							
- Rainy season paddy	1.5	1.5	-	1.5	1.5	-	-
Upland Crops							
- Soybean	-	2.0	-	-	2.0	-	-
- Groundnut	-	2.5	-	-	2.5	-	-
- Garlic	-	7.0	-	-	7.0	-	-

Table X-9 Calculation of Net Production Value in Economic Price (2/3)

Description	Originally-planned Area			Extension Area			Total Increment
	Without Project	With Project	Increment	Without Project	With Project	Increment	
3. Crop Production (ton)							
Irrigated Paddy							
- Rainy season paddy	0	7,650	7,650	0	4,500	4,500	12,150
- Dry season paddy	348	7,876	7,529	0	3,949	3,949	11,478
Rainfed Paddy							
- Rainy season paddy	3,389	600	-2,789	1,157	452	-705	-3,494
Upland Crops							
- Soybean	0	340	340	0	360	360	700
- Groundnuts	0	195	195	0	205	205	400
- Garlic	0	140	140	0	140	140	280
4. Unit Price (Kip/ton)							
Paddy	98,490	98,490	-	98,490	98,490	-	-
Soybean	155,170	155,170	-	155,170	155,170	-	-
Groundnuts	116,320	116,320	-	116,320	116,320	-	-
Garlic	180,000	180,000	-	180,000	180,000	-	-
5. Gross Production Value (Kip thousand)							
Paddy	367,960	1,588,250	1,220,290	113,900	876,610	762,710	1,983,000
Soybean	0	52,760	52,760	0	55,860	55,860	108,620
Groundnuts	0	22,680	22,680	0	23,850	23,850	46,530
Garlic	0	25,200	25,200	0	25,200	25,200	50,400

Table X-9 Calculation of Net Production Value in Economic Price (3/3)

Description	Originally-planned Area			Extension Area			Total Increment
	Without Project	With Project	Increment	Without Project	With Project	Increment	
6. Unit Production Cost							
(Kip/ha)							
Irrigated Paddy							
- Rainy season paddy	-	130,600		-	130,600		
- Dry season paddy	39,600	87,900		39,600	87,900		
Rainfed Paddy							
- Rainy season paddy	55,200	55,200		55,200	55,200		
Upland Crops							
- Soybean	-	80,400		-	80,400		
- Groundnuts	-	83,100		-	83,100		
- Garlic	-	524,500		-	524,500		
7. Total Production Cost							
(Kip thousand)							
Paddy	130,200	369,970	239,770	42,560	210,330	167,770	407,540
Soybean	0	13,670	13,670	0	14,470	14,470	28,140
Groundnuts	0	6,480	6,480	0	6,810	6,810	13,290
Garlic	0	10,490	10,490	0	10,490	10,490	20,980
8. Net Production Value							
(Kip thousand)							
Paddy	237,760	1,218,280	980,520	71,340	666,280	594,940	1,575,460
Soybean	0	39,090	39,090	0	41,390	41,390	80,480
Groundnuts	0	16,200	16,200	0	17,040	17,040	33,240
Garlic	0	14,710	14,710	0	14,710	14,710	29,420
Total	237,760	1,288,280	1,050,520	71,340	739,420	668,080	1,718,600
in US$	528,360	2,862,840	2,334,490	158,530	1,643,160	1,484,620	3,819,110

Table X-10 Financial Capital Cost and Disbursement Schedule

(Unit: US$ thousand)

	Foreign currency portion						Local currency portion						Total
	1989	1990	1991	1992	1993	Total	1989	1990	1991	1992	1993	Total	
1. Preparatory work		126	114			240		107	96			203	443
2. Major irrigation and drainage facilities													
- Haedreach		983	2,949	983		4,915		136	413	136		685	
- Major canals		329	1,183	908	193	2,613		35	117	70	11	233	2,846
- Major drains		88	463	527	52	1,130		10	53	69	1	133	1,263
- Main pump station		1,038	1,038	507	1,003	3,586		17	17	6	13	53	3,639
- Regulation pond		48	99			147		4	9			13	
- Booster pump station				336	1,010	1,346				7	13	20	1,366
3. On farm development													
- Tertiary canals		18	1,616	1,047	227	2,908		2	75	174	89	340	3,248
- Tertiary drains		20	105	184	28	337		2	13	22	2	39	376
- Field canals			1,008	811	140	1,959			96	90	14	200	2,159
- Field drains			48	77	28	153			1	1	1	3	156
- land clearing and leveling			237	775	179	1,191			6	18	4	28	1,219
4. Project office						0	51	103				154	154
5. O & M Equipment			610			610						0	610
6. Engineering services and administration	475	267	415	415	207	1,779	114	114	114	114	38	494	2,273
Sub-total (1+2+3+4+5+6)	475	2,917	9,885	6,570	3,067	22,914	165	530	1,010	707	186	2,598	0 19,752
Physical contingency (8%)	38	233	791	526	245	1,833	13	42	81	57	15	208	0 1,580
Total	513	3,150	10,676	7,096	3,312	24,747	178	572	1,091	764	201	2,806	0 21,332

Table X-11 Cost and Benefit Stream of the Project

(Unit: US$ 1,000)

Year in order	Year	Benefit	Costs				Balance
			Capital Cost	O&M Cost	Replacement Cost	Total Cost	
1	1989		627.5			627.5	-627.5
2	1990		3369.6			3369.6	-3369.6
3	1991		11034.6	6.5		11041.2	-11041.2
4	1992	277.1	7367.5	65.3		7432.7	-7155.6
5	1993	1481.2	3388.1	167.6		3555.7	-2074.5
6	1994	2383.0		208.1		208.1	2174.9
7	1995	2867.0		208.1		208.1	2658.9
8	1996	3356.3		208.1		208.1	3148.2
9	1997	3717.8		208.1		208.1	3509.7
10	1998	3819.1		208.1		208.1	3611.0
11	1999	3819.1		208.1		208.1	3611.0
12	2000	3819.1		208.1		208.1	3611.0
13	2001	3819.1		208.1		208.1	3611.0
14	2002	3819.1		208.1	610.0	818.1	3001.0
15	2003	3819.1		208.1		208.1	3611.0
16	2004	3819.1		208.1		208.1	3611.0
17	2005	3819.1		208.1		208.1	3611.0
18	2006	3819.1		208.1		208.1	3611.0
19	2007	3819.1		208.1		208.1	3611.0
20	2008	3819.1		208.1		208.1	3611.0
21	2009	3819.1		208.1		208.1	3611.0
22	2010	3819.1		208.1		208.1	3611.0
23	2011	3819.1		208.1		208.1	3611.0
24	2012	3819.1		208.1	610.0	818.1	3001.0
25	2013	3819.1		208.1		208.1	3611.0
26	2014	3819.1		208.1		208.1	3611.0
27	2015	3819.1		208.1		208.1	3611.0
28	2016	3819.1		208.1		208.1	3611.0
29	2017	3819.1		208.1	5004.0	5212.1	-1393.0
30	2018	3819.1		208.1		208.1	3611.0
31	2019	3819.1		208.1		208.1	3611.0
32	2020	3819.1		208.1		208.1	3611.0
33	2021	3819.1		208.1		208.1	3611.0
34	2022	3819.1		208.1	610.0	818.1	3001.0
35	2023	3819.1		208.1		208.1	3611.0
36	2024	3819.1		208.1		208.1	3611.0
37	2025	3819.1		208.1		208.1	3611.0
38	2026	3819.1		208.1		208.1	3611.0
39	2027	3819.1		208.1		208.1	3611.0
40	2028	3819.1		208.1		208.1	3611.0
41	2029	3819.1		208.1		208.1	3611.0
42	2030	3819.1		208.1		208.1	3611.0
43	2031	3819.1		208.1		208.1	3611.0
44	2032	3819.1		208.1	610.0	818.1	3001.0
45	2033	3819.1		208.1		208.1	3611.0
46	2034	3819.1		208.1		208.1	3611.0
47	2035	3819.1		208.1		208.1	3611.0
48	2036	3819.1		208.1		208.1	3611.0
49	2037	3819.1		208.1		208.1	3611.0
50	2038	3819.1		208.1		208.1	3611.0
51	2039	3819.1		208.1		208.1	3611.0
52	2040	3819.1		208.1		208.1	3611.0
53	2041	3819.1		208.1		208.1	3611.0

IRR= 11.06% NPV(8%)= 8382.2

Table X-12 Change of Farm Budget

(Unit: Kip 1,000/household/year)

Description Scale	Farm Income	Total Income	Farm Expense	Disposable Income
Without Project				
- 1 ha	109.0	194.5	12.1	182.4
1 ha - 2 ha	135.7	262.3	24.2	238.1
2 ha -	213.0	323.3	44.0	279.3
With Project				
Case - 1				
- 1 ha	466.0	551.5	109.2	442.3
1 ha - 2 ha	849.7	976.3	218.4	757.9
2 ha -	1,509.3	1,619.6	396.5	1,223.1
Case - 2				
- 1 ha	496.4	581.9	141.6	440.3
1 ha - 2 ha	910.5	1,037.1	283.3	753.8
2 ha -	1,619.7	1,730.0	514.3	1,215.7

Remarks: 1. Farm expense includes farm inputs cost and agro-tax.

2. Cases represent following cropping patterns.

Case-1: Paddy - Paddy

Case-2: Paddy - Soybean, Groundnut, Garlic (ratio of area for three corps is 350:160:40)

Table X-13 Financial Cash Flow of Executing Organization

(Unit: US$ thousand)

Year	Year in Order	Cash Outflow						Cash Inflow				Balance
		Project Cost	O&M Cost	Replace-ment Cost	Loan Repayment for Principal	Loan Repayment for Interest	Total Outflow	Foreign Loan	Govern-ment Budget	Irriga-tion Charge	Total Inflow	
1989	1	698				5	703	518	180		698	-5
1990	2	3,827				38	3,865	3,241	586		3,827	-38
1991	3	12,537	7			151	12,695	11,307	1,230		12,537	-158
1992	4	8,336	72			226	8,634	7,545	791	182	8,518	-116
1993	5	3,679	204			261	4,144	3,468	211	453	4,132	-12
1994	6		238			261	499			556	556	57
1995	7		238			261	499			556	556	57
1996	8		238			261	499			556	556	57
1997	9		238			261	499			556	556	57
1998	10		238			261	499			556	556	57
1999	11		238		1,304	248	1,790			556	556	-1,234
2000	12		238		1,304	235	1,777			556	556	-1,221
2001	13		238	610	1,304	222	2,374			556	556	-1,818
2002	14		238		1,304	209	1,751			556	556	-1,195
2003	15		238		1,304	196	1,738			556	556	-1,182
2004	16		238		1,304	183	1,725			556	556	-1,169
2005	17		238		1,304	170	1,711			556	556	-1,155
2006	18		238		1,304	156	1,698			556	556	-1,142
2007	19		238		1,304	143	1,685			556	556	-1,129
2008	20		238		1,304	130	1,672			556	556	-1,116
2009	21		238		1,304	117	1,659			556	556	-1,103
2010	22		238		1,304	104	1,646			556	556	-1,090
2011	23		238	610	1,304	91	2,243			556	556	-1,687
2012	24		238		1,304	78	1,620			556	556	-1,064
2013	25		238		1,304	65	1,607			556	556	-1,051
2014	26		238		1,304	52	1,594			556	556	-1,038
2015	27		238		1,304	39	1,581			556	556	-1,025
2016	28		238	5,114	1,304	26	6,682			556	556	-6,126
2017	29		238		1,304	13	1,555			556	556	-999
2018	30		238		1,304		1,542			556	556	-986
Total		29,077	6,234	6,334	26,079	4,462	72,185	26,079	2,998	14,535	43,612	-28,574

Remark: Condition of foreign loan; Annual interst of 1.00 % for repayment period of 30 years including 10 year of grace period

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