

ANNEX M : PROJECT IMPLEMENTATION  
(INCLUDE ORGANIZATION)



## ANNEX M : PROJECT IMPLEMENTATION

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## ANNEX M : PROJECT IMPLEMENTATION

### M.1 Project Implementation

#### M.1.1 Executing Agency and Organization

The project executing agency shall be HIMAT. Planning of the Project shall be under responsibility the Engineering Div. in collaboration with Planning Div., and arrangement for procurement of external loan shall be made by the Planning Div. through DNP. The Engineering Div. through its Designing Sec. and Construction supervision of civil works; for conducting these services, consulting firm(s) will be employed. The construction of civil works shall be on the contract basis and the contract shall be awarded to contractors by means of tendering. The project executive office will be established at the project site so as to manage and supervise construction works. An acquisition of proposed land for construction works shall be made by means of negotiation with land owners; in case that land owners do not agree to sell their land, an expropriation method may be taken.

Works to be constructed under responsibility of HIMAT shall be intake and trunk and secondary canals, but shall not be included tertiary facilities which are to be developed by farmers.

Operation and maintenance of completed works shall be entrusted to beneficiaries of these works, but technical assistance by the regional office No.6 and Conservation Sec. of HIMAT is indispensable.

Institutional supporting services are essential factor for attaining the expected benefits of the Project. Furthermore, the development of the present Project to accord with the rural infrastructure is another important factor. Thus, an intimate communication among relevant organization is expected.

This type of project can not succeed if farmers' intension is ignored. Therefore, farmer's participation in the Project at its planning stage is prerequisite so that proposed sites for construction works may be acquired smoothly and the objective of the Project and the necessity to form water users' association may be diffused effectively. Taking all of these factors into account, it is recommended the ((Project Executing Committee)) should be incorporated with the participation of the project executing organization and representatives of concerned agencies and bodies with the Project.

### M.1.2 Project Implementation

#### (1) Budgetary Allocation

The project cost except for the amount that the government of the Colombian Republic can be appropriate as local currency portion will be financed by a foreign monetary institution.

#### (2) Contractor

The contractor will be employed through formal international competitive tendering.

#### (3) Project Management Office

The executing agency will establish a Project Management Office which will be responsible for the supervision of construction works. Assisted by the Consultants, the Project Management Office will be supervise the workmanship of the contractor and grasp the up-to-date information on construction.

The building of the Project Management Office will be designed so that it might be used at the same time as the building of the Operation and Maintenance Office after the completion of civil engineering works.

### M.1.3 Project Implementation Schedule

The overall project period will be extend over a total of 84 months as shown in Fig. M-1-2, including 18 months for detailed design period, 6 months for tendering and 60 months for civil engineering works period. During the detailed design period, the detailed design including geological and detailed topographic survey of the sites for the proposed major structures, the preparation of tender documents, etc. will be carried out. During the construction period, the land acquisition, tender evaluation, execution of construction works, procurement of equipment for operation and maintenance, etc. are to be envisaged.

#### (1) Detailed Design

The detailed topographic survey of the sites for the proposed major structures such as headworks, bridges and etc. and the route surveys including profile and cross-section of roads, canal and revetment works will be carried out.

On the basis of the above results, detailed design of the Project facilities, the estimation of construction costs and preparation of tender documents will be carried out.

#### (2) Land acquisition

The land acquisition for construction of the facilities and structures such as headworks, irrigation canals, drainage canals, farm roads, etc. should be acquired by the Colombian Government before the commencement of the construction works.

(3) Contract

A contractor will be selected by means of international tendering for execution of the construction works. The construction machinery and materials are to be procured from domestic and/or international market under the responsibility of the contractor. Six months are allocated for tendering and tender evaluation.

(4) Construction works

Construction works will be started in the second year after the commencement of the Project. Works are to be performed in the following order unless otherwise specified.

- 1) Headworks construction
- 2) Agricultural roads and bridge construction
- 3) irrigation canal construction
- 4) Siphon construction
- 5) Drainage canal works
- 6) Revetment construction

The headworks should be started in the first year of the construction period, because the period of the work is limited to the dry season when the Guape river runs low. And farm roads and bridges should be constructed at the initial stage of the construction works, because these facilities may be used as access roads for the construction of the other structures.

The Project area covers a lengthy tract in the river basin, and the tertiary canals and terminal facilities are directly constructed by farmers. Therefore, the construction works should be executed starting with the upper zone so that the benefits of the Project will turn up as early as possible.



## M.2 Operation and Maintenance Organization

### M.2.1 Organization of O/M

The task for operation and maintenance (O/M) of completed irrigation and drainage facilities shall, as the case of other irrigation districts of HIMAT, be entrusted to water users' association. Nonetheless, it is worth while to indicate that, of existing associations, only a couple of association have attained financial independence, the rest of associations being provided financial support (subsidy) from public organizations. An association can not succeed in financial independence until expected benefits of the Project are attained and O/M of facilities are adequately conducted. In this regard, it is imperative that supporting services for both technical and managerial aspects be provided by concerned institutions.

Because farmers in the project area are scare of experience in O/M of irrigation facilities, HIMAT through its regional office No.6 will back the water users' association up until it gets underway; engineers of HIMAT will be stationed at the association and, if necessary, machinery will be provided. The managerial aspect of the association will be advised by SENA and technology of paddy cultivation by Fedearroz. These services are at the expense of the association and the association shall collect the expense from its members as a part of water charge.

In principal, the water users' association will have the following organization.

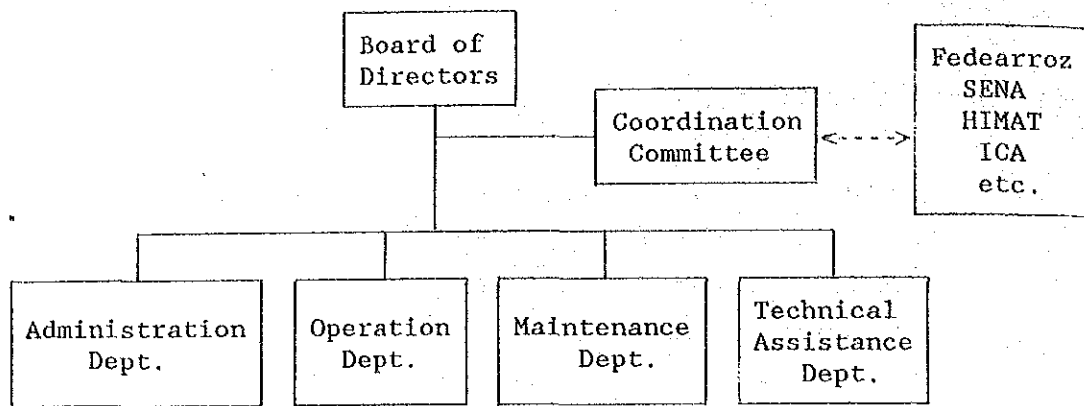


Fig.M-2-1 ORGANIZATION OF WATER USERS ASSOCIATION

Each section shall have the following functions:

- Board of directors: to make final decision on important matter of the association
- Administration Dept.: general affairs and accounting including collection of water charge
- Operation Dept.: operation of facilities and distribution of water
- Maintenance Dept.: maintenance of facilities and administration of machinery and vehicles
- Technical assistance Dept.: technical assistance and extension services of irrigation farming to farmers
- Coordination committee: coordination with relevant organization

### M.2.2 Equipment and Machinery for Operation and Maintenance

The equipment and machinery required for the operation and maintenance after completion of the project are selected as shown in Table M-2-1.

### M.2.3 Operation and Maintenance Cost

The costs for operation and maintenance are shown in Table M-2-2. The equipment and machinery will be replaced before the termination of their durable life, and the replacement cost will all be borne by the beneficiaries and is shown in Table M-2-5.

### M.2.4 Technical Assistance Cost

As explained in 4.3.4, the following technical assistances shall be provided on a contract basis between water users' association and related organizations.

<u>Services</u>	<u>Responsible Organizations</u>
1. Rice cultivation in irrigated fields	Fedearroz
2. Cultivation of non-traditional crop and irrigation farming for upland crops	ICA
3. Operation and Maintenance of Agricultural Machinery	SENA

As disbursement of these costs is proposed as follows;

<u>Project Year</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>Total</u>
Fedearroz	21,000	3,000	3,000				27,000
ICA	7,000	1,000	1,000	1,000	1,000	1,000	12,000
SENA	5,000	2,000	2,000	2,000	2,000	2,000	15,000
<b>Total</b>	<b>33,000</b>	<b>6,000</b>	<b>6,000</b>	<b>3,000</b>	<b>3,000</b>	<b>3,000</b>	<b>54,000</b>

Note: Amounts are represented in thousand of Col\$

## TABLES

Table M-2-1 Acquisition Cost of O/M Equipment

(Unit: Col. \$1,000)

Equipment and Machinery	Capacity	Quantity	Investment	
			Unit Price	Total Price
Tractor shovel	1.14 m3	2	37,847	75,694
Backhoe (wheel type)	0.4 m3	2	33,348	66,696
Backhoe (crawler type)	0.4 m3	2	46,936	93,872
Bulldozer	105 HP	2	54,117	108,234
Drag-line (crawler type)	0.57 m3	2	57,618	115,236
Truck crane	52 HP	1	32,169	32,169
Motorgrador	100 HP	2	16,351	32,702
Vibrating Compactor	48 HP	2	22,949	45,898
Tractor	44 HP	4	9,345	37,380
Dump truck	3.8 m3	5	9,339	46,695
Vehicle		4	7,500	30,000
Motocycle		10	978	9,780
TOTAL				694,356

NOTE : Price on December, 1988

Table M-2-2 Annual Operation and Maintenance Cost

(Unit: Col.\$)

	Description	Annual Cost	Total
20	Personal Expense		
01	Salary	45,006,420	
02	A.D.T	2,381,400	
03	S.D.A.	2,673,000	
04	B.P.S.P (01 * 50%)	22,503,210	
05	H.E (01 * 15%)	6,750,963	
06	P.D.S ((01+02+03+04)/12)/2	3,023,501	
07	P.D.V ((01+02+03+(04+05+06))/12)	6,861,541	
08	P.D.J ((01+02+03+(04+05+06+07))/12)	7,433,336	
09	P.D.N ((01+02+03+(04+05+06+07))/12)	7,433,336	
10	B.E.D.R (01/30*2)	3,000,428	
11	B.Q ((01+02+03+(04+05+06))/12)	6,861,541	
12	F.N.A (01+05)*8%	4,140,591	
13	ICBF (01+05)*3%	1,552,721	
14	SENA (01+05)*2%	1,035,148	
15	CAJA COMP. (01+05)*4%	2,070,295	
			122,727,432
21	Security	1,056,000	
			1,056,000
22	Travel Expense	475,200	
			475,200
23	Materials and Provision	2,098,800	
			2,098,800
24	Maintenance and store		
01	Office equipment	380,160	
02	Communication equipment	158,400	
			538,560
25	Rental	2,661,120	
			2,661,120
26	Public Service	475,200	
			475,200
27	Maintenance works of Facilities O/M of Machinery	129,663,600	
			129,663,600
			259,695,912

Table M-2-3 Personnel Expenses for O/M

Description	No.	Salary (\$/m)	Salary (\$/y)	Total (\$)	Remarks
<b>ADMINISTRATION</b>					
General administrator	1	174,500	2,094,000	2,094,000	
Section chief	1	126,500	1,518,000	1,518,000	
Treasurer	1	81,500	978,000	978,000	
Director secretary	1	81,000	972,000	972,000	
Treasure Secretary	1	39,000	468,000	468,000	
Warehouse man	1	81,000	972,000	972,000	
Auxiliary	2	42,800	513,600	1,027,200	
General auxiliary	3	44,500	534,000	1,602,000	
Driver	1	39,400	472,800	472,800	
Subtotal	12			10,104,000	
<b>OPERATION</b>					
Section chief	1	126,500	1,518,000	1,518,000	
Zones chief	3	68,100	817,200	2,451,600	
Registry chief	1	58,800	705,600	705,600	
Secretary	1	35,000	420,000	420,000	
Operator (Headwork)	2	32,970	395,640	791,280	
Canal operator	12	35,340	424,080	5,088,960	
Driver	1	39,400	472,800	472,800	
Caretaker	5	27,115	325,380	1,626,900	
Subtotal	26			13,075,140	
<b>MAINTENANCE</b>					
Section chief	1	126,500	1,518,000	1,518,000	
Inspector	2	68,100	817,200	1,634,400	
Technical assistant	2	28,597	343,164	686,328	
Topographer	1	61,700	740,400	740,400	
Secretary	1	35,000	420,000	420,000	
Mechanic	1	54,280	651,360	651,360	
Helper	7	28,597	343,164	2,402,148	
Machine operator	7	62,214	746,568	5,225,976	
Driver	10	38,797	465,564	4,655,640	
Surveyor	2	35,340	424,080	848,160	
Path-finger man	2	31,967	383,604	767,208	
Caretaker	7	27,115	325,380	2,277,660	
Subtotal	43			21,827,280	
Total	81			45,006,420	

Table M-2-4 Operating and Maintenance Cost of O/M Equipment

Machinery and Equipment	Quantity	O/M Cost	
		Unit Cost (\$/hr)	Total Cost (\$/year)
Tractor shovel	2	5,840	14,016,000
Backhoe (wheel type)	2	5,733	13,759,200
Backhoe (crawler type)	2	7,423	17,815,200
Bulldozer	2	6,779	16,269,600
Drag-line (crawler type)	2	7,305	17,532,000
Truck crane	1	4,439	5,326,800
Motor grador	2	2,999	7,197,600
Vibrating Compactor	2	2,841	6,818,400
Agricultural Tractor	4	1,631	7,828,800
Dump truck	5	3,070	18,420,000
Vehicle	4	675	3,240,000
Motocycle	10	120	1,440,000
<b>TOTAL</b>			<b>129,663,600</b>

NOTE : Price on December 1988



Table M-2-5 Replacement and Repair Cost

(Unit: Col. \$1,000)

Year	Equip.	Gate	Total
1			0
2			0
3			0
4			0
5			0
6			0
7			0
8			0
9			0
10			0
11			0
12			0
13			0
14			0
15	729,074		729,074
16			0
17			0
18			0
19			0
20			0
21			0
22			0
23	729,074		729,074
24			0
25			0
26			0
27			0
28			0
29			0
30			0
31	729,074		729,074
32		851,513	851,513
33		196,230	196,230
34		196,230	196,230
35		196,230	196,230
36		196,230	196,230
37			0
38			0
39	729,074		729,074
40			0
41			0
42			0
43			0
44			0
45			0
46			0
47	729,074		729,074
48			0
49			0
50			0
51			0
52			0
<b>Total</b>	<b>3,645,370</b>	<b>1,636,433</b>	<b>5,281,803</b>

FIGURES

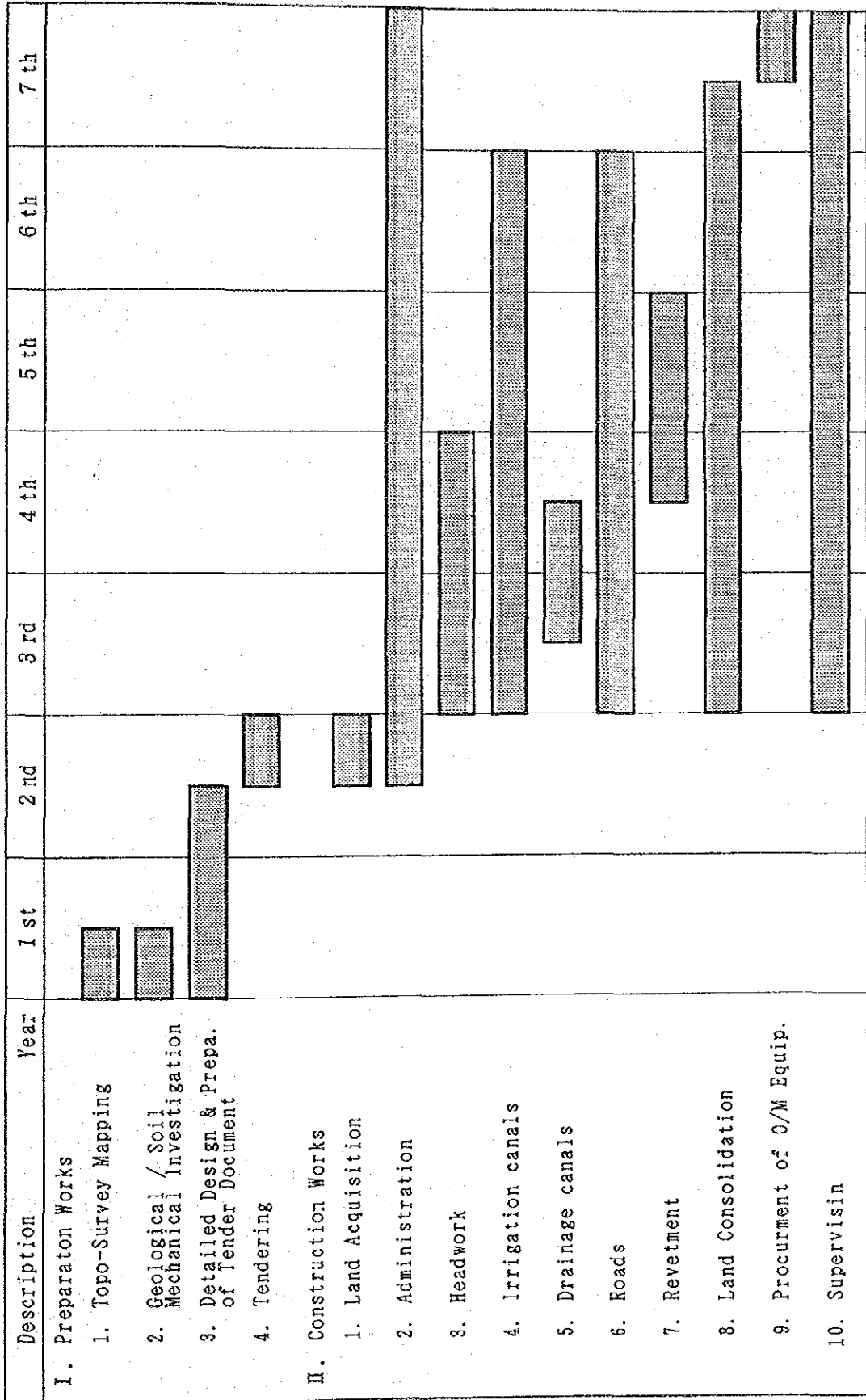


Fig. M-1-2 Implementation Schedule of the Project



ANNEX N : PROJECT EVALUATION



## ANNEX N : PROJECT EVALUATION

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## ANNEX N : PROJECT EVALUATION

### N.1 Economic Evaluation

#### N.1.1 Benefit

Increase of agricultural products and saving of transportation expenses are expected after completion of the work. These are appraised as direct benefits of the project.

##### (1) Increase of Agricultural Products in Target Year

Items	Agricultural Products (Col.\$1,000)
With project	18,150,228
Without project	9,875,172
Increase	8,275,056

(Refer to Tables N-1-1, N-1-3 to N-1-12)

Increased agricultural products are estimated based on the following assumptions;

- The exchange rate, US\$ 1.00 equals to Col.\$ 332.56 as formal rate in December, 1988 is applied.
- Foreign currency portion of the project cost is adjusted multiplying the estimated cost by 1.2 which is shadow exchange price factor and is applied for similar project in Colombia.
- The value of agricultural products is estimated applying the prices at the farm yards during the period of the latter half of 1988. For imported and exported crops as shown below are adopted the shadow prices which are calculated based on the international market prices

- 1) Imported crops; rice, maize, sorghum, soybean
- 2) Exported crops; cotton, cacao, oilpalm, beef

In this study, Agricultural Outlook, March 1989, Department of Agriculture, U.S.A. and the data obtained from IDEMA, FEDELAGODON, FEDECACAO, FEDEPALMA, FRIGORIFIT de GUADALUPE, CIGA and HIMAT were referred.

- Concerning the value of the agricultural inputs, shadow prices are applied. The actual prices of them are chosen from the data by Caja Agraria, while the shadow prices are calculated referring the exchange price factor by Estimating Shadow Prices in Colombia, World Bank.
- The shadow price for the labor is Col. \$ 840 per man day, which is calculated multiplying Col. \$ 1,200 of actual price by 0.7 of shadow exchange price factor.

- Annual production costs after completion of the project are assumed to be constant from the first year.

(2) Saving of Transportation Expenses

Saving of expenses in transportation by construction of service roads are expected to be Col.\$143,289 as shown in Table N-1-14.

N.1.2 Project Cost

(1) Construction Cost (Agricultural Portion)

The construction cost for economic evaluation is adjusted applying the opportunity costs for labor costs, and its disbursement will be made corresponding to the construction schedule described in Annex M.

Presumed disbursement schedule is as follow;

Year	(Unit: Col.\$1,000)	
	Disbursement	
	(Economic)	(Financial)
1st	431,483	385,253
2nd	598,230	534,134
3rd	5,893,467	5,262,020
4th	5,891,338	5,260,123
5th	4,688,690	4,186,330
6th	4,690,810	4,188,223
7th	1,322,129	1,180,472
Total	23,516,142	20,995,555

(Refer to Table N-1-15, Table N-1-16)

(2) O/M and Replacement Costs

Operation and maintenance cost is estimated to be Col.\$290,860,000 in total. While the replacement costs of the facilities and machinery and their durable life are as follow;

Facilities & Machinery	Durable life (year)	Costs (Col.\$1,000)
Machinery	8	816,563
Gates	30	1,832,807

### (3) Production Costs

The production costs of crops are estimated as follow;

Items	Production Cost (Col.\$1,000)
With project	7,555,614
Without project	4,733,188
Increase	2,822,426

(Refer to Table N-1-2 to Table N-1-13)

#### 1.3 Economic Internal Rate of Return

Economic Internal rate or return is calculated on the benefits and costs for the project life of 50 years. As a result EIRR is 17.2%. (Refer to Table N-1-16)

#### 1.4 Benefit Cost Ratio

Benefit cost ratio is also examined on conditions that the discount rate is 12% and the project life is 50 years and the result is 1.27. (Refer to Table N-1-17)

#### 1.5 Sensitivity Analysis

Sensitivity analysis was made considering the variations of the construction cost, price of products, yield of crops, production costs etc. in future. The results are as follow;

(0) Original Case	:	17.2
(1) 10% increase of construction cost	:	15.9
(2) 10% reduction of construction cost	:	18.7
(3) 15% increase in prices of agricultural products and/or yields	:	20.5
(4) 15% reduction in price of agricultural products and/or yields	:	13.6
(5) 15% increase of production cost	:	15.9
(6) 15% reduction of production cost	:	18.4
(7) Optimistic estimate	:	23.4
(Combination of (2), (3) and (6))		
(8) Conservative estimate	:	11.3
(Combination of (1), (4) and (5))		
(Refer to Tables N-1-18 -N-1-25)		

### N.2 FINANCIAL ANALYSIS

Financial analysis was examined applying the actual prices during the period of the latter half of 1988.

### N.2.1 Benefit

#### (1) Increase of Agricultural Products

Anticipated increase of agricultural products is as follow;

Items	Agricultural Products (Co.\$1,000)
With project	19,415,425
Without project	9,433,735
Increase	9,981,690

(Refer to Tables N-2-1, N-2-3 to N-2-12)

#### (2) Saving Expense in Transportation

Saving expense in transportation by construction of the service roads is estimated to be Col. \$143,289,000 in total.

### N.2.2 Construction Cost

#### (1) Disbursement schedule of the investment for the construction is as follow; (Refer to Annex M)

Year	Disbursement (Col.\$1,000)
1st	385,253
2nd	534,134
3rd	4,262,020
4th	5,260,123
5th	4,186,330
6th	4,188,223
7th	1,180,472
Total	20,996,555

(Refer to Table N-1-15)

#### (2) O/M Cost and Replacement Costs

O/M cost is estimated to be Col.\$259,696,000 and replacement costs are as shown in Table N-2-14.

### (3) Production Costs

Estimated production costs of crops are as follow;

Items	Production Cost (Col. \$1,000)
With project	8,003,004
Without project	5,053,457
Increase	2,949,547

(Refer to Tables N-2-2 to N-2-13)

#### N.2.3 Financial Internal Rate of Return

Financial internal rate of return is calculated to be 23.4 % as shown in Table N-2-14.

#### N.2.4 Benefit Cost Ratio

Benefit cost rate is examined on condition that the discount rate is 12% and the project life is 50 years. As a result, B/C = 1.6. (Refer to Table N-2-15)

#### N.2.5 Sensitivity Analysis

Sensitivity analysis was made for the following cases;

- (0) Original Case : 23.4%
  - (1) 10% increase of construction cost : 21.8
  - (2) 10% resection of construction cost : 25.3
  - (3) 15% increase in price of agricultural products and/or yield : 27.2
  - (4) 15% reduction in price of agricultural products and/or yield : 19.3
  - (5) 15% increase of production cost : 22.1
  - (6) 15% reduction of production cost : 24.1
  - (7) Optimistic estimate : 30.7  
(Combination of (2), (3) and (6))
  - (8) Conservative estimate : 16.5  
(Combination of (1), (4) and (5))
- (Refer to Tables N-2-16, N-2-16 to N-2-23)

### N.3 Repayment Schedule

#### N.3.1 Financing

The foreign portion of the project cost will be procured from the international banking institution(s) and the local currency one will be disbursed from the national treasury.

Presumed financing plan are as follow;

Year	TOTAL		F/C		L/C
	(Col. \$1,000)	[US\$1,000]	(Col. \$1,000)	[US\$1,000]	(Col. \$1,000)
1st	570,009	[ 1,253]	346,183	[ 761]	223,826
2nd	982,319	[ 1,814]	321,963	[ 595]	660,356
3rd	10,538,160	[ 16,356]	5,961,773	[ 9,253]	4,576,387
4th	12,956,092	[ 16,899]	7,374,107	[ 9,618]	5,581,985
5th	12,287,841	[ 13,468]	6,466,167	[ 7,087]	5,821,674
6th	14,762,653	[ 14,220]	7,658,422	[ 7,376]	7,104,231
7th	4,284,307	[ 3,838]	4,022,289	[ 3,416]	262,018
Total	56,381,381	[ 67,848]	32,150,904	[ 38,416]	24,230,477

### N.3.2 Repayment Schedule of Foreign Currency Portion

The conditions for financing of foreign currency are assumed as follow;

Interest per annum : 7 %  
 Grace Period : 5 years  
 Term of repayment : 20 years  
 Amortization : annual repayment  
 Uniformity in the amount of principal

Details on repayment schedule are shown in Table N-3-1.

### N.3.3 Financial Analysis of Model Farmers

#### (1) Financing

Balances of farm household economy are examined presuming the following conditions;

- 1) Agricultural gross incomes are estimated based on the applicable yields of crops with the project and the actual prices at the market, which have been obtained by the field investigations.
- 2) Production costs are also estimated based on the results of farming survey.
- 3) Family labor cost is excluded from the production costs.
- 4) The funds for production are presumed to be financed with credit from the Caja Agraria and the terms of repayment will be as follow;

for annual crops : 6 months  
 for perennial crops : 1 year  
 annual interest : 25 %



- 5) Terminal facilities will be constructed by each farmer, while these investment will be financed with loan from the FFA. The terms of repayment are presumed as below;

Limit of loan : 80 % of the construction cost  
 Annual interest : 24.6 %  
 Term of repayment : 5 years  
 Grace period : 3 years  
 Interest for the grace period will be exempted  
 Amortization : Semi-annual repayment  
 Uniformity in amount of principal

(2) Water Charge

The expenditure for operation and maintenance described in Annex M is divided into a fixed portion and volumetric portion. These expenditure will be borne by the beneficiary.

Presumed water charges are as follow;

Fixed charge per ha. : Col.\$8,356  
 Volumetric charge per 1,000 m<sup>3</sup> : Col.\$ 50  
 (Quantity use of water)  
 (Refer to Table N-3-3)

(3) Burden

Investment for the construction will be borne by the beneficiary in accordance with the provisions of the "Reglamento de Valorizacion" and the terms of repayment are as follow;

Model Farmer	Grace Period Period (year)	Terms of Repayment (years)
Small Scale Farmers Cases 3, 6 and 7	3	7
Medium Scale Farmers Cases 2, 5 and 9	3	7
Large Scale Farmers Cases 1, 4 and 8	3	7

(Note) - Annual interest in 18% in any case  
 - Refer to Table N-3-4

Note: Standard of Repayment by the "Reglamento de Valorizacion"

R (Col. \$)	KR	G (Col. \$)	KG	A (ha)	KA
< 50,000	3	< 30,000	2	< 10	1
50,000 - 20,000	2	30,001 - 200,000	3	10 - 30	2
> 200,00	1	> 200,001	4	> 30	3

R: Solvency (Net Income)

G: Construction Cost

A: Area of Farm land

#### (4) Profit and Loss and Repayment Schedule

Profit and loss and repayment schedule (cash flow) of the model farmers are as shown in Table N-3-5 to N-3-14.

Alternative plans for the model farmers Case 4, 7 and 9 are recommended for decrease the initial fund. The statement of them are shown in Table N-3-15, N-3-16, N-3-17 and N-3-18.

#### N.4 Effect by Improvement of the Road "Trocha-4"

The project cost including the cost for improvement of the "Trocha 4" is Col.\$22,632,297,000 as shown in Table N-4-1. Damages of the products such as vegetables and fruits are expected to be lightened by improvement of the road "Trocha-4". The effect will be as follows;

Reduction of damages for the papaya during transportation is estimated to be Col.\$14,940,000, equivalent to 3% of the selling price.

Economic Internal Rate of Return is calculated to be 16% as shown in Table N-4-2. While the benefit cost ratio is 1.23 on the assumptions that the discount rate is 12% per annum and the project life is 50 years. (Refer to Table N-4-3)

Table N-1-1 Increased Production Value (Economic)

(Unit: Col. \$1,000)

Zone	Without Project	With Project	Increased Production
Upper	2,442,367	3,839,883	1,397,516
Middle	3,926,372	7,324,615	3,398,243
Lower	3,506,433	6,985,730	3,479,297
Total	9,875,172	18,150,228	8,275,056

Table N-1-2 Increased Production Cost (Economic)

(Unit: Col. \$1,000)

Zone	Without Project	With Project	Increased Production Cost
Upper	871,887	1,384,311	512,424
Middle	2,065,506	3,168,008	1,102,502
Lower	1,795,795	3,003,295	1,207,500
Total	4,733,188	7,555,614	2,822,426

Table N-1-3 Production Cost and Value without Project (Economic)  
Upper Zone

Upper Zone

Crop	Area (ha)	Production cost		Production value		N. P. V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	95	195,612	18,583	271,707	25,812	7,229
Upland rice	2,140	145,479	311,325	218,691	467,999	156,674
Maize	1,090	70,672	77,032	139,504	152,059	75,027
Soybean	1,130	134,397	151,869	205,040	231,695	79,827
Sorghum	310	101,037	31,321	210,938	65,391	34,069
Other crops	120	148,976	17,877	234,610	28,153	10,276
Plantain	1,020	88,372	90,139	300,000	306,000	215,861
Cacao	260	77,331	20,106	244,773	63,641	43,535
Papaya	840	138,573	116,401	800,000	672,000	555,599
Oil palm						
Other tree crops	10	70,021	700	80,000	800	100
Pasture	3,195	5,050	16,135		0	-16,135
Cattle	3,195	6,384	20,397	134,215	428,817	408,420
Total			871,887		2,442,367	1,570,481

Table N-1-4 Production Cost and Value without Project (Economic)  
Middle Zone

Middle Zone

Crop	Area (ha)	Production cost		Production value		N. P. V. (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	1,030	195,612	201,480	271,707	279,858	78,378
Upland rice	6,975	145,479	1,014,716	218,691	1,525,370	510,654
Maize	1,890	70,672	133,570	139,504	263,663	130,092
Soybean	3,500	134,397	470,390	205,040	717,640	247,251
Sorghum	590	101,037	59,612	210,938	124,453	64,842
Other crops	120	148,976	17,877	234,610	28,153	10,276
Plantain	590	88,372	52,139	300,000	177,000	124,861
Cacao	380	77,331	29,386	244,773	93,014	63,628
Papaya						
Oil palm	320	114,146	36,527	437,400	139,968	103,441
Other tree crops	10	70,021	700	80,000	800	100
Pasture	4,295	5,050	21,690		0	-21,690
Cattle	4,295	6,384	27,419	134,215	576,453	549,034
Total			2,065,506		3,926,372	1,860,866

Table N-1-5 Production Cost and Value without Project (Economic)  
Lower Zone

Lower Zone

Crop	Area (ha)	Production cost		Production value		N. P. V. (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	2,185	195,612	427,412	271,707	593,680	166,268
Upland rice	6,135	145,479	892,514	218,691	1,341,669	449,156
Maize	540	70,672	38,163	139,504	75,332	37,169
Soybean	1,590	134,397	213,691	205,040	326,014	112,322
Sorghum	510	101,037	51,529	210,938	107,578	56,050
Other crops	160	148,976	23,836	234,610	37,538	13,701
Plantain	760	88,372	67,163	300,000	228,000	160,837
Cacao	230	77,331	17,786	244,773	56,298	38,512
Papaya						
Oil palm						
Other tree crops	10	70,021	700	80,000	800	100
Pasture	5,510	5,050	27,826		0	-27,826
Cattle	5,510	6,384	35,176	134,215	739,525	704,349
Total			1,795,795		3,506,433	1,710,638

Table N-1-6 Production Cost and Value with Project (Economic)  
Upper Zone

Upper Zone

Crop	Area (ha)	Production cost		Production value		N. P. V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	4,575	173,933	795,743	364,485	1,667,519	871,775
Upland rice						
Maize	500	77,488	38,744	174,380	87,190	48,446
Maize (Non irr)	130	77488	10073	139504	18136	8063
Soybean	700	135,202	94,641	230,670	161,469	66,828
Sorghum	300	109,140	32,742	243,390	73,017	40,275
Other crops	235	158,626	37,277	351,915	82,700	45,423
Plantain	960	127,428	122,331	500,000	480,000	357,669
Plantain (Non irr)	60	127428	7646	300000	18000	10354
Cacao	260	125,381	32,599	342,682	89,097	56,498
Papaya	410	178,914	73,355	880,000	360,800	287,445
Papaya (Non irr)	430	178914	76933	800000	344000	267067
Oil palm						
Other tree crops	10	455,273	4,553	880,000	8,800	4,247
Pasture	2,600	14,202	36,925		0	-36,925
Cattle	2,600	7,980	20,748	172,752	449,155	428,407
Total			1,384,311		3,839,883	2,455,573

Table N-1-7 Production Cost and Value with Project (Economic)  
Middle Zone

Middle Zone

Crop	Area (ha)	Production cost		Production value		N. P. V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	14,960	173,933	2,602,038	364,485	5,452,696	2,850,658
Upland rice			0		0	0
Maize	525	77,488	40,681	174,380	91,550	50,868
Maize (Non irr)	25	77488	1,937	139504	3,488	1,550
Soybean	1,200	135,202	162,242	230,670	276,804	114,562
Sorghum	500	109,140	54,570	243,390	121,695	67,125
Other crops	200	158,626	31,725	351,915	70,383	38,658
Plantain	590	127,428	75,183	500,000	295,000	219,817
Cacao	380	125,381	47,645	342,682	130,219	82,574
Papaya			0		0	0
Oil palm	320	237,434	75,979	923,400	295,488	219,509
Other tree crops	10	70,021	700	80,000	800	100
Pasture	3,395	14,202	48,216		0	-48,216
Cattle	3,395	7,980	27,092	172,752	586,493	559,401
Total			3,168,008		7,324,615	4,156,607

Table N-1-8 Production Cost and Value with Project (Economic)  
Lower Zone

Crop	Area (ha)	Production cost		Production value		N. P. V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	14,525	173,933	2,526,377	364,485	5,294,145	2,767,768
Upland rice	0					
Maize	300	77,488	23,246	174,380	52,314	29,068
Maize (Non irr)	220	77,488	17,047	139,504	30,691	13,644
Soybean	850	135,202	114,922	230,670	196,070	81,148
Sorghum	500	109,140	54,570	243,390	121,695	67,125
Other crops	275	158,626	43,622	351,915	96,777	53,154
Plantain	760	127,428	96,845	500,000	380,000	283,155
Cacao	230	125,381	28,838	342,682	78,817	49,979
Papaya			0		0	0
Oil palm			0		0	0
Other tree crops	10	455,273	4,553	880,000	8,800	4,247
Pasture	4,205	14,202	59,719		0	-59,719
Cattle	4,205	7,980	33,556	172,752	726,422	692,866
Total			3,003,295		6,985,730	3,982,434

Table N-1-9 Annual Benefit on Agricultural Production (Economic)

(Unit : Col. \$1,000)

Year	With Project		Upper		Middle		Lower		Sub-total	
	Prd. Cost	N.P.V	Prd. Cost	N.P.V	Prd. Cost	N.P.V	Prd. Cost	N.P.V	Prd. Cost	N.P.V
1	1,384,311	1,868,886	3,253,197	1,868,886	3,168,008	5,993,788	2,825,780	3,003,295	1,884,311	3,253,197
2	1,384,311	2,135,968	3,520,279	2,135,968	3,168,008	6,655,335	3,487,327	3,003,295	4,552,319	9,514,067
3	1,384,311	2,440,945	3,825,256	2,440,945	3,168,008	7,293,457	4,125,449	3,003,295	7,555,614	16,220,704
4	1,384,311	2,448,058	3,832,359	2,448,058	3,168,008	7,319,922	4,151,914	3,003,295	7,555,614	17,495,468
5	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,129,030
6	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,141,775
7	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,150,228
8	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,150,228
9	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,150,228
10	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,150,228
11	1,384,311	2,455,572	3,839,883	2,455,572	3,168,008	7,324,615	4,156,607	3,003,295	7,555,614	18,150,228

Unit : Col. \$1,000

Year	Without Project		Upper		Middle		Lower		Sub-total	
	Prd. Cost	N.P.V	Prd. Cost	N.P.V	Prd. Cost	N.P.V	Prd. Cost	N.P.V	Prd. Cost	N.P.V
1	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	871,887	2,442,367
2	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	2,937,393	6,368,739
3	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
4	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
5	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
6	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
7	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
8	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
9	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
10	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172
11	871,887	1,570,480	2,442,367	1,570,480	2,065,506	3,926,372	1,860,866	1,795,795	4,733,188	9,875,172

Year	Production Cost		Production Value	
	With	Without	With	Without
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	871,887	512,424	3,253,197	810,890
6	2,937,393	1,614,926	9,514,067	3,145,328
7	4,733,188	2,822,426	16,220,704	6,345,592
8	4,733,188	2,822,426	17,495,468	7,620,296
9	4,733,188	2,822,426	18,129,030	8,253,858
10	4,733,188	2,822,426	18,141,775	8,266,603
11	4,733,188	2,822,426	18,150,228	8,275,056

Table N-1-10 Annual Production Value with Project (Economic)  
Upper Zone

Crop	Unit price (\$/ton)	Area (ha)	1st		2nd		3rd		4th		5th	
			Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)
Paddy rice	66,270	4,575	4.50	1,364,334	5.00	1,515,926	5.50	1,667,519	5.50	1,667,519	5.50	1,667,519
Upland rice	66,270											
Maize	87,190	500	1.70	74,112	1.80	78,471	2.00	87,190	2.00	87,190	2.00	87,190
Maize (Non irr)	87,190	130	1.60	18,136	1.60	18,136	1.60	18,136	1.60	18,136	1.60	18,136
Soybean	128,150	700	1.65	148,013	1.70	152,499	1.80	161,469	1.80	161,469	1.80	161,469
Sorghum	81,130	300	2.70	65,715	2.80	68,149	3.00	73,017	3.00	73,017	3.00	73,017
Other crops	234,610	235	1.10	60,647	1.20	66,160	1.30	71,673	1.40	77,187	1.50	82,700
Plantain	50,000	960	7.00	336,000	8.00	384,000	10.00	480,000	10.00	480,000	10.00	480,000
Plantain (Non irr)	50,000	60	6.00	18,000	6.00	18,000	6.00	18,000	6.00	18,000	6.00	18,000
Cacao	543,940	260	0.50	70,712	0.55	77,783	0.63	89,097	0.63	89,097	0.63	89,097
Papaya	40,000	410	20.50	336,200	21.00	344,400	22.00	360,800	22.00	360,800	22.00	360,800
Papaya (Non irr)	40,000	430	20.00	344,000	20.00	344,000	20.00	344,000	20.00	344,000	20.00	344,000
Oil palm	243,000											
Other tree crops	40,000	10	5.00	2,000	9.00	3,600	13.00	5,200	17.00	6,800	22.00	8,800
Cattle	664,430	2,600	0.23	397,329	0.26	449,155	0.26	449,155	0.26	449,155	0.26	449,155
Total				3,235,197		3,520,279		3,825,256		3,832,369		3,839,883



Table N-1-11 Annual Production Value with Project (Economic)  
Middle Zone

Crop	Unit price (\$/ton)	Area (ha)	1st		2nd		3rd		4th		5th	
			Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)
Paddy rice	66,270	14,960	4.50	4,451,296	5.00	4,956,996	5.50	5,452,696	5.50	5,452,696	5.50	5,452,696
Upland rice	66,270											
Maize	87,190	525	1.70	77,817	1.80	82,395	2.00	91,550	2.00	91,550	2.00	91,550
Maize (Non irr)	87,190	25	1.60	3,488	1.60	3,488	1.60	3,488	1.60	3,488	1.60	3,488
Soybean	128,150	1,200	1.65	253,737	1.70	261,426	1.80	276,804	1.80	276,804	1.80	276,804
Sorghum	81,130	500	2.70	109,526	2.80	113,582	3.00	121,695	3.00	121,695	3.00	121,695
Other crops	234,610	200	1.10	51,614	1.20	56,305	1.30	60,999	1.40	65,691	1.50	70,383
Plantain	50,000	590	7.00	206,500	8.00	236,000	10.00	295,000	10.00	295,000	10.00	295,000
Plantain(Non irr)	50,000											
Cacao	543,940	380	0.50	103,349	0.55	113,683	0.63	130,219	0.63	130,219	0.63	130,219
Papaya	40,000											
Papaya (Non irr)	40,000											
Oil palm	243,000	320	2.66	206,842	3.14	244,166	3.52	273,715	3.80	295,488	3.80	295,488
Other tree crops	40,000	10	2.00	800	2.00	800	2.00	800	2.00	800	2.00	800
Cattle	664,430	3,395	0.23	518,820	0.26	586,492	0.26	586,492	0.26	586,492	0.26	586,492
Total				5,993,788		6,655,335		7,293,457		7,319,922		7,324,615

Table N-1-12 Annual Production Value with Project (Economic)  
Lower Zone

Crop	Unit price (\$/ton)	Area (ha)	1st		2nd		3rd		4th		5th	
			Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)
Paddy rice	66,270	14,525	4.50	4,331,573	5.00	4,812,859	5.50	5,294,145	5.50	5,294,145	5.50	5,294,145
Upland rice	66,270	0	3.30									
Maize	87,190	300	1.70	44,467	1.80	47,083	2.00	52,314	2.00	52,314	2.00	52,314
Maize (Non irr)	87,190	220	1.60	30,691	1.60	30,691	1.60	30,691	1.60	30,691	1.60	30,691
Soybean	128,150	850	1.65	179,730	1.70	185,177	1.80	196,070	1.80	196,070	1.80	196,070
Sorghum	81,130	500	2.70	109,526	2.80	113,582	3.00	121,695	3.00	121,695	3.00	121,695
Other crops	234,610	275	1.10	70,970	1.20	77,421	1.30	83,873	1.40	90,325	1.50	96,777
Plantain	50,000	760	7.00	266,000	8.00	304,000	10.00	380,000	10.00	380,000	10.00	380,000
Plantain(Non irr)	50,000	0	6.00									
Cacao	543,940	230	0.50	62,553	0.55	68,808	0.63	78,817	0.63	78,817	0.63	78,817
Papaya	40,000	0	20.50									
Papaya (Non irr)	40,000	0	20.00									
Oil palm	243,000	0										
Other tree crops	40,000	10	5.00	2,000	9.00	3,600	13.00	5,200	17.00	6,800	22.00	8,800
Cattle	664,430	4,205	0.23	642,603	0.26	726,421	0.26	726,421	0.26	726,421	0.26	726,421
Total				5,740,113		6,369,642		6,969,225		6,977,277		6,985,730

Table N-1-13 Production Cost per Hectare (Economic)

Crop	Condition	Production Cost										Farm Labor			Production			Net Prod. Value (\$/ha)
		Seed (\$/ha)	Fert. (\$/ha)	Chem. (\$/ha)	Mech. (\$/ha)	Trans. (\$/ha)	Others (\$/ha)	Subtotal (\$/ha)	person (pns.)	wage (\$/ha)	Total (\$/ha)	Yield (ton/ha)	Unit Price (\$/ton)	Value (\$/ha)				
Paddy rice	without	36.800	40.082	29.078	60.822	8.282	8.200	188.264	14.7	12.348	195.612	4.10	66.270	271.707	76.095			
	with	27.600	25.725	17.532	66.418	11.110	13.200	181.585	14.7	12.348	173.933	5.50	66.270	364.485	190.552			
Upland rice	without	35.512	22.765	24.265	49.803	6.656	0	139.011	7.7	6.468	145.479	3.30	66.270	218.591	73.212			
	with																	
Maize	without	4.720	12.348	8.908	12.120	4.040	4.680	46.816	28.4	23.856	70.672	1.60	87.190	139.504	68.832			
	with	8.740	10.548	8.810	12.120	5.050	7.020	52.288	30.0	25.200	77.488	2.00	87.190	174.380	95.892			
Soybean	without	36.432	13.230	14.531	51.712	4.040	7.800	127.845	7.8	6.552	134.397	1.60	128.150	205.040	70.643			
	with	24.288	15.582	20.864	63.388	5.050	4.350	133.522	2.0	1.680	135.202	1.80	128.150	230.670	95.468			
Sorghum	without	18.400	14.112	5.174	44.743	5.252	8.400	96.081	5.9	4.956	101.037	2.50	81.130	210.938	109.901			
	with	14.720	21.815	11.486	38.784	7.575	7.200	101.580	9.0	7.560	109.140	3.00	81.130	243.390	134.250			
Cotton	without	2.944	21.168	30.988	41.814	4.798	10.640	112.352	43.6	36.624	148.976	1.00	234.610	234.610	85.634			
	with	3.680	16.464	29.086	47.975	5.151	11.750	114.106	53.0	44.520	158.626	1.50	234.610	351.915	193.289			
Kidney bean	without	22.080	21.462	11.064	21.715	2.525	1.650	80.496	35.0	29.400	109.896	0.70	270.000	189.000	79.104			
Plantain (est.)	without	31.740	15.523	21.889	0	8.030	0	71.862	38.7	32.808	104.390	1.50	50.000	80.000	-24.390			
	with	40.480	27.322	38.881	0	5.050	0	111.533	40.7	34.188	145.721	3.00	50.000	150.000	4.279			
Plantain (maint.)	without	0	15.523	21.889	0	10.100	0	47.212	49.0	41.160	88.372	6.00	50.000	300.000	211.628			
	with	0	18.463	47.275	0	17.170	0	82.908	53.0	44.520	127.428	10.00	50.000	500.000	372.572			
Cacao (maint.)	without	0	11.290	9.241	0	8.080	0	26.611	58.0	48.720	77.331	0.45	543.940	244.773	167.442			
	with	0	45.472	15.709	0	12.120	0	73.301	62.0	52.080	125.381	0.63	543.940	342.682	217.901			
Papaya (est.)	without	1.940	29.980	12.828	18.180	3.030	20.000	86.858	58.0	48.720	134.578	2.00	40.000	80.000	-84.578			
	with	4.600	57.918	21.589	18.180	13.130	20.000	135.417	99.0	83.160	218.577	4.00	40.000	160.000	-56.577			
Papaya (maint.)	without	0	29.980	12.828	0	14.645	24.000	81.453	58.0	57.120	138.573	20.00	40.000	800.000	561.427			
	with	0	58.212	15.337	0	16.665	24.000	114.234	77.0	54.680	178.914	22.00	40.000	880.000	701.086			
Oil palm	without	0	10.584	22.432	20.200	18.180	28.470	99.866	17.0	14.280	114.146	1.80	243.000	437.400	323.254			
	with	0	66.150	10.579	40.400	40.400	45.455	202.994	41.0	34.440	237.434	3.80	243.000	923.400	683.366			
Passion Fruit	without	20.930	12.887	8.604	0	15.000	0	57.421	15.0	12.600	70.021	2.00	40.000	80.000	9.379			
	with	27.370	77.665	21.589	18.180	34.340	100.000	279.144	230.0	193.200	472.344	22.00	40.000	880.000	407.556			
Sunflower	without	99.912	24.696	7.673	37.875	3.030	3.600	176.786	15.0	12.600	189.386	1.50	140.600	210.900	21.514			
Pasture	without	0	0	0	5.050	0	0	5.050	0.0	0	5.050	0	0	-5.050				
	with	13.800	3.871	0	22.220	0	0	39.891	13.0	10.920	50.811	0	0	-50.811				
Cattle	without	0	0	0	0	0	0	2.352	4.8	4.032	6.384	0.20	664.430	134.215	127.831			
	with	0	0	0	0	0	0	2.940	6.0	5.040	7.980	0.26	664.430	172.752	164.772			

Note: In pasture with Project, it is assumed that an artificial pasture renovates every five years and improve every year.  
Annual production cost: \$14,202

Table N-1-14 Benefit by Road Construction

Description	Unit	without	with	Remarks
1. Condition				
Capacity	ton	3	8	
Velocity	km/h	10	20	
2. Cost				
Capacity (90%)		2.7	7.2	
Travelin hour	h	0.5	0.25	
Operating Cost	\$/h	3,984	4,605	
Transporting Cost	\$/t	738	160	
3. Road Benefit				
			578	

Description	Road Benefit \$/ton	1st		2nd		3rd		4th		5th	
		Weight ton	Benefit \$1,000	Weight ton	Benefit \$1,000	Weight ton	Benefit \$1,000	Weight ton	Benefit \$1,000	Weight ton	Benefit \$1,000
Upper	578	48,732	28,167	52,454	30,318	57,386	33,169	57,449	33,206	57,523	33,248
Middle	578	77,775	44,954	86,302	49,883	95,459	55,175	95,568	55,238	95,588	55,250
Lower	578	75,732	43,773	84,082	48,599	93,195	53,867	93,263	53,906	94,794	54,791

Table N-1-15 Annual Disbursement Schedule of the Project Cost  
(Agricultural Portion)

Description	Year	(Unit: Col. \$i.000)											
		1st	2nd	3rd	4th	5th	6th	7th	Total				
Detailed Design	F/C	227,144	170,710										397,854
	L/C	139,764	105,040										244,804
	Total	366,908	275,750										642,658
Land Acquisition	F/C												0
	L/C		205,215										205,215
	Total		205,215										205,215
Administration	F/C		8,188	16,375	16,375	16,375	16,375	16,375	16,375	16,375	16,375	16,375	90,063
	L/C		8,188	16,375	16,375	16,375	16,375	16,375	16,375	16,375	16,375	16,375	90,063
	Total		16,375	32,750	32,750	32,750	32,750	32,750	32,750	32,750	32,750	32,750	180,126
Headwork	F/C		547,836	547,836	547,836	547,836	547,836	547,836	547,836	547,836	547,836	547,836	1,295,572
	L/C		235,995	235,995	235,994	235,994	235,994	235,994	235,994	235,994	235,994	235,994	471,989
	Total		783,831	783,831	783,830	783,830	783,830	783,830	783,830	783,830	783,830	783,830	1,767,561
Irrigation Canal	F/C		1,413,935	1,413,935	1,413,935	1,413,935	1,413,935	1,413,935	1,413,935	1,413,935	1,413,935	1,413,935	5,655,739
	L/C		1,401,649	1,401,649	1,401,649	1,401,649	1,401,649	1,401,649	1,401,649	1,401,649	1,401,649	1,401,649	5,605,591
	Total		2,815,584	2,815,584	2,815,584	2,815,584	2,815,584	2,815,584	2,815,584	2,815,584	2,815,584	2,815,584	11,262,330
Drainage Canal	F/C		31,540	31,539	31,539	31,539	31,539	31,539	31,539	31,539	31,539	31,539	53,079
	L/C		18,364	18,364	18,364	18,364	18,364	18,364	18,364	18,364	18,364	18,364	36,728
	Total		49,904	49,903	49,903	49,903	49,903	49,903	49,903	49,903	49,903	49,903	89,807
Road (O/M Road)	F/C		45,357	45,357	45,357	45,357	45,357	45,357	45,357	45,357	45,357	45,357	181,427
	L/C		24,423	24,423	24,423	24,423	24,423	24,423	24,423	24,423	24,423	24,423	97,691
	Total		69,780	69,780	69,780	69,780	69,780	69,780	69,780	69,780	69,780	69,780	279,118
Road (Trocha 4)	F/C		0	0	0	0	0	0	0	0	0	0	0
	L/C		0	0	0	0	0	0	0	0	0	0	0
	Total		0	0	0	0	0	0	0	0	0	0	0
Land Consolidation	F/C		313,380	313,380	313,380	313,380	313,380	313,380	313,380	313,380	313,380	313,380	1,253,520
	L/C		171,758	171,758	171,758	171,758	171,758	171,758	171,758	171,758	171,758	171,758	687,032
	Total		485,138	485,138	485,138	485,138	485,138	485,138	485,138	485,138	485,138	485,138	1,940,552
Revetment	F/C												0
	L/C												0
	Total												0
O/M Equipment	F/C												694,356
	L/C												694,356
	Total												1,388,712
Supervision	F/C			211,685	210,294	210,294	210,294	210,294	210,294	210,294	210,294	210,294	841,165
	L/C			63,090	62,576	62,576	62,576	62,576	62,576	62,576	62,576	62,576	251,396
	Total			274,775	272,870	272,870	272,870	272,870	272,870	272,870	272,870	272,870	1,092,561
Sub-total	F/C	227,144	170,710	2,559,333	2,559,333	2,559,333	2,559,333	2,559,333	2,559,333	2,559,333	2,559,333	2,559,333	10,579,039
	L/C	139,764	318,444	1,931,654	1,931,654	1,931,654	1,931,654	1,931,654	1,931,654	1,931,654	1,931,654	1,931,654	7,810,778
	Total	366,908	489,154	4,490,987	4,490,987	4,490,987	4,490,987	4,490,987	4,490,987	4,490,987	4,490,987	4,490,987	18,389,817
Physical Contingency	F/C		11,337	8,536	379,231	379,231	379,231	379,231	379,231	379,231	379,231	379,231	1,537,085
	L/C		6,988	36,444	281,602	281,602	281,602	281,602	281,602	281,602	281,602	281,602	1,109,553
	Total		18,345	44,980	660,833	660,833	660,833	660,833	660,833	660,833	660,833	660,833	2,646,638
Total	F/C	227,144	179,246	3,048,564	3,048,564	3,048,564	3,048,564	3,048,564	3,048,564	3,048,564	3,048,564	3,048,564	12,076,124
	L/C	146,752	354,888	2,213,456	2,213,456	2,213,456	2,213,456	2,213,456	2,213,456	2,213,456	2,213,456	2,213,456	8,920,431
	Total	385,553	534,134	5,262,020	5,262,020	5,262,020	5,262,020	5,262,020	5,262,020	5,262,020	5,262,020	5,262,020	20,996,555

Table N-1-16 Estimation of EIRR

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	431,483				431,483		-431,483
2	598,230				598,230		-598,230
3	5,893,462				5,893,462		-5,893,462
4	5,891,338				5,891,338		-5,891,338
5	4,688,690		36,960	512,424	5,238,074	838,997	-4,399,077
6	4,690,810		6,720	1,614,926	6,312,456	3,220,600	-3,091,856
7	1,322,129		6,720	2,822,426	4,151,275	6,473,039	2,321,764
8			148,996	2,822,426	2,971,422	7,752,163	4,780,741
9			148,996	2,822,426	2,971,422	8,397,467	5,426,045
10			148,996	2,822,426	2,971,422	8,409,846	5,438,424
11			145,636	2,822,426	2,968,062	8,418,345	5,450,283
12			145,636	2,822,426	2,968,062	8,418,345	5,450,283
13			290,860	2,822,426	3,113,286	8,418,345	5,305,059
14			290,860	2,822,426	3,113,286	8,418,345	5,305,059
15		816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
16			290,860	2,822,426	3,113,286	8,418,345	5,305,059
17			290,860	2,822,426	3,113,286	8,418,345	5,305,059
18			290,860	2,822,426	3,113,286	8,418,345	5,305,059
19			290,860	2,822,426	3,113,286	8,418,345	5,305,059
20			290,860	2,822,426	3,113,286	8,418,345	5,305,059
21			290,860	2,822,426	3,113,286	8,418,345	5,305,059
22			290,860	2,822,426	3,113,286	8,418,345	5,305,059
23		816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
24			290,860	2,822,426	3,113,286	8,418,345	5,305,059
25			290,860	2,822,426	3,113,286	8,418,345	5,305,059
26			290,860	2,822,426	3,113,286	8,418,345	5,305,059
27			290,860	2,822,426	3,113,286	8,418,345	5,305,059
28			290,860	2,822,426	3,113,286	8,418,345	5,305,059
29			290,860	2,822,426	3,113,286	8,418,345	5,305,059
30			290,860	2,822,426	3,113,286	8,418,345	5,305,059
31		816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
32		953,695	290,860	2,822,426	4,066,980	8,418,345	4,351,365
33		219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
34		219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
35		219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
36		219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
37			290,860	2,822,426	3,113,286	8,418,345	5,305,059
38			290,860	2,822,426	3,113,286	8,418,345	5,305,059
39		816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
40			290,860	2,822,426	3,113,286	8,418,345	5,305,059
41			290,860	2,822,426	3,113,286	8,418,345	5,305,059
42			290,860	2,822,426	3,113,286	8,418,345	5,305,059
43			290,860	2,822,426	3,113,286	8,418,345	5,305,059
44			290,860	2,822,426	3,113,286	8,418,345	5,305,059
45			290,860	2,822,426	3,113,286	8,418,345	5,305,059
46			290,860	2,822,426	3,113,286	8,418,345	5,305,059
47		816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
48			290,860	2,822,426	3,113,286	8,418,345	5,305,059
49			290,860	2,822,426	3,113,286	8,418,345	5,305,059
50			290,860	2,822,426	3,113,286	8,418,345	5,305,059
51			290,860	2,822,426	3,113,286	8,418,345	5,305,059
52			290,860	2,822,426	3,113,286	8,418,345	5,305,059
	23,516,142	5,915,619	12,423,040	131,958,946	173,813,747	388,662,602	214,848,855

INTERNAL RATE OF RETURN (IRR) = 17.2%

Table N-1-17 Estimation B/C and NPV (Economic)

(Unit: Col. \$1,000)

Year	Project Costs	Incremental Benefit	Project Return	N.P.V (Dis. Rate=12%)	
				P. Cost	I. Benefit
1	431,483	0	-431,483	385,253	0
2	598,230	0	-598,230	476,905	0
3	5,893,462	0	-5,893,462	4,194,850	0
4	5,891,338	0	-5,891,338	3,744,052	0
5	5,238,074	838,997	-4,399,077	2,972,224	476,069
6	6,312,456	3,220,600	-3,091,856	3,198,087	1,631,656
7	4,151,275	6,473,039	2,321,764	1,877,826	2,928,074
8	2,971,422	7,752,163	4,780,741	1,200,107	3,130,969
9	2,971,422	8,397,467	5,426,045	1,071,525	3,028,211
10	2,971,422	8,409,846	5,438,424	956,718	2,707,745
11	2,968,062	8,418,345	5,450,283	853,247	2,420,073
12	2,968,062	8,418,345	5,450,283	761,828	2,160,779
13	3,113,286	8,418,345	5,305,059	713,485	1,929,267
14	3,113,286	8,418,345	5,305,059	637,040	1,722,560
15	3,929,848	8,418,345	4,488,497	717,969	1,538,000
16	3,113,286	8,418,345	5,305,059	507,844	1,373,214
17	3,113,286	8,418,345	5,305,059	453,432	1,226,084
18	3,113,286	8,418,345	5,305,059	404,850	1,094,718
19	3,113,286	8,418,345	5,305,059	361,474	977,427
20	3,113,286	8,418,345	5,305,059	322,744	872,703
21	3,113,286	8,418,345	5,305,059	288,164	779,199
22	3,113,286	8,418,345	5,305,059	257,290	695,713
23	3,929,848	8,418,345	4,488,497	289,975	621,172
24	3,113,286	8,418,345	5,305,059	205,110	554,618
25	3,113,286	8,418,345	5,305,059	183,134	495,195
26	3,113,286	8,418,345	5,305,059	163,512	442,138
27	3,113,286	8,418,345	5,305,059	145,993	394,766
28	3,113,286	8,418,345	5,305,059	130,351	352,470
29	3,113,286	8,418,345	5,305,059	116,385	314,705
30	3,113,286	8,418,345	5,305,059	103,915	280,987
31	3,929,848	8,418,345	4,488,497	117,116	250,881
32	4,066,980	8,418,345	4,351,365	108,217	224,001
33	3,333,063	8,418,345	5,085,282	79,186	200,001
34	3,333,063	8,418,345	5,085,282	70,702	178,572
35	3,333,063	8,418,345	5,085,282	63,127	159,440
36	3,333,063	8,418,345	5,085,282	56,363	142,357
37	3,113,286	8,418,345	5,305,059	47,006	127,104
38	3,113,286	8,418,345	5,305,059	41,970	113,486
39	3,929,848	8,418,345	4,488,497	47,301	101,327
40	3,113,286	8,418,345	5,305,059	33,458	90,470
41	3,113,286	8,418,345	5,305,059	29,873	80,777
42	3,113,286	8,418,345	5,305,059	26,672	72,122
43	3,113,286	8,418,345	5,305,059	23,815	64,395
44	3,113,286	8,418,345	5,305,059	21,263	57,495
45	3,113,286	8,418,345	5,305,059	18,985	51,335
46	3,113,286	8,418,345	5,305,059	16,951	45,835
47	3,929,848	8,418,345	4,488,497	19,104	40,924
48	3,113,286	8,418,345	5,305,059	13,513	36,539
49	3,113,286	8,418,345	5,305,059	12,065	32,624
50	3,113,286	8,418,345	5,305,059	10,773	29,129
51	3,113,286	8,418,345	5,305,059	9,618	26,008
52	3,113,286	8,418,345	5,305,059	8,588	23,221
	173,813,747	388,662,602	214,848,855	28,570,954	36,296,561

B/C (Discount rate 12%) =

1.27

Table N-1-18 Sensitivity Analysis  
 (1) A 10% Increase in Construction Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	474,632	0	0	0	474,632	0	-474,632
2	658,053	0	0	0	658,053	0	-658,053
3	6,482,809	0	0	0	6,482,809	0	-6,482,809
4	6,480,472	0	0	0	6,480,472	0	-6,480,472
5	5,157,559	0	36,960	512,424	5,706,943	838,997	-4,867,946
6	5,159,891	0	6,720	1,614,926	6,781,537	3,220,600	-3,560,937
7	1,454,342	0	6,720	2,822,426	4,283,488	6,473,039	2,189,551
8	0	0	148,996	2,822,426	2,971,422	7,752,163	4,780,741
9	0	0	148,996	2,822,426	2,971,422	8,397,467	5,426,045
10	0	0	148,996	2,822,426	2,971,422	8,409,846	5,438,424
11	0	0	145,636	2,822,426	2,968,062	8,418,345	5,450,283
12	0	0	145,636	2,822,426	2,968,062	8,418,345	5,450,283
13	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
14	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
15	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
16	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
17	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
18	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
19	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
20	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
21	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
22	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
23	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
24	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
25	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
26	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
27	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
28	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
29	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
30	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
31	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
32	0	953,695	290,860	2,822,426	4,066,980	8,418,345	4,351,365
33	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
34	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
35	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
36	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
37	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
38	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
39	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
40	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
41	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
42	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
43	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
44	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
45	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
46	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
47	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
48	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
49	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
50	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
51	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
52	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
	25,867,756	5,915,619	12,423,040	131,958,946	176,165,361	388,662,602	212,497,241

INTERNAL RATE OF RETURN (IRR) = 15.9%



Table N-1-19 Sensitivity Analysis  
(2) A 10% Reduction in Construction Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	388,335	0	0	0	388,335	0	-388,335
2	538,407	0	0	0	538,407	0	-538,407
3	5,304,116	0	0	0	5,304,116	0	-5,304,116
4	5,302,204	0	0	0	5,302,204	0	-5,302,204
5	4,219,821	0	36,960	512,424	4,769,205	838,997	-3,930,208
6	4,221,729	0	6,720	1,614,926	5,843,375	3,220,600	-2,622,775
7	1,189,916	0	6,720	2,822,426	4,019,062	6,473,039	2,453,977
8	0	0	148,996	2,822,426	2,971,422	7,752,163	4,780,741
9	0	0	148,996	2,822,426	2,971,422	8,397,467	5,426,045
10	0	0	148,996	2,822,426	2,971,422	8,409,846	5,438,424
11	0	0	145,636	2,822,426	2,968,062	8,418,345	5,450,283
12	0	0	145,636	2,822,426	2,968,062	8,418,345	5,450,283
13	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
14	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
15	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
16	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
17	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
18	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
19	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
20	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
21	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
22	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
23	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
24	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
25	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
26	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
27	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
28	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
29	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
30	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
31	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
32	0	953,695	290,860	2,822,426	4,066,980	8,418,345	4,351,365
33	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
34	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
35	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
36	0	219,778	290,860	2,822,426	3,333,063	8,418,345	5,085,282
37	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
38	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
39	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
40	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
41	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
42	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
43	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
44	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
45	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
46	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
47	0	816,563	290,860	2,822,426	3,929,848	8,418,345	4,488,497
48	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
49	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
50	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
51	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
52	0	0	290,860	2,822,426	3,113,286	8,418,345	5,305,059
	21,164,527	5,915,619	12,423,040	131,958,946	171,462,133	388,662,602	217,200,469

INTERNAL RATE OF RETURN (IRR) = 18.7%

Table N-1-20 Sensitivity Analysis  
(3) A 15% Increase in Production Value

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	431,483	0	0	0	431,483	0	-431,483
2	598,230	0	0	0	598,230	0	-598,230
3	5,893,462	0	0	0	5,893,462	0	-5,893,462
4	5,891,338	0	0	0	5,891,338	0	-5,891,338
5	4,688,690	0	36,960	512,424	5,238,074	964,847	-4,273,227
6	4,690,810	0	6,720	1,614,926	6,312,456	3,703,690	-2,608,766
7	1,322,129	0	6,720	2,822,426	4,151,275	7,443,995	3,292,720
8	0	0	148,996	2,822,426	2,971,422	8,914,987	5,943,566
9	0	0	148,996	2,822,426	2,971,422	9,657,087	6,685,665
10	0	0	148,996	2,822,426	2,971,422	9,671,323	6,699,901
11	0	0	145,636	2,822,426	2,968,062	9,681,097	6,713,035
12	0	0	145,636	2,822,426	2,968,062	9,681,097	6,713,035
13	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
14	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
15	0	816,563	290,860	2,822,426	3,929,848	9,681,097	5,751,248
16	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
17	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
18	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
19	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
20	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
21	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
22	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
23	0	816,563	290,860	2,822,426	3,929,848	9,681,097	5,751,248
24	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
25	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
26	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
27	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
28	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
29	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
30	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
31	0	816,563	290,860	2,822,426	3,929,848	9,681,097	5,751,248
32	0	953,695	290,860	2,822,426	4,066,980	9,681,097	5,614,117
33	0	219,778	290,860	2,822,426	3,333,063	9,681,097	6,348,034
34	0	219,778	290,860	2,822,426	3,333,063	9,681,097	6,348,034
35	0	219,778	290,860	2,822,426	3,333,063	9,681,097	6,348,034
36	0	219,778	290,860	2,822,426	3,333,063	9,681,097	6,348,034
37	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
38	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
39	0	816,563	290,860	2,822,426	3,929,848	9,681,097	5,751,248
40	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
41	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
42	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
43	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
44	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
45	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
46	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
47	0	816,563	290,860	2,822,426	3,929,848	9,681,097	5,751,248
48	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
49	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
50	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
51	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
52	0	0	290,860	2,822,426	3,113,286	9,681,097	6,567,811
	23,516,142	5,915,619	12,423,040	131,958,946	173,813,747	446,961,992	273,148,245

INTERNAL RATE OF RETURN (IRR) = 20.5%

Table N-1-21 Sensitivity Analysis  
(4) A 15% Reduction in Production Value

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	431,483	0	0	0	431,483	0	-431,483
2	598,230	0	0	0	598,230	0	-598,230
3	5,893,462	0	0	0	5,893,462	0	-5,893,462
4	5,891,338	0	0	0	5,891,338	0	-5,891,338
5	4,688,690	0	36,960	512,424	5,238,074	713,147	-4,524,926
6	4,690,810	0	6,720	1,614,926	6,312,456	2,737,510	-3,574,946
7	1,322,129	0	6,720	2,822,426	4,151,275	5,502,083	1,350,809
8	0	0	148,996	2,822,426	2,971,422	6,589,339	3,617,917
9	0	0	148,996	2,822,426	2,971,422	7,137,847	4,166,425
10	0	0	148,996	2,822,426	2,971,422	7,148,369	4,176,947
11	0	0	145,636	2,822,426	2,968,062	7,155,593	4,187,531
12	0	0	145,636	2,822,426	2,968,062	7,155,593	4,187,531
13	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
14	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
15	0	816,563	290,860	2,822,426	3,929,848	7,155,593	3,225,745
16	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
17	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
18	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
19	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
20	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
21	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
22	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
23	0	816,563	290,860	2,822,426	3,929,848	7,155,593	3,225,745
24	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
25	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
26	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
27	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
28	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
29	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
30	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
31	0	816,563	290,860	2,822,426	3,929,848	7,155,593	3,225,745
32	0	953,695	290,860	2,822,426	4,066,980	7,155,593	3,088,613
33	0	219,778	290,860	2,822,426	3,333,063	7,155,593	3,822,530
34	0	219,778	290,860	2,822,426	3,333,063	7,155,593	3,822,530
35	0	219,778	290,860	2,822,426	3,333,063	7,155,593	3,822,530
36	0	219,778	290,860	2,822,426	3,333,063	7,155,593	3,822,530
37	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
38	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
39	0	816,563	290,860	2,822,426	3,929,848	7,155,593	3,225,745
40	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
41	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
42	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
43	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
44	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
45	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
46	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
47	0	816,563	290,860	2,822,426	3,929,848	7,155,593	3,225,745
48	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
49	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
50	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
51	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
52	0	0	290,860	2,822,426	3,113,286	7,155,593	4,042,308
	23,516,142	5,915,619	12,423,040	131,958,946	173,813,747	330,363,212	156,549,465

INTERNAL RATE OF RETURN (IRR) = 13.6%

Table N-1-22 Sensitivity Analysis  
(5) A 15% Increase in Production Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	431,483	0	0	0	431,483	0	-431,483
2	598,230	0	0	0	598,230	0	-598,230
3	5,893,462	0	0	0	5,893,462	0	-5,893,462
4	5,891,338	0	0	0	5,891,338	0	-5,891,338
5	4,688,690	0	36,960	589,288	5,314,937	838,997	-4,475,940
6	4,690,810	0	6,720	1,857,165	6,554,695	3,220,600	-3,334,095
7	1,322,129	0	6,720	3,245,790	4,574,639	6,473,039	1,898,400
8	0	0	148,996	3,245,790	3,394,786	7,752,163	4,357,377
9	0	0	148,996	3,245,790	3,394,786	8,397,467	5,002,681
10	0	0	148,996	3,245,790	3,394,786	8,409,846	5,015,060
11	0	0	145,636	3,245,790	3,391,426	8,418,345	5,026,919
12	0	0	145,636	3,245,790	3,391,426	8,418,345	5,026,919
13	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
14	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
15	0	816,563	290,860	3,245,790	4,353,212	8,418,345	4,065,133
16	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
17	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
18	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
19	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
20	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
21	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
22	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
23	0	816,563	290,860	3,245,790	4,353,212	8,418,345	4,065,133
24	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
25	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
26	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
27	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
28	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
29	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
30	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
31	0	816,563	290,860	3,245,790	4,353,212	8,418,345	4,065,133
32	0	953,695	290,860	3,245,790	4,490,344	8,418,345	3,928,001
33	0	219,778	290,860	3,245,790	3,756,427	8,418,345	4,661,918
34	0	219,778	290,860	3,245,790	3,756,427	8,418,345	4,661,918
35	0	219,778	290,860	3,245,790	3,756,427	8,418,345	4,661,918
36	0	219,778	290,860	3,245,790	3,756,427	8,418,345	4,661,918
37	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
38	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
39	0	816,563	290,860	3,245,790	4,353,212	8,418,345	4,065,133
40	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
41	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
42	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
43	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
44	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
45	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
46	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
47	0	816,563	290,860	3,245,790	4,353,212	8,418,345	4,065,133
48	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
49	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
50	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
51	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
52	0	0	290,860	3,245,790	3,536,649	8,418,345	4,881,696
	23,516,142	5,915,619	12,423,040	151,752,788	193,607,589	388,662,602	195,055,013

INTERNAL RATE OF RETURN (IRR) = 15.9%

Table N-1-23 Sensitivity Analysis  
(6) A 15% Reduction in Production Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	431,483	0	0	0	431,483	0	-431,483
2	598,230	0	0	0	598,230	0	-598,230
3	5,893,462	0	0	0	5,893,462	0	-5,893,462
4	5,891,338	0	0	0	5,891,338	0	-5,891,338
5	4,688,690	0	36,960	435,560	5,161,210	838,997	-4,322,213
6	4,690,810	0	6,720	1,372,687	6,070,217	3,220,600	-2,849,617
7	1,322,129	0	6,720	2,399,062	3,727,911	6,473,039	2,745,128
8	0	0	148,996	2,399,062	2,548,058	7,752,163	5,204,105
9	0	0	148,996	2,399,062	2,548,058	8,397,467	5,849,409
10	0	0	148,996	2,399,062	2,548,058	8,409,846	5,861,788
11	0	0	145,636	2,399,062	2,544,698	8,418,345	5,873,647
12	0	0	145,636	2,399,062	2,544,698	8,418,345	5,873,647
13	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
14	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
15	0	816,563	290,860	2,399,062	3,506,485	8,418,345	4,911,861
16	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
17	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
18	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
19	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
20	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
21	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
22	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
23	0	816,563	290,860	2,399,062	3,506,485	8,418,345	4,911,861
24	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
25	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
26	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
27	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
28	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
29	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
30	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
31	0	816,563	290,860	2,399,062	3,506,485	8,418,345	4,911,861
32	0	953,695	290,860	2,399,062	3,643,616	8,418,345	4,774,729
33	0	219,778	290,860	2,399,062	2,909,699	8,418,345	5,508,646
34	0	219,778	290,860	2,399,062	2,909,699	8,418,345	5,508,646
35	0	219,778	290,860	2,399,062	2,909,699	8,418,345	5,508,646
36	0	219,778	290,860	2,399,062	2,909,699	8,418,345	5,508,646
37	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
38	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
39	0	816,563	290,860	2,399,062	3,506,485	8,418,345	4,911,861
40	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
41	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
42	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
43	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
44	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
45	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
46	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
47	0	816,563	290,860	2,399,062	3,506,485	8,418,345	4,911,861
48	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
49	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
50	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
51	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
52	0	0	290,860	2,399,062	2,689,922	8,418,345	5,728,423
	23,516,142	5,915,619	12,423,040	112,165,104	154,019,905	388,662,602	234,642,697

INTERNAL RATE OF RETURN (IRR) = 18.4%

Table N-1-24 Sensitivity Analysis  
(7) Combination of (2), (3) and (6)

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	388,335	0	0	0	388,335	0	-388,335
2	538,407	0	0	0	538,407	0	-538,407
3	5,304,116	0	0	0	5,304,116	0	-5,304,116
4	5,302,204	0	0	0	5,302,204	0	-5,302,204
5	4,219,821	0	36,960	435,560	4,692,341	964,847	-3,727,494
6	4,221,729	0	6,720	1,372,687	5,601,136	3,703,690	-1,897,446
7	1,189,916	0	6,720	2,399,062	3,595,698	7,443,995	3,848,297
8	0	0	148,996	2,399,062	2,548,058	8,914,987	6,366,930
9	0	0	148,996	2,399,062	2,548,058	9,657,087	7,109,029
10	0	0	148,996	2,399,062	2,548,058	9,671,323	7,123,265
11	0	0	145,636	2,399,062	2,544,698	9,681,097	7,136,399
12	0	0	145,636	2,399,062	2,544,698	9,681,097	7,136,399
13	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
14	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
15	0	816,563	290,860	2,399,062	3,506,485	9,681,097	6,174,612
16	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
17	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
18	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
19	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
20	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
21	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
22	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
23	0	816,563	290,860	2,399,062	3,506,485	9,681,097	6,174,612
24	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
25	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
26	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
27	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
28	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
29	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
30	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
31	0	816,563	290,860	2,399,062	3,506,485	9,681,097	6,174,612
32	0	953,695	290,860	2,399,062	3,643,616	9,681,097	6,037,481
33	0	219,778	290,860	2,399,062	2,909,699	9,681,097	6,771,398
34	0	219,778	290,860	2,399,062	2,909,699	9,681,097	6,771,398
35	0	219,778	290,860	2,399,062	2,909,699	9,681,097	6,771,398
36	0	219,778	290,860	2,399,062	2,909,699	9,681,097	6,771,398
37	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
38	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
39	0	816,563	290,860	2,399,062	3,506,485	9,681,097	6,174,612
40	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
41	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
42	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
43	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
44	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
45	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
46	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
47	0	816,563	290,860	2,399,062	3,506,485	9,681,097	6,174,612
48	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
49	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
50	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
51	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
52	0	0	290,860	2,399,062	2,689,922	9,681,097	6,991,175
	21,164,527	5,915,619	12,423,040	112,165,104	151,668,291	446,961,992	295,293,701

INTERNAL RATE OF RETURN (IRR) = 23.4%

Table N-1-25 Sensitivity Analysis  
(8) Combination (1), (4) and (5)

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	474,632	0	0	0	474,632	0	-474,632
2	658,053	0	0	0	658,053	0	-658,053
3	6,482,809	0	0	0	6,482,809	0	-6,482,809
4	6,480,472	0	0	0	6,480,472	0	-6,480,472
5	5,157,559	0	36,960	589,288	5,783,806	713,147	-5,070,659
6	5,159,891	0	6,720	1,857,165	7,023,776	2,737,510	-4,286,266
7	1,454,342	0	6,720	3,245,790	4,706,851	5,502,083	795,232
8	0	0	148,996	3,245,790	3,394,786	6,589,339	3,194,553
9	0	0	148,996	3,245,790	3,394,786	7,137,847	3,743,061
10	0	0	148,996	3,245,790	3,394,786	7,148,369	3,753,583
11	0	0	145,636	3,245,790	3,391,426	7,155,593	3,764,168
12	0	0	145,636	3,245,790	3,391,426	7,155,593	3,764,168
13	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
14	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
15	0	816,563	290,860	3,245,790	4,353,212	7,155,593	2,802,381
16	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
17	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
18	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
19	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
20	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
21	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
22	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
23	0	816,563	290,860	3,245,790	4,353,212	7,155,593	2,802,381
24	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
25	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
26	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
27	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
28	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
29	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
30	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
31	0	816,563	290,860	3,245,790	4,353,212	7,155,593	2,802,381
32	0	953,695	290,860	3,245,790	4,490,344	7,155,593	2,665,249
33	0	219,778	290,860	3,245,790	3,756,427	7,155,593	3,399,166
34	0	219,778	290,860	3,245,790	3,756,427	7,155,593	3,399,166
35	0	219,778	290,860	3,245,790	3,756,427	7,155,593	3,399,166
36	0	219,778	290,860	3,245,790	3,756,427	7,155,593	3,399,166
37	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
38	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
39	0	816,563	290,860	3,245,790	4,353,212	7,155,593	2,802,381
40	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
41	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
42	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
43	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
44	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
45	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
46	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
47	0	816,563	290,860	3,245,790	4,353,212	7,155,593	2,802,381
48	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
49	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
50	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
51	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
52	0	0	290,860	3,245,790	3,536,649	7,155,593	3,618,944
	25,867,756	5,915,619	12,423,040	151,752,788	195,959,203	330,363,212	134,404,009

INTERNAL RATE OF RETURN (IRR) = 11.3%

Table N-2-1 Increased Production Value (Financial)

(Unit: Col. \$1,000)

Zone	Without Project	With Project	Increased Production
Upper	2,215,525	3,845,282	1,629,757
Middle	3,816,151	7,997,721	4,181,570
Lower	3,402,059	7,572,422	4,170,363
Total	9,433,735	19,415,425	9,981,690

Table N-2-2 Increased Production Cost (Financial)

(Unit: Col. \$1,000)

Zone	Without Project	With Project	Increased Production Cost
Upper	958,727	1,496,275	537,548
Middle	2,192,488	3,338,046	1,145,558
Lower	1,902,242	3,168,683	1,266,441
Total	5,053,457	8,003,004	2,949,547

Table N-2-3 Production Cost and Value without Project (Financial)  
Upper Zone

Crop	Area (ha)	Production cost		Production value		N.P.V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	95	204,770	19,453	328,000	31,160	11,707
Upland rice	2,140	151,740	324,724	264,000	564,960	240,236
Maize	1,090	81,580	88,922	104,000	113,360	24,438
Soybean	1,130	140,390	158,641	200,000	226,000	67,359
Sorghum	310	104,660	32,445	163,800	50,778	18,333
Other crops	120	165,530	19,864	210,000	25,200	5,336
Plantain	1,020	106,670	108,803	300,000	306,000	197,197
Cacao	260	98,550	25,623	196,200	51,012	25,389
Papaya	840	163,790	137,584	800,000	672,000	534,416
Oil palm						
Other tree crops	10	77,680	777	80,000	800	23
Pasture	3,195	5,000	15,975		0	-15,975
Cattle	3,195	8,112	25,918	54,540	174,255	148,337
Total			958,727		2,215,525	1,256,798



Table N-2-4 Production Cost and Value without Project (Financial)  
Middle Zone

Middle Zone

Crop	Area (ha)	Production cost		Production value		N. P. V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	1,030	204,770	210,913	328,000	337,840	126,927
Upland rice	6,975	151,740	1,058,387	264,000	1,841,400	783,014
Maize	1,890	81,580	154,186	104,000	196,560	42,374
Soybean	3,500	140,390	491,365	200,000	700,000	208,635
Sorghum	590	104,660	61,749	163,800	96,642	34,893
Other crops	120	165,530	19,864	210,000	25,200	5,336
Plantain	590	106,670	62,935	300,000	177,000	114,065
Cacao	380	98,550	37,449	196,200	74,556	37,107
Papaya						
Oil palm	320	120,460	38,547	412,200	131,904	93,357
Other tree crops	10	77,680	777	80,000	800	23
Pasture	4,295	5,000	21,475		0	-21,475
Cattle	4,295	8,112	34,841	54,540	234,249	199,408
Total			2,192,488		3,816,151	1,623,663

Table N-2-5 Production Cost and Value without Project (Financial)  
Lower Zone

Lower Zone

Crop	Area (ha)	Production cost		Production value		N. P. V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	2,185	204,770	447,422	328,000	716,680	269,258
Upland rice	6,135	151,740	930,925	264,000	1,619,640	688,715
Maize	540	81,580	44,053	104,000	56,160	12,107
Soybean	1,590	140,390	223,220	200,000	318,000	94,780
Sorghum	510	104,660	53,377	163,800	83,538	30,161
Other crops	160	165,530	26,485	210,000	33,600	7,115
Plantain	760	106,670	81,069	300,000	228,000	146,931
Cacao	230	98,550	22,667	196,200	45,126	22,460
Papaya						
Oil palm						
Other tree crops	10	77,680	777	80,000	800	23
Pasture	5,510	5,000	27,550		0	-27,550
Cattle	5,510	8,112	44,697	54,540	300,515	255,818
Total			1,902,242		3,402,059	1,499,818

Table N-2-6 Production Cost and Value with Project (Financial)  
Upper Zone

Upper Zone						
Crop	Area (ha)	Production cost		Production value		N. P. V
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	(\$1,000)
Paddy rice	4,575	181,740	831,461	440,000	2,013,000	1,181,540
Upland rice						
Maize	500	89,310	44,655	130,000	65,000	20,345
Maize (Non irr)	130	89,310	11,610	104,000	13,520	1,910
Soybean	700	138,100	96,670	225,000	157,500	60,830
Sorghum	300	113,880	34,164	189,000	56,700	22,536
Other crops	235	178,430	41,931	315,000	74,025	32,094
Plantain	960	147,680	141,773	500,000	480,000	338,227
Plantain (Non irr)	60	147,680	8,861	300,000	18,000	9,139
Cacao	260	148,830	38,696	274,680	71,417	32,721
Papaya	410	207,970	85,268	880,000	360,800	275,532
Papaya (Non irr)	430	207,970	89,427	800,000	344,000	254,573
Oil palm						
Other tree crops	10	559,030	5,590	880,000	8,800	3,210
Pasture	2,600	15,310	39,806		0	-39,806
Cattle	2,600	10,140	26,364	70,200	182,520	156,156
Total			1,496,275		3,845,282	2,349,006

Table N-2-7 Production Cost and Value with Project (Financial)  
Middle Zone

Middle Zone						
Crop	Area (ha)	Production cost		Production value		N. P. V
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	(\$1,000)
Paddy rice	14,960	181,740	2,718,830	440,000	6,582,400	3,863,570
Upland rice						
Maize	525	89,310	46,888	130,000	68,250	21,362
Maize (Non irr)	25	89,310	2,233	104,000	2,600	367
Soybean	1,200	138,100	165,720	225,000	270,000	104,280
Sorghum	500	113,880	56,940	189,000	94,500	37,560
Other crops	200	178,430	35,686	315,000	63,000	27,314
Plantain	590	147,680	87,131	500,000	295,000	207,869
Cacao	380	148,830	56,555	274,680	104,378	47,823
Papaya						
Oil palm	320	252,760	80,883	870,200	278,464	-197,581
Other tree crops	10	77,680	777	80,000	800	23
Pasture	3,395	15,310	51,977		0	-51,977
Cattle	3,395	10,140	34,425	70,200	238,329	203,904
Total			3,338,046		7,997,721	4,659,675

Table N-2-8 Production Cost and Value with Project (Financial)  
Lower Zone

Lower Zone

Crop	Area (ha)	Production cost		Production value		N.P.V (\$1,000)
		(\$/ha)	(\$1,000)	(\$/ha)	(\$1,000)	
Paddy rice	14,525	181,740	2,639,774	440,000	6,391,000	3,751,227
Upland rice						
Maize	300	89,310	26,793	130,000	39,000	12,207
Maize (Non irr)	220	89,310	19,648	104,000	22,880	3,232
Soybean	850	138,100	117,385	225,000	191,250	73,865
Sorghum	500	113,880	56,940	189,000	94,500	37,560
Other crops	275	178,430	49,068	315,000	86,625	37,557
Plantain	760	147,680	112,237	500,000	380,000	267,763
Cacao	230	148,830	34,231	274,680	63,176	28,946
Papaya						
Oil palm						
Other tree crops	10	559,030	5,590	880,000	8,800	3,210
Pasture	4,205	15,310	64,379		0	-64,379
Cattle	4,205	10,140	42,639	70,200	295,191	252,552
Total			3,168,683		7,572,422	4,403,739

Table N-2-9 Annual Benefit on Agricultural Production (Financial)

(Unit : Col.\$1,000)

Year	Upper			Middle			Lower			Sub-total		
	Prd. Cost	Prod. Value	N.P.V	Prd. Cost	Prod. Value	N.P.V	Prd. Cost	Prod. Value	N.P.V	Prd. Cost	Prod. Value	N.P.V
1												0
2												0
3												0
4												0
5	1,496,275	3,219,800	1,723,525									3,219,800
6	1,496,275	3,501,778	2,005,503	3,338,046	6,520,857	3,182,811						10,022,635
7	1,496,275	3,831,812	2,335,537	3,338,046	7,237,977	3,899,931						17,257,977
8	1,496,275	3,838,347	2,342,072	3,338,046	7,968,803	4,630,757	3,168,683	6,188,188	3,019,505			19,371,200
9	1,496,275	3,845,282	2,349,007	3,338,046	7,993,521	4,655,475	3,168,683	6,864,050	3,695,367			10,658,196
10	1,496,275	3,845,282	2,349,007	3,338,046	7,997,721	4,659,675	3,168,683	7,557,272	4,388,589			11,393,071
11	1,496,275	3,845,282	2,349,007	3,338,046	7,997,721	4,659,675	3,168,683	7,564,647	4,395,964			11,404,646
												19,415,425
												1,496,275
												4,834,321
												8,003,004
												8,003,004
												19,396,075
												19,407,550
												19,415,425

Unit : Col.\$1,000

Year	Upper			Middle			Lower			Sub-total		
	Prd. Cost	Prod. Value	N.P.V	Prd. Cost	Prod. Value	N.P.V	Prd. Cost	Prod. Value	N.P.V	Prd. Cost	Prod. Value	N.P.V
1												0
2												0
3												0
4												0
5	958,727	2,215,525	1,256,798									2,215,525
6	958,727	2,215,525	1,256,798	2,192,488	3,816,151	1,823,663						6,031,676
7	958,727	2,215,525	1,256,798	2,192,488	3,816,151	1,823,663						9,433,735
8	958,727	2,215,525	1,256,798	2,192,488	3,816,151	1,823,663	1,902,242	3,402,059	1,499,817			9,433,735
9	958,727	2,215,525	1,256,798	2,192,488	3,816,151	1,823,663	1,902,242	3,402,059	1,499,817			9,433,735
10	958,727	2,215,525	1,256,798	2,192,488	3,816,151	1,823,663	1,902,242	3,402,059	1,499,817			9,433,735
11	958,727	2,215,525	1,256,798	2,192,488	3,816,151	1,823,663	1,902,242	3,402,059	1,499,817			9,433,735
												2,215,525
												3,151,215
												5,053,457
												5,053,457
												9,433,735
												9,433,735
												9,433,735
												9,433,735
												9,433,735

Year	Production Cost			Production Value		
	With out	With	Increased	Without	With	Increased
1	0	0	0	0	0	0
2	0	0	0	0	0	0
3	0	0	0	0	0	0
4	0	0	0	0	0	0
5	958,727	1,496,275	537,548	2,215,525	3,219,800	1,004,275
6	3,151,215	4,834,321	1,683,106	6,031,676	10,022,635	3,990,959
7	5,053,457	8,003,004	2,949,547	9,433,735	17,257,977	7,824,242
8	5,053,457	8,003,004	2,949,547	9,433,735	18,671,200	9,237,465
9	5,053,457	8,003,004	2,949,547	9,433,735	19,396,075	9,962,340
10	5,053,457	8,003,004	2,949,547	9,433,735	19,407,650	9,973,915
11	5,053,457	8,003,004	2,949,547	9,433,735	19,415,425	9,981,690

Table N-2-10 Annual Production Value with Project (Financial)  
Upper Zone

Upper Zone Crop	Unit price (\$/ton)	Area (ha)	1st		2nd		3rd		4th		5th	
			Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)
Paddy rice	80,000	4,575	4.50	1,647,000	5.00	1,830,000	5.50	2,013,000	5.50	2,013,000	5.50	2,013,000
Upland rice	80,000											
Maize	65,000	500	1.70	55,250	1.80	58,500	2.00	65,000	2.00	65,000	2.00	65,000
Maize (Non irr)	65,000	130	1.60	13,520	1.60	13,520	1.60	13,520	1.60	13,520	1.60	13,520
Soybean	125,000	700	1.65	144,375	1.70	148,750	1.80	157,500	1.80	157,500	1.80	157,500
Sorghum	63,000	300	2.70	51,030	2.80	52,920	3.00	56,700	3.00	56,700	3.00	56,700
Other crops	210,000	235	1.10	54,285	1.20	58,220	1.30	64,155	1.40	59,090	1.50	74,025
Plantain	50,000	980	7.00	336,000	8.00	384,000	10.00	480,000	10.00	480,000	10.00	480,000
Plantain(Non irr)	50,000	60	6.00	18,000	6.00	18,000	6.00	18,000	6.00	18,000	6.00	18,000
Cacao	436,000	260	0.50	56,680	0.55	62,348	0.63	71,417	0.63	71,417	0.63	71,417
Papaya	40,000	410	20.50	336,200	21.00	344,400	22.00	360,800	22.00	360,800	22.00	360,800
Papaya (Non irr)	40,000	480	20.00	344,000	20.00	344,000	20.00	344,000	20.00	344,000	20.00	344,000
Oil palm	229,000											
Other tree crops	40,000	10	5.00	2,000	8.00	3,600	13.00	5,200	17.00	6,800	22.00	8,800
Cattle	270,000	2,600	0.23	161,460	0.26	182,520	0.26	182,520	0.26	182,520	0.26	182,520
Total				3,219,800		3,501,778		3,831,812		3,838,347		3,845,282

Table N-2-11 Annual Production Value with Project (Financial)  
Middle Zone

Crop	Unit price (\$/ton)	Area (ha)	1st		2nd		3rd		4th		5th	
			Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)
Paddy rice	80,000	14,960	4.50	5,385,500	5.00	5,984,000	5.50	6,582,400	5.50	6,582,400	5.50	6,582,400
Upland rice	80,000											
Maize	65,000	525	1.70	58,013	1.80	61,425	2.00	68,250	2.00	68,250	2.00	68,250
Maize (Non irr)	65,000	25	1.60	2,600	1.60	2,600	1.60	2,600	1.60	2,600	1.60	2,600
Soybean	125,000	1,200	1.65	247,500	1.70	255,000	1.80	270,000	1.80	270,000	1.80	270,000
Sorghum	63,000	500	2.70	85,050	2.80	88,200	3.00	94,500	3.00	94,500	3.00	94,500
Other crops	210,000	200	1.10	46,200	1.20	50,400	1.30	54,600	1.40	58,800	1.50	63,000
Plantain	50,000	590	7.00	206,500	8.00	236,000	10.00	295,000	10.00	295,000	10.00	295,000
Plantain(Non irr)	50,000											
Cacao	436,000	380	0.50	82,840	0.55	91,124	0.63	104,378	0.63	104,378	0.63	104,378
Papaya	40,000											
Papaya (Non irr)	40,000											
Oil palm	229,000	320	2.66	194,925	3.14	230,099	3.52	257,946	3.80	278,454	3.80	278,454
Other tree crops	40,000	10	2.00	800	2.00	800	2.00	800	2.00	800	2.00	800
Cattle	270,000	3,395	0.23	210,830	0.26	238,329	0.26	238,329	0.26	238,329	0.26	238,329
Total				6,520,857		7,237,977		7,968,803		7,993,521		7,997,721

Table N-2-12 Annual Production Value with Project (Financial)  
Lower Zone

Crop	Unit price (\$/ton)	Area (ha)	1st		2nd		3rd		4th		5th	
			Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)	Yield (ton)	Value (\$1,000)
Paddy rice	80,000	14,525	4.50	5,229,000	5.00	5,810,000	5.50	6,391,000	5.50	6,391,000	5.50	6,391,000
Upland rice	80,000											
Maize	65,000	300	1.70	33,150	1.80	35,100	2.00	39,000	2.00	39,000	2.00	39,000
Maize (Non irr)	65,000	220	1.60	22,880	1.60	22,880	1.60	22,880	1.60	22,880	1.60	22,880
Soybean	125,000	850	1.65	175,313	1.70	180,625	1.80	191,250	1.80	191,250	1.80	191,250
Sorghum	63,000	500	2.70	85,050	2.80	88,200	3.00	94,500	3.00	94,500	3.00	94,500
Other crops	210,000	275	1.10	63,525	1.20	69,300	1.30	75,075	1.40	80,850	1.50	86,625
Plantain	50,000	760	7.00	266,000	8.00	304,000	10.00	380,000	10.00	380,000	10.00	380,000
Plantain(Non irr)	50,000											
Cacao	436,000	230	0.50	50,140	0.55	55,154	0.63	63,176	0.63	63,176	0.63	63,176
Papaya	40,000											
Papaya (Non irr)	40,000											
Oil palm	229,000	10	5.00	2,000	9.00	3,600	13.00	5,200	17.00	6,800	22.00	8,800
Other tree crops	40,000	4,205	0.23	261,131	0.26	295,191	0.26	295,191	0.26	295,191	0.26	295,191
Cattle	270,000											
Total				6,188,188		6,864,050		7,557,272		7,564,647		7,572,422

Table N-2-13 Production Cost per Hectare (Financial)

Crop	Condition	Production Cost							Farm Labor			Production			Net Prod. Value (\$/ha)
		Seed (\$/ha)	Fert. (\$/ha)	Chem. (\$/ha)	Mech. (\$/ha)	Trans. (\$/ha)	Others (\$/ha)	Subtotal (\$/ha)	person (pns.)	wage (\$/pns.)	Total (\$/ha)	Yield (ton/ha)	Unit Price (\$/ton)	Value (\$/ha)	
Paddy rice	without	40,000	40,900	29,610	60,220	8,200	8,200	187,130	14.7	17,640	204,770	4.10	80,000	328,000	123,230
	with	30,000	26,250	17,990	55,760	11,000	13,200	164,100	14.7	17,640	181,740	5.50	80,000	440,000	258,260
	without with	38,600	23,230	24,760	49,310	6,600	0	142,500	7.7	9,240	151,740	3.30	80,000	254,000	112,260
Maize	without	5,130	12,660	9,090	12,000	4,000	4,680	47,500	28.4	34,080	81,580	1.60	65,000	104,000	22,420
	with	9,500	10,800	8,990	12,000	5,000	7,020	53,310	30.0	36,000	89,310	2.00	65,000	130,000	40,690
Soybean	without	39,600	13,500	14,930	51,200	4,000	7,800	131,030	7.8	9,360	140,390	1.60	125,000	200,000	59,610
	with	26,400	15,900	21,290	62,760	5,000	4,350	135,700	2.0	2,400	138,100	1.80	125,000	225,000	86,900
Sorghum	without	20,000	14,400	5,280	44,300	5,200	8,400	97,580	5.9	7,080	104,660	2.60	63,000	163,800	59,140
	with	16,000	22,250	11,720	38,400	7,500	7,200	103,080	9.0	10,800	113,880	3.00	63,000	189,000	75,120
Cotton	without	3,200	21,600	31,620	41,400	4,750	10,640	113,210	43.6	52,320	165,530	1.00	210,000	210,000	44,470
	with	4,000	16,800	29,680	47,500	5,100	11,750	114,830	53.0	63,600	178,430	1.50	210,000	315,000	136,570
Kidney bean	without	24,000	21,900	11,290	21,500	2,500	1,650	82,840	35.0	42,000	124,840	0.70	270,000	189,000	64,160
Plantain (est.)	without	34,500	15,840	22,030	0	3,000	0	75,370	38.7	46,440	121,810	1.60	50,000	80,000	-41,810
	with	44,000	27,880	39,470	0	5,000	0	116,350	40.7	48,840	165,190	3.00	50,000	150,000	-15,190
Plantain (maint.)	without	0	15,840	22,030	0	10,000	0	47,870	49.0	58,800	106,670	6.00	50,000	300,000	193,330
	with	0	18,840	48,240	0	17,000	0	84,080	53.0	63,600	147,680	10.00	50,000	500,000	352,320
Cacao (maint.)	without	0	11,520	9,430	0	8,000	0	28,950	58.0	69,600	98,550	0.45	436,000	196,200	97,650
	with	0	46,400	16,030	0	12,000	0	74,430	62.0	74,400	148,830	0.63	436,000	274,880	125,850
Papaya (est.)	without	2,000	30,600	13,090	18,000	3,000	20,000	86,690	58.0	69,600	156,290	2.00	40,000	80,000	-76,290
	with	5,000	59,100	22,030	18,000	13,000	20,000	137,130	99.0	118,800	255,930	4.00	40,000	160,000	-95,930
Papaya (maint.)	without	0	30,600	13,090	0	14,500	24,000	82,190	68.0	81,600	163,790	20.00	40,000	800,000	636,210
	with	0	59,400	15,970	0	16,500	24,000	115,570	77.0	92,400	207,970	22.00	40,000	880,000	672,030
Oil palm	without	0	10,800	22,890	20,000	18,000	28,370	100,060	17.0	20,400	120,460	1.80	229,000	412,200	291,740
	with	0	67,500	10,795	40,000	40,000	45,265	203,560	41.0	49,200	252,760	3.80	223,000	870,200	617,440
Passion Fruit	without	22,750	13,150	8,780	0	15,000	15,000	59,680	15.0	18,000	77,680	2.00	40,000	80,000	2,320
	with	29,750	79,250	22,030	18,000	34,000	100,000	283,030	230.0	276,000	559,030	22.00	40,000	880,000	320,970
Sunflower	without	10,860	25,200	7,830	37,500	3,000	3,500	87,990	15.0	18,000	105,990	1.50	150,000	225,000	119,010
	with	0	0	0	5,000	0	0	5,000	0.0	0	5,000				-5,000
Pasture	without	15,000	3,950	0	22,000	0	0	40,950	13.0	15,600	56,550				-56,550
	with	0	0	0	0	0	0	0	4.8	5,760	8,112	0.20	270,000	54,540	46,428
Cattle	without	0	0	0	0	0	2,940	2,940	6.0	7,200	10,140	0.26	270,000	70,200	60,060
	with	0	0	0	0	0	2,940	2,940	6.0	7,200	10,140	0.26	270,000	70,200	60,060

Note: In pasture with Project, it is assumed that an artificial pasture renovates every five year and improve every year.  
Annual production cost: \$15,310



Table N-2-14 Estimation of FIRR

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	385,253				385,253		-385,253
2	534,134				534,134		-534,134
3	5,262,020				5,262,020		-5,262,020
4	5,260,123				5,260,123		-5,260,123
5	4,186,330		33,000	537,548	4,756,878	1,032,442	-3,724,436
6	4,188,223		6,000	1,683,106	5,877,329	4,066,231	-1,811,098
7	1,180,472		6,000	2,949,547	4,136,019	7,951,749	3,815,730
8			133,032	2,949,547	3,082,579	9,369,332	6,286,753
9			133,032	2,949,547	3,082,579	10,105,954	7,023,375
10			133,032	2,949,547	3,082,579	10,117,158	7,034,579
11			130,032	2,949,547	3,079,579	10,124,979	7,045,400
12			130,032	2,949,547	3,079,579	10,124,979	7,045,400
13			259,696	2,949,547	3,209,243	10,124,979	6,915,736
14			259,696	2,949,547	3,209,243	10,124,979	6,915,736
15		729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
16			259,696	2,949,547	3,209,243	10,124,979	6,915,736
17			259,696	2,949,547	3,209,243	10,124,979	6,915,736
18			259,696	2,949,547	3,209,243	10,124,979	6,915,736
19			259,696	2,949,547	3,209,243	10,124,979	6,915,736
20			259,696	2,949,547	3,209,243	10,124,979	6,915,736
21			259,696	2,949,547	3,209,243	10,124,979	6,915,736
22			259,696	2,949,547	3,209,243	10,124,979	6,915,736
23		729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
24			259,696	2,949,547	3,209,243	10,124,979	6,915,736
25			259,696	2,949,547	3,209,243	10,124,979	6,915,736
26			259,696	2,949,547	3,209,243	10,124,979	6,915,736
27			259,696	2,949,547	3,209,243	10,124,979	6,915,736
28			259,696	2,949,547	3,209,243	10,124,979	6,915,736
29			259,696	2,949,547	3,209,243	10,124,979	6,915,736
30			259,696	2,949,547	3,209,243	10,124,979	6,915,736
31		729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
32		851,513	259,696	2,949,547	4,060,756	10,124,979	6,064,223
33		196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
34		196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
35		196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
36		196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
37			259,696	2,949,547	3,209,243	10,124,979	6,915,736
38			259,696	2,949,547	3,209,243	10,124,979	6,915,736
39		729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
40			259,696	2,949,547	3,209,243	10,124,979	6,915,736
41			259,696	2,949,547	3,209,243	10,124,979	6,915,736
42			259,696	2,949,547	3,209,243	10,124,979	6,915,736
43			259,696	2,949,547	3,209,243	10,124,979	6,915,736
44			259,696	2,949,547	3,209,243	10,124,979	6,915,736
45			259,696	2,949,547	3,209,243	10,124,979	6,915,736
46			259,696	2,949,547	3,209,243	10,124,979	6,915,736
47		729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
48			259,696	2,949,547	3,209,243	10,124,979	6,915,736
49			259,696	2,949,547	3,209,243	10,124,979	6,915,736
50			259,696	2,949,547	3,209,243	10,124,979	6,915,736
51			259,696	2,949,547	3,209,243	10,124,979	6,915,736
52			259,696	2,949,547	3,209,243	10,124,979	6,915,736
	20,996,555	5,281,803	11,092,000	137,899,816	175,270,174	467,891,984	292,621,810

INTERNAL RATE OF RETURN (IRR) = 23.4%

Table N-2-15 Estimation B/C and NPV (Financial)

(Unit: Col. \$1,000)

Year	Project Costs	Incremental Benefit	Project Return	N. P. V (Dis. Rate=12%)	
				P. Costs	I. Benefit
1	385,253	0	-385,253	343,976	0
2	534,134	0	-534,134	425,808	0
3	5,262,020	0	-5,262,020	3,745,402	0
4	5,260,123	0	-5,260,123	3,342,903	0
5	4,756,878	1,032,442	-3,724,436	2,699,180	585,835
6	5,877,329	4,066,231	-1,811,098	2,977,638	2,060,079
7	4,136,019	7,951,749	3,815,730	1,870,925	3,596,967
8	3,082,579	9,369,332	6,286,753	1,245,002	3,784,116
9	3,082,579	10,105,954	7,023,375	1,111,609	3,644,308
10	3,082,579	10,117,158	7,034,579	992,508	3,257,454
11	3,079,579	10,124,979	7,045,400	885,305	2,910,690
12	3,079,579	10,124,979	7,045,400	790,451	2,598,830
13	3,209,243	10,124,979	6,915,736	735,476	2,320,384
14	3,209,243	10,124,979	6,915,736	656,675	2,071,771
15	3,938,317	10,124,979	6,186,662	719,516	1,849,796
16	3,209,243	10,124,979	6,915,736	523,497	1,651,603
17	3,209,243	10,124,979	6,915,736	467,408	1,474,646
18	3,209,243	10,124,979	6,915,736	417,329	1,316,648
19	3,209,243	10,124,979	6,915,736	372,615	1,175,579
20	3,209,243	10,124,979	6,915,736	332,692	1,049,624
21	3,209,243	10,124,979	6,915,736	297,046	937,164
22	3,209,243	10,124,979	6,915,736	265,220	836,754
23	3,938,317	10,124,979	6,186,662	290,600	747,102
24	3,209,243	10,124,979	6,915,736	211,432	667,055
25	3,209,243	10,124,979	6,915,736	188,778	595,585
26	3,209,243	10,124,979	6,915,736	168,552	531,772
27	3,209,243	10,124,979	6,915,736	150,493	474,797
28	3,209,243	10,124,979	6,915,736	134,369	423,925
29	3,209,243	10,124,979	6,915,736	119,972	378,505
30	3,209,243	10,124,979	6,915,736	107,118	337,951
31	3,938,317	10,124,979	6,186,662	117,369	301,742
32	4,060,756	10,124,979	6,064,223	108,051	269,412
33	3,405,473	10,124,979	6,719,506	80,906	240,547
34	3,405,473	10,124,979	6,719,506	72,238	214,774
35	3,405,473	10,124,979	6,719,506	64,498	191,762
36	3,405,473	10,124,979	6,719,506	57,588	171,216
37	3,209,243	10,124,979	6,915,736	48,455	152,872
38	3,209,243	10,124,979	6,915,736	43,263	136,493
39	3,938,317	10,124,979	6,186,662	47,403	121,868
40	3,209,243	10,124,979	6,915,736	34,489	108,811
41	3,209,243	10,124,979	6,915,736	30,794	97,153
42	3,209,243	10,124,979	6,915,736	27,494	86,744
43	3,209,243	10,124,979	6,915,736	24,549	77,450
44	3,209,243	10,124,979	6,915,736	21,918	69,151
45	3,209,243	10,124,979	6,915,736	19,570	61,742
46	3,209,243	10,124,979	6,915,736	17,473	55,127
47	3,938,317	10,124,979	6,186,662	19,145	49,221
48	3,209,243	10,124,979	6,915,736	13,930	43,947
49	3,209,243	10,124,979	6,915,736	12,437	39,238
50	3,209,243	10,124,979	6,915,736	11,105	35,034
51	3,209,243	10,124,979	6,915,736	9,915	31,281
52	3,209,243	10,124,979	6,915,736	8,852	27,929
	175,270,174	467,891,984	292,621,810	27,480,937	43,862,453

B/C (Discount Rate 12%) = 1.60

Table N-2-16 Sensitivity Analysis  
 (1) A 10% Increase in Construction Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	423,778	0	0	0	423,778	0	-423,778
2	587,547	0	0	0	587,547	0	-587,547
3	5,788,222	0	0	0	5,788,222	0	-5,788,222
4	5,786,135	0	0	0	5,786,135	0	-5,786,135
5	4,604,963	0	33,000	537,548	5,175,511	1,032,442	-4,143,069
6	4,607,045	0	6,000	1,683,106	6,296,151	4,066,231	-2,229,920
7	1,298,519	0	6,000	2,949,547	4,254,066	7,951,749	3,697,683
8	0	0	133,032	2,949,547	3,082,579	9,369,332	6,286,753
9	0	0	133,032	2,949,547	3,082,579	10,105,954	7,023,375
10	0	0	133,032	2,949,547	3,082,579	10,117,158	7,034,579
11	0	0	130,032	2,949,547	3,079,579	10,124,979	7,045,400
12	0	0	130,032	2,949,547	3,079,579	10,124,979	7,045,400
13	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
14	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
15	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
16	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
17	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
18	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
19	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
20	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
21	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
22	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
23	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
24	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
25	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
26	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
27	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
28	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
29	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
30	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
31	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
32	0	851,513	259,696	2,949,547	4,060,756	10,124,979	6,064,223
33	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
34	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
35	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
36	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
37	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
38	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
39	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
40	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
41	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
42	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
43	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
44	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
45	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
46	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
47	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
48	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
49	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
50	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
51	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
52	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
	23,096,211	5,281,803	11,092,000	137,899,816	177,369,830	467,891,984	290,522,155

INTERNAL RATE OF RETURN (IRR) = 21.8%

Table N-2-17 Sensitivity Analysis  
(2) A 10% Reduction in Construction Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	346,728	0	0	0	346,728	0	-346,728
2	480,721	0	0	0	480,721	0	-480,721
3	4,735,818	0	0	0	4,735,818	0	-4,735,818
4	4,734,111	0	0	0	4,734,111	0	-4,734,111
5	3,767,697	0	33,000	537,548	4,338,245	1,032,442	-3,305,803
6	3,769,401	0	6,000	1,683,106	5,458,507	4,066,231	-1,392,276
7	1,062,425	0	6,000	2,949,547	4,017,972	7,951,749	3,933,777
8	0	0	133,032	2,949,547	3,082,579	9,369,332	6,286,753
9	0	0	133,032	2,949,547	3,082,579	10,105,954	7,023,375
10	0	0	133,032	2,949,547	3,082,579	10,117,158	7,034,579
11	0	0	130,032	2,949,547	3,079,579	10,124,979	7,045,400
12	0	0	130,032	2,949,547	3,079,579	10,124,979	7,045,400
13	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
14	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
15	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
16	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
17	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
18	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
19	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
20	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
21	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
22	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
23	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
24	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
25	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
26	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
27	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
28	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
29	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
30	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
31	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
32	0	851,513	259,696	2,949,547	4,060,756	10,124,979	6,064,223
33	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
34	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
35	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
36	0	196,230	259,696	2,949,547	3,405,473	10,124,979	6,719,506
37	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
38	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
39	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
40	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
41	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
42	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
43	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
44	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
45	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
46	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
47	0	729,074	259,696	2,949,547	3,938,317	10,124,979	6,186,662
48	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
49	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
50	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
51	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
52	0	0	259,696	2,949,547	3,209,243	10,124,979	6,915,736
	18,896,900	5,281,803	11,092,000	137,899,816	173,170,519	467,891,984	294,721,466

INTERNAL RATE OF RETURN (IRR) = 25.3%

Table N-2-18 Sensitivity Analysis  
(3) A 15% Increase in Production Value

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	385,253	0	0	0	385,253	0	-385,253
2	534,134	0	0	0	534,134	0	-534,134
3	5,262,020	0	0	0	5,262,020	0	-5,262,020
4	5,260,123	0	0	0	5,260,123	0	-5,260,123
5	4,186,330	0	33,000	537,548	4,756,878	1,183,083	-3,573,795
6	4,188,223	0	6,000	1,683,106	5,877,329	4,664,875	-1,212,454
7	1,180,472	0	6,000	2,949,547	4,136,019	9,125,385	4,989,366
8	0	0	133,032	2,949,547	3,082,579	10,754,952	7,672,373
9	0	0	133,032	2,949,547	3,082,579	11,600,305	8,517,726
10	0	0	133,032	2,949,547	3,082,579	11,613,245	8,530,666
11	0	0	130,032	2,949,547	3,079,579	11,622,233	8,542,654
12	0	0	130,032	2,949,547	3,079,579	11,622,233	8,542,654
13	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
14	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
15	0	729,074	259,696	2,949,547	3,938,317	11,622,233	7,683,916
16	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
17	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
18	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
19	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
20	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
21	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
22	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
23	0	729,074	259,696	2,949,547	3,938,317	11,622,233	7,683,916
24	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
25	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
26	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
27	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
28	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
29	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
30	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
31	0	729,074	259,696	2,949,547	3,938,317	11,622,233	7,683,916
32	0	851,513	259,696	2,949,547	4,060,756	11,622,233	7,561,477
33	0	196,230	259,696	2,949,547	3,405,473	11,622,233	8,216,760
34	0	196,230	259,696	2,949,547	3,405,473	11,622,233	8,216,760
35	0	196,230	259,696	2,949,547	3,405,473	11,622,233	8,216,760
36	0	196,230	259,696	2,949,547	3,405,473	11,622,233	8,216,760
37	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
38	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
39	0	729,074	259,696	2,949,547	3,938,317	11,622,233	7,683,916
40	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
41	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
42	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
43	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
44	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
45	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
46	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
47	0	729,074	259,696	2,949,547	3,938,317	11,622,233	7,683,916
48	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
49	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
50	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
51	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
52	0	0	259,696	2,949,547	3,209,243	11,622,233	8,412,990
	20,996,555	5,281,803	11,092,000	137,899,816	175,270,174	537,075,610	361,805,436

INTERNAL RATE OF RETURN (IRR) = 27.2%

Table N-2-19 Sensitivity Analysis  
(4) A 15% Reduction in Production Value

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	385,253	0	0	0	385,253	0	-385,253
2	534,134	0	0	0	534,134	0	-534,134
3	5,262,020	0	0	0	5,262,020	0	-5,262,020
4	5,260,123	0	0	0	5,260,123	0	-5,260,123
5	4,186,330	0	33,000	537,548	4,756,878	881,801	-3,875,077
6	4,188,223	0	6,000	1,683,106	5,877,329	3,467,587	-2,409,742
7	1,180,472	0	6,000	2,949,547	4,136,019	6,778,113	2,642,094
8	0	0	133,032	2,949,547	3,082,579	7,983,712	4,901,133
9	0	0	133,032	2,949,547	3,082,579	8,611,603	5,529,024
10	0	0	133,032	2,949,547	3,082,579	8,621,071	5,538,492
11	0	0	130,032	2,949,547	3,079,579	8,627,726	5,548,147
12	0	0	130,032	2,949,547	3,079,579	8,627,726	5,548,147
13	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
14	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
15	0	729,074	259,696	2,949,547	3,938,317	8,627,726	4,689,409
16	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
17	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
18	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
19	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
20	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
21	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
22	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
23	0	729,074	259,696	2,949,547	3,938,317	8,627,726	4,689,409
24	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
25	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
26	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
27	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
28	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
29	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
30	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
31	0	729,074	259,696	2,949,547	3,938,317	8,627,726	4,689,409
32	0	851,513	259,696	2,949,547	4,060,756	8,627,726	4,566,970
33	0	196,230	259,696	2,949,547	3,405,473	8,627,726	5,222,253
34	0	196,230	259,696	2,949,547	3,405,473	8,627,726	5,222,253
35	0	196,230	259,696	2,949,547	3,405,473	8,627,726	5,222,253
36	0	196,230	259,696	2,949,547	3,405,473	8,627,726	5,222,253
37	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
38	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
39	0	729,074	259,696	2,949,547	3,938,317	8,627,726	4,689,409
40	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
41	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
42	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
43	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
44	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
45	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
46	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
47	0	729,074	259,696	2,949,547	3,938,317	8,627,726	4,689,409
48	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
49	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
50	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
51	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
52	0	0	259,696	2,949,547	3,209,243	8,627,726	5,418,483
	20,996,555	5,281,803	11,092,000	137,899,816	175,270,174	398,708,358	223,438,184

INTERNAL RATE OF RETURN (IRR) = 19.3%

Table N-2-20 Sensitivity Analysis  
(5) A 15% Increase in Production Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	385,253	0	0	0	385,253	0	-385,253
2	534,134	0	0	0	534,134	0	-534,134
3	5,262,020	0	0	0	5,262,020	0	-5,262,020
4	5,260,123	0	0	0	5,260,123	0	-5,260,123
5	4,186,330	0	33,000	618,180	4,837,510	1,032,442	-3,805,068
6	4,188,223	0	6,000	1,935,572	6,129,795	4,066,231	-2,063,564
7	1,180,472	0	6,000	3,391,979	4,578,451	7,951,749	3,373,298
8	0	0	133,032	3,391,979	3,525,011	9,369,332	5,844,321
9	0	0	133,032	3,391,979	3,525,011	10,105,954	6,580,943
10	0	0	133,032	3,391,979	3,525,011	10,117,158	6,592,147
11	0	0	130,032	3,391,979	3,522,011	10,124,979	6,602,968
12	0	0	130,032	3,391,979	3,522,011	10,124,979	6,602,968
13	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
14	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
15	0	729,074	259,696	3,391,979	4,380,749	10,124,979	5,744,230
16	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
17	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
18	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
19	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
20	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
21	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
22	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
23	0	729,074	259,696	3,391,979	4,380,749	10,124,979	5,744,230
24	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
25	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
26	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
27	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
28	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
29	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
30	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
31	0	729,074	259,696	3,391,979	4,380,749	10,124,979	5,744,230
32	0	851,513	259,696	3,391,979	4,503,188	10,124,979	5,621,791
33	0	196,230	259,696	3,391,979	3,847,905	10,124,979	6,277,074
34	0	196,230	259,696	3,391,979	3,847,905	10,124,979	6,277,074
35	0	196,230	259,696	3,391,979	3,847,905	10,124,979	6,277,074
36	0	196,230	259,696	3,391,979	3,847,905	10,124,979	6,277,074
37	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
38	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
39	0	729,074	259,696	3,391,979	4,380,749	10,124,979	5,744,230
40	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
41	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
42	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
43	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
44	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
45	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
46	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
47	0	729,074	259,696	3,391,979	4,380,749	10,124,979	5,744,230
48	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
49	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
50	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
51	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
52	0	0	259,696	3,391,979	3,651,675	10,124,979	6,473,304
	20,996,555	5,281,803	11,092,000	158,584,788	195,955,146	467,891,984	271,936,838

INTERNAL RATE OF RETURN (IRR) =

22.1%

Table N-2-21 Sensitivity Analysis  
(6) A 15% Reduction in Production Cost

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	385,253	0	0	0	385,253	0	-385,253
2	534,134	0	0	0	534,134	0	-534,134
3	5,262,020	0	0	0	5,262,020	0	-5,262,020
4	5,260,123	0	0	0	5,260,123	0	-5,260,123
5	4,186,330	0	33,000	456,916	4,676,246	1,032,442	-3,643,804
6	4,188,223	0	6,000	1,430,640	5,624,863	4,066,231	-1,558,632
7	1,180,472	0	6,000	2,507,115	3,693,587	7,951,749	4,258,162
8	0	0	133,032	2,507,115	2,640,147	9,369,332	6,729,185
9	0	0	133,032	2,507,115	2,640,147	10,105,954	7,465,807
10	0	0	133,032	2,507,115	2,640,147	10,117,158	7,477,011
11	0	0	130,032	2,507,115	2,637,147	10,124,979	7,487,832
12	0	0	130,032	2,507,115	2,637,147	10,124,979	7,487,832
13	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
14	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
15	0	729,074	259,696	2,507,115	3,495,885	10,124,979	6,629,094
16	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
17	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
18	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
19	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
20	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
21	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
22	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
23	0	729,074	259,696	2,507,115	3,495,885	10,124,979	6,629,094
24	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
25	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
26	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
27	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
28	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
29	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
30	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
31	0	729,074	259,696	2,507,115	3,495,885	10,124,979	6,629,094
32	0	851,513	259,696	2,507,115	3,618,324	10,124,979	6,506,655
33	0	196,230	259,696	2,507,115	2,963,041	10,124,979	7,161,938
34	0	196,230	259,696	2,507,115	2,963,041	10,124,979	7,161,938
35	0	196,230	259,696	2,507,115	2,963,041	10,124,979	7,161,938
36	0	196,230	259,696	2,507,115	2,963,041	10,124,979	7,161,938
37	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
38	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
39	0	729,074	259,696	2,507,115	3,495,885	10,124,979	6,629,094
40	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
41	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
42	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
43	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
44	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
45	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
46	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
47	0	729,074	259,696	2,507,115	3,495,885	10,124,979	6,629,094
48	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
49	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
50	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
51	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
52	0	0	259,696	2,507,115	2,766,811	10,124,979	7,358,168
	20,996,555	5,281,803	11,092,000	117,214,844	154,585,202	467,891,984	313,306,782

INTERNAL RATE OF RETURN (IRR) = 24.7%



Table N-2-22 Sensitivity Analysis  
(7) Combination of (2), (3) and (6)

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	346,728	0	0	0	346,728	0	-346,728
2	480,721	0	0	0	480,721	0	-480,721
3	4,735,818	0	0	0	4,735,818	0	-4,735,818
4	4,734,111	0	0	0	4,734,111	0	-4,734,111
5	3,767,697	0	33,000	456,916	4,257,613	1,183,083	-3,074,530
6	3,769,401	0	6,000	1,430,640	5,206,041	4,664,875	-541,166
7	1,062,425	0	6,000	2,507,115	3,575,540	9,125,385	5,549,846
8	0	0	133,032	2,507,115	2,640,147	10,754,952	8,114,805
9	0	0	133,032	2,507,115	2,640,147	11,600,305	8,960,158
10	0	0	133,032	2,507,115	2,640,147	11,613,245	8,973,098
11	0	0	130,032	2,507,115	2,637,147	11,622,233	8,985,086
12	0	0	130,032	2,507,115	2,637,147	11,622,233	8,985,086
13	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
14	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
15	0	729,074	259,696	2,507,115	3,495,885	11,622,233	8,126,348
16	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
17	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
18	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
19	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
20	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
21	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
22	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
23	0	729,074	259,696	2,507,115	3,495,885	11,622,233	8,126,348
24	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
25	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
26	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
27	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
28	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
29	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
30	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
31	0	729,074	259,696	2,507,115	3,495,885	11,622,233	8,126,348
32	0	851,513	259,696	2,507,115	3,618,324	11,622,233	8,003,909
33	0	196,230	259,696	2,507,115	2,963,041	11,622,233	8,659,192
34	0	196,230	259,696	2,507,115	2,963,041	11,622,233	8,659,192
35	0	196,230	259,696	2,507,115	2,963,041	11,622,233	8,659,192
36	0	196,230	259,696	2,507,115	2,963,041	11,622,233	8,659,192
37	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
38	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
39	0	729,074	259,696	2,507,115	3,495,885	11,622,233	8,126,348
40	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
41	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
42	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
43	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
44	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
45	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
46	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
47	0	729,074	259,696	2,507,115	3,495,885	11,622,233	8,126,348
48	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
49	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
50	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
51	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
52	0	0	259,696	2,507,115	2,766,811	11,622,233	8,855,422
	18,896,900	5,281,803	11,092,000	117,214,844	152,485,546	537,075,610	384,590,064

INTERNAL RATE OF RETURN (IRR) = 30.7%

Table N-2-23 Sensitivity Analysis  
(8) Combination (1), (4) and (5)

(Unit: Col. \$1,000)

Year	Construc. Cost	Replacement Cost	O/M Cost	Incremental Prod. Cost	Project Costs	Incremental Benefit	Project Return
1	423,778	0	0	0	423,778	0	-423,778
2	587,547	0	0	0	587,547	0	-587,547
3	5,788,222	0	0	0	5,788,222	0	-5,788,222
4	5,786,135	0	0	0	5,786,135	0	-5,786,135
5	4,604,963	0	33,000	618,180	5,256,143	881,801	-4,374,342
6	4,607,045	0	6,000	1,935,572	6,548,617	3,467,587	-3,081,030
7	1,298,519	0	6,000	3,391,979	4,696,498	6,778,113	2,081,614
8	0	0	133,032	3,391,979	3,525,011	7,983,712	4,458,701
9	0	0	133,032	3,391,979	3,525,011	8,611,603	5,086,592
10	0	0	133,032	3,391,979	3,525,011	8,621,071	5,096,060
11	0	0	130,032	3,391,979	3,522,011	8,627,726	5,105,714
12	0	0	130,032	3,391,979	3,522,011	8,627,726	5,105,714
13	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
14	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
15	0	729,074	259,696	3,391,979	4,380,749	8,627,726	4,246,976
16	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
17	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
18	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
19	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
20	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
21	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
22	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
23	0	729,074	259,696	3,391,979	4,380,749	8,627,726	4,246,976
24	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
25	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
26	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
27	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
28	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
29	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
30	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
31	0	729,074	259,696	3,391,979	4,380,749	8,627,726	4,246,976
32	0	851,513	259,696	3,391,979	4,503,188	8,627,726	4,124,537
33	0	196,230	259,696	3,391,979	3,847,905	8,627,726	4,779,820
34	0	196,230	259,696	3,391,979	3,847,905	8,627,726	4,779,820
35	0	196,230	259,696	3,391,979	3,847,905	8,627,726	4,779,820
36	0	196,230	259,696	3,391,979	3,847,905	8,627,726	4,779,820
37	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
38	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
39	0	729,074	259,696	3,391,979	4,380,749	8,627,726	4,246,976
40	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
41	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
42	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
43	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
44	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
45	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
46	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
47	0	729,074	259,696	3,391,979	4,380,749	8,627,726	4,246,976
48	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
49	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
50	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
51	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
52	0	0	259,696	3,391,979	3,651,675	8,627,726	4,976,050
	23,096,211	5,281,803	11,092,000	158,584,788	198,054,802	398,708,358	200,653,556

INTERNAL RATE OF RETURN (IRR) =

16.5%

Table N-3-1 Amortization Schedule of Foreign Loan

(Unit: US\$1,000)

Year	Foreign Loan	Accumulated Foreign Loan	Interest Payment	Capital Payment	Total Payment
1	761	761	53	0	53
2	595	1,356	95	0	95
3	9,253	10,609	743	0	743
4	9,618	20,227	2,089	0	2,089
5	7,087	27,314	2,585	0	2,585
6	7,376	34,690	2,585	38	2,623
7	3,416	38,106	2,822	68	2,889
8			2,817	530	3,347
9			2,780	1,011	3,791
10			2,675	1,366	4,041
11			2,546	1,735	4,281
12			2,417	1,905	4,322
13			2,276	1,905	4,181
14			2,134	1,905	4,040
15			1,993	1,905	3,898
16			1,852	1,905	3,757
17			1,711	1,905	3,616
18			1,570	1,905	3,475
19			1,428	1,905	3,334
20			1,287	1,905	3,192
21			1,146	1,905	3,051
22			1,005	1,905	2,910
23			863	1,905	2,769
24			722	1,905	2,628
25			581	1,905	2,486
26			440	1,867	2,307
27			301	1,838	2,139
28			165	1,375	1,540
29			61	894	955
30			24	540	564
31			12	171	183

Table N-3-2 Financing for Terminal Facilities

Description	Cost	Remarks
Construction Cost (\$/ha)	92,728	
Defined Loan (\$/ha)	74,182	80% of Const. Cost
Private Fund (\$/ha)	18,546	

Table N-3-3 Water Charge of Fixed and Volumetric Charge

Description	Cost	Remarks
Administration Cost (\$)	29,192,424	
O/M Cost (\$)	230,503,488	
Total (\$)	259,695,912	
Irrigated Area (ha)	23,815	
Fixed Charge (\$/ha)	8,356	
Consumption Volume (1,000m <sup>3</sup> )	1,212,424	
Volumetric Charge (\$/1,000m <sup>3</sup> )	50	

Table N-3-4 Amortization of Project Cost per Hectare  
(Without Terminal Facilities)

Description	Cost	Remarks
Project Costs (\$ 1,000)	20,996,555	
Land Consolidation (\$ 1,000)	2,539,570	
Project Costs (\$ 1,000) without Land Con.	18,456,985	
Irrigation Area (ha)	23,815	
Amortization (\$/ha)	775,015	

Table N-3-5 Profit and Loss Statement of Model Farmers

(Unit: Col. \$1,000)

Description	Case - 1		Case - 2		Case - 3		Case - 4		Case - 5		Case - 6		Case - 7		Case - 8		Case - 9	
	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with
Holding Area (ha)	120		30		17		89		36		16		13		100		43	
Production Value	26,400	96,280	12,834	28,400	7,751	14,960	9,542	33,659	15,064	27,880	2,419	10,448	6,059	10,640	17,738	55,608	5,824	15,379
Production Cost	15,174	41,388	7,692	10,904	4,953	6,179	5,997	15,706	8,682	10,927	1,403	4,528	3,619	5,507	9,332	22,215	3,151	6,928
Living Expenses	1,773	1,773	1,166	1,196	619	619	1,773	1,773	1,186	1,186	619	619	619	619	1,773	1,773	1,196	1,196
Interest (credit)	1,897	5,174	962	1,303	619	772	871	2,156	1,216	1,551	249	678	472	968	1,238	2,828	459	977
O/M Charge		1,350		354		201		512		392		169		140		708		239
Net Return	7,556	46,595	2,984	12,583	1,560	7,189	901	13,512	3,990	13,814	146	4,454	1,349	3,406	5,395	28,084	1,018	6,039

Table N-3-6 Estimation of Cash Flow of Model Farmer (Model: 1)

(Unit: Col.\$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	10,797	33,646	66,484	74,291	86,721	103,774	125,451	175,000	226,768	278,536
Farm Credit (Long)											
Farm Credit (Short)	21,809	11,899	0	0	0	0	0	0	0	0	0
Sub-total (A)	21,809	11,899	0	0	0	0	0	0	0	0	0
Required Fund (Stage I)											
Production Cost	21,809	21,809	21,809	21,809	21,809	21,809	21,809	21,809	21,809	21,809	21,809
Living Expenses	887	887	887	887	887	887	887	887	887	887	887
Sub-total (B)	22,696	22,696	22,696	22,696	22,696	22,696	22,696	22,696	22,696	22,696	22,696
Farm Income	48,200	48,000	52,800	52,800	52,800	52,800	52,800	52,800	52,800	52,800	52,800
Sub-total (C)	48,200	48,000	52,800	52,800	52,800	52,800	52,800	52,800	52,800	52,800	52,800
Interest (Short)	2,726	1,487	0	0	0	0	0	0	0	0	0
Repayment (short)	21,809	11,899	0	0	0	0	0	0	0	0	0
Sub-total (D)	24,535	13,386	0	0	0	0	0	0	0	0	0
Balance Carried Forward	17,778	34,614	63,750	96,588	104,395	116,825	133,878	155,555	205,104	256,872	308,640
Farm Credit (Short)	2,688	0	0	0	0	0	0	0	0	0	0
Sub-total (E)	2,688	0	0	0	0	0	0	0	0	0	0
Required Fund (Stage II)											
Production Cost	19,579	19,579	19,579	19,579	19,579	19,579	19,579	19,579	19,579	19,579	19,579
Living Expenses	887	887	887	887	887	887	887	887	887	887	887
Sub-total (F)	20,466	20,466	20,466	20,466	20,466	20,466	20,466	20,466	20,466	20,466	20,466
Farm Income	36,327	39,778	43,480	43,480	43,480	43,480	43,480	43,480	43,480	43,480	43,480
Sub-total (G)	36,327	39,778	43,480	43,480	43,480	43,480	43,480	43,480	43,480	43,480	43,480
Term-end Fund											
Amortization (I)	16,740	16,740	16,740	39,991	35,806	31,621	27,435				
Amortization (II)	4,416	2,190	2,190	3,970	3,532	3,094	2,656	2,219			
O/M Charge	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350	1,350
Interest (Short)	336	0	0	0	0	0	0	0	0	0	0
Repayment (Short)	2,688	0	0	0	0	0	0	0	0	0	0
Interest (Long)	0	0	0	0	0	0	0	0	0	0	0
Repayment (Long)	0	0	0	0	0	0	0	0	0	0	0
Sub-total (H)	25,530	20,280	20,280	45,311	40,688	36,065	31,441	3,569	1,350	1,350	1,350
Balance Carried Forward	10,797	33,646	66,484	74,291	86,721	103,774	125,451	175,000	226,768	278,536	330,304

Table N-3-7 Estimation of Cash Flow of Model Farmer (Model: 2)

(Unit: Col. \$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	2,928	9,352	18,566	21,521	25,633	30,900	37,323	50,714	64,660	78,606
Farm Credit (Long)	5,452	3,122	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	5,452	3,122	0	0	0	0	0	0	0	0	0
Sub-total (A)	5,452	3,122	0	0	0	0	0	0	0	0	0
Required Fund (Stage I)	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452
Production Cost	598	598	598	598	598	598	598	598	598	598	598
Living Expenses	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050
Sub-total (B)	10,800	12,000	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
Farm Income	10,800	12,000	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
Sub-total (C)	682	390	0	0	0	0	0	0	0	0	0
Interest (Short)	5,452	3,122	0	0	0	0	0	0	0	0	0
Repayment (short)	6,134	3,512	0	0	0	0	0	0	0	0	0
Sub-total (D)	4,068	3,488	16,502	25,716	28,671	32,783	38,050	44,473	57,864	71,810	85,756
Balance Carried Forward	1,982	0	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	1,982	0	0	0	0	0	0	0	0	0	0
Sub-total (E)	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452	5,452
Required Fund (Stage II)	598	598	598	598	598	598	598	598	598	598	598
Production Cost	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050	6,050
Living Expenses	10,800	12,000	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
Sub-total (F)	10,800	12,000	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
Farm Income	10,800	12,000	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200	13,200
Sub-total (G)	4,185	4,185	4,185	9,998	8,951	7,905	6,859				
Term-end Fund	1,103	547	547	998	883	774	664				
Amortization (I)	354	354	354	354	354	354	354				
Amortization (II)	248	0	0	0	0	0	0				
O/M Charge	1,982	0	0	0	0	0	0				
Interest (Short)	0	0	0	0	0	0	0				
Repayment (Short)	0	0	0	0	0	0	0				
Interest (Long)	0	0	0	0	0	0	0				
Repayment (Long)	0	0	0	0	0	0	0				
Sub-total (H)	7,872	5,086	5,086	11,345	10,188	9,033	7,877				
Balance Carried Forward	2,928	9,352	18,566	21,521	25,633	30,900	37,323	50,714	64,660	78,606	92,552

Table N-3-8 Estimation of Cash Flow of Model Farmer (Model: 3)

(Unit: Col.\$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	1,723	5,430	10,407	12,139	14,526	17,567	21,263	28,908	36,867	44,826
Farm Credit (Long)	3,090	1,677	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	3,090	1,677	0	0	0	0	0	0	0	0	0
Sub-total (A)	3,090	1,677	0	0	0	0	0	0	0	0	0
Required Fund (Stage I)	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090
Production Cost	310	310	310	310	310	310	310	310	310	310	310
Living Expenses	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Sub-total (B)	6,120	6,800	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480
Farm Income	6,120	6,800	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480
Sub-total (C)	386	210	0	0	0	0	0	0	0	0	0
Interest (Short)	3,090	1,677	0	0	0	0	0	0	0	0	0
Repayment (short)	3,476	1,887	0	0	0	0	0	0	0	0	0
Sub-total (D)	2,334	4,913	9,510	14,487	16,219	18,606	21,647	25,343	32,988	40,947	48,906
Balance Carried Forward	1,066	0	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	1,066	0	0	0	0	0	0	0	0	0	0
Sub-total (E)	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090	3,090
Required Fund (Stage II)	310	310	310	310	310	310	310	310	310	310	310
Production Cost	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400	3,400
Living Expenses	6,120	6,800	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480
Sub-total (F)	6,120	6,800	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480
Farm Income	6,120	6,800	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480	7,480
Sub-total (G)	2,372	2,372	2,372	5,665	5,072	4,480	3,887	3,887	3,887	3,887	3,887
Term-end Fund	625	310	610	562	500	438	376	314	314	314	314
Amortization (I)	201	201	201	201	201	201	201	201	201	201	201
Amortization (II)	133	0	0	0	0	0	0	0	0	0	0
O/M Charge	1,066	0	0	0	0	0	0	0	0	0	0
Interest (Short)	0	0	0	0	0	0	0	0	0	0	0
Repayment (Short)	0	0	0	0	0	0	0	0	0	0	0
Interest (Long)	0	0	0	0	0	0	0	0	0	0	0
Repayment (Long)	0	0	0	0	0	0	0	0	0	0	0
Sub-total (H)	4,397	2,883	3,183	6,428	5,773	5,119	4,464	515	201	201	201
Balance Carried Forward	1,723	5,430	10,407	12,139	14,526	17,567	21,263	28,908	36,867	44,826	52,785



Table N-3-9 Estimation of Cash Flow of Model Farmer (Model: 4)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	6,500	4,549	7,184	13,165	7,140	3,082	695	26	12,977	28,566	44,155
Farm Credit (Long)	971	863	375	0	383	1,135	1,542	1,542	0	0	0
Farm Credit (Short)	2,663	3,794	1,647	0	1,683	4,989	6,777	6,777	0	0	0
Sub-total (A)	3,634	4,657	2,022	0	2,066	6,124	8,319	8,319	0	0	0
Required Fund (Stage I)											
Production Cost	9,247	8,319	8,319	8,319	8,319	8,319	8,319	8,319	8,319	8,319	8,319
Living Expenses	887	887	887	887	887	887	887	887	887	887	887
Sub-total (B)	10,134	9,206	9,206	9,206	9,206	9,206	9,206	9,206	9,206	9,206	9,206
Farm Income	11,763	12,925	14,250	14,250	14,250	14,250	14,250	14,250	14,250	14,250	14,250
Sub-total (C)	11,763	12,925	14,250	14,250	14,250	14,250	14,250	14,250	14,250	14,250	14,250
Interest (Short)	333	474	206	0	210	624	847	847	0	0	0
Repayment (short)	2,663	3,794	1,647	0	1,683	4,989	6,777	6,777	0	0	0
Sub-total (D)	2,996	4,268	1,853	0	1,893	5,613	7,624	7,624	0	0	0
Balance Carried Forward	8,767	8,657	12,397	18,209	12,357	8,637	6,434	5,765	18,021	33,510	49,199
Farm Credit (Short)	0	0	0	0	0	0	1,841	2,510	0	0	0
Sub-total (E)	0	0	0	0	0	0	1,841	2,510	0	0	0
Required Fund (Stage II)											
Production Cost	7,388	7,588	7,388	7,388	7,388	7,388	7,388	7,388	7,388	7,388	7,388
Living Expenses	887	887	887	887	887	887	887	887	887	887	887
Sub-total (F)	8,275	8,275	8,275	8,275	8,275	8,275	8,275	8,275	8,275	8,275	8,275
Farm Income	16,262	17,778	19,409	19,409	19,409	19,409	19,409	19,409	19,409	19,409	19,409
Sub-total (G)	16,262	17,778	19,409	19,409	19,409	19,409	19,409	19,409	19,409	19,409	19,409
Term-end Fund											
Amortization (I)	8,231	8,231	8,231	19,662	17,604	15,547	13,489				
Amortization (II)	2,171	1,077	1,077	1,952	1,737	1,521	1,306	1,091			
O/M Charge	589	589	589	589	589	589	589	589	589	589	589
Interest (Short)	0	0	0	0	0	0	230	314	0	0	0
Repayment (Short)	0	0	0	0	0	0	1,841	2,510	0	0	0
Interest (Long)	243	216	94	0	96	284	386	386	0	0	0
Repayment (Long)	971	863	375	0	383	1,135	1,542	1,542	0	0	0
Sub-total (H)	12,205	10,976	10,366	22,203	20,409	19,076	19,383	6,492	589	589	589
Balance Carried Forward	4,549	7,184	13,165	7,140	3,082	695	26	12,977	28,566	44,155	59,744

(Unit: Col. \$1,000)

Table N-3-10 Estimation of Cash Flow of Model Farmer (Model: 5)

(Unit: Col. \$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	1,944	7,799	17,485	19,662	23,225	28,176	34,513	49,212	64,577	79,942
Farm Credit (Long)	1,652	1,156	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	4,725	3,700	0	0	0	0	0	0	0	0	0
Sub-total (A)	6,377	4,856	0	0	0	0	0	0	0	0	0
Required Fund (Stage I)	6,377	6,202	6,202	6,202	6,202	6,202	6,202	6,202	6,202	6,202	6,202
Production Cost	598	598	598	598	598	598	598	598	598	598	598
Living Expenses	6,975	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800	6,800
Sub-total (B)	9,360	10,400	11,440	11,440	11,440	11,440	11,440	11,440	11,440	11,440	11,440
Farm Income	9,360	10,400	11,440	11,440	11,440	11,440	11,440	11,440	11,440	11,440	11,440
Sub-total (C)	591	462	0	0	0	0	0	0	0	0	0
Interest (Short)	4,725	3,700	0	0	0	0	0	0	0	0	0
Repayment (short)	5,316	4,162	0	0	0	0	0	0	0	0	0
Sub-total (D)	3,446	6,238	12,439	22,125	24,302	27,865	32,816	39,153	53,852	69,217	84,582
Balance Carried Forward	1,877	0	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	1,877	0	0	0	0	0	0	0	0	0	0
Sub-total (E)	4,725	4,725	4,725	4,725	4,725	4,725	4,725	4,725	4,725	4,725	4,725
Required Fund (Stage II)	598	598	598	598	598	598	598	598	598	598	598
Production Cost	5,323	5,323	5,323	5,323	5,323	5,323	5,323	5,323	5,323	5,323	5,323
Living Expenses	12,860	14,400	16,440	16,440	16,440	16,440	16,440	16,440	16,440	16,440	16,440
Sub-total (F)	12,860	14,400	16,440	16,440	16,440	16,440	16,440	16,440	16,440	16,440	16,440
Farm Income	12,860	14,400	16,440	16,440	16,440	16,440	16,440	16,440	16,440	16,440	16,440
Sub-total (G)	5,022	5,022	5,022	5,022	5,022	5,022	5,022	5,022	5,022	5,022	5,022
Term-end Fund	1,325	657	657	1,191	1,060	928	797	666	666	666	666
Amortization (I)	392	392	392	392	392	392	392	392	392	392	392
Amortization (II)	235	0	0	0	0	0	0	0	0	0	0
Interest (Short)	1,877	0	0	0	0	0	0	0	0	0	0
Repayment (Short)	413	289	0	0	0	0	0	0	0	0	0
Interest (Long)	1,652	1,156	0	0	0	0	0	0	0	0	0
Repayment (Long)	10,916	7,516	6,071	13,580	12,194	10,806	9,420	1,058	392	392	392
Sub-total (H)	1,944	7,799	17,485	19,662	23,225	28,176	34,513	49,212	64,577	79,942	95,307
Balance Carried Forward											

Table N-3-11 Estimation of Cash Flow of Model Farmer (Model: 6)

(Unit: Col.\$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	2,619	7,331	13,216	15,764	18,928	22,708	27,105	35,218	43,627	52,035
Farm Credit (Long)	1,536	308	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	1,817	448	0	0	0	0	0	0	0	0	0
Sub-total (A)	3,353	756	0	0	0	0	0	0	0	0	0
Required Fund (Stage I)											
Production Cost	3,353	3,065	3,065	3,065	3,065	3,065	3,065	3,065	3,065	3,065	3,065
Living Expenses	310	310	310	310	310	310	310	310	310	310	310
Sub-total (B)	3,663	3,375	3,375	3,375	3,375	3,375	3,375	3,375	3,375	3,375	3,375
Farm Income	3,600	4,000	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400
Sub-total (C)	3,600	4,000	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400
Interest (Short)	227	56	0	0	0	0	0	0	0	0	0
Repayment (short)	1,817	448	0	0	0	0	0	0	0	0	0
Sub-total (D)	2,044	504	0	0	0	0	0	0	0	0	0
Balance Carried Forward	1,246	3,496	8,356	14,241	16,789	19,953	23,733	28,130	36,243	44,652	53,061
Farm Credit (Short)	881	0	0	0	0	0	0	0	0	0	0
Sub-total (E)	881	0	0	0	0	0	0	0	0	0	0
Required Fund (Stage II)											
Production Cost	1,817	1,817	1,817	1,817	1,817	1,817	1,817	1,817	1,817	1,817	1,817
Living Expenses	310	310	310	310	310	310	310	310	310	310	310
Sub-total (F)	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127
Farm Income	8,520	9,040	9,680	9,680	9,680	9,680	9,680	9,680	9,680	9,680	9,680
Sub-total (G)	8,520	9,040	9,680	9,680	9,680	9,680	9,680	9,680	9,680	9,680	9,680
Term-end Fund											
Amortization (I)	2,232	2,232	2,232	5,332	4,774	4,216	3,658				
Amortization (II)	589	292	292	529	471	413	354	296			
O/M Charge	169	169	169	169	169	169	169	169	169	169	169
Interest (Short)	110	0	0	0	0	0	0	0	0	0	0
Repayment (Short)	881	0	0	0	0	0	0	0	0	0	0
Interest (Long)	384	77	0	0	0	0	0	0	0	0	0
Repayment (Long)	1,536	308	0	0	0	0	0	0	0	0	0
Sub-total (H)	5,901	3,078	2,693	6,030	5,414	4,798	4,181	465	169	169	169
Balance Carried Forward	2,619	7,331	13,216	15,764	18,928	22,708	27,105	35,218	43,627	52,036	60,445

Table N-3-12 Estimation of Cash Flow of Model Farmer (Model: 7)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	3,100	1,607	1,260	2,045	753	187	34	369	3,750	8,037	12,409
Farm Credit (Long)	625	1,487	1,687	1,234	1,980	2,236	2,236	2,202	249	0	0
Farm Credit (Short)	457	1,088	1,235	903	1,449	1,636	1,636	1,611	183	0	0
Sub-total (A)	1,082	2,575	2,922	2,137	3,429	3,872	3,872	3,813	432	0	0
Required Fund (Stage I)											
Production Cost	3,872	3,872	3,872	3,872	3,872	3,872	3,872	3,872	3,872	3,872	3,872
Living Expenses	310	310	310	310	310	310	310	310	310	310	310
Sub-total (B)	4,182	4,182	4,182	4,182	4,182	4,182	4,182	4,182	4,182	4,182	4,182
Farm Income	3,240	3,600	3,960	3,960	3,960	3,960	3,960	3,960	3,960	3,960	3,960
Sub-total (C)	3,240	3,600	3,960	3,960	3,960	3,960	3,960	3,960	3,960	3,960	3,960
Interest (Short)	57	136	154	113	181	205	205	201	23	0	0
Repayment (short)	457	1,088	1,235	903	1,449	1,636	1,636	1,611	183	0	0
Sub-total (D)	514	1,224	1,389	1,016	1,630	1,841	1,841	1,812	206	0	0
Balance Carried Forward	2,726	2,376	2,571	2,944	2,330	1,995	1,843	2,148	3,754	7,815	12,187
Farm Credit (Short)	0	0	0	0	0	0	103	0	0	0	0
Sub-total (E)	0	0	0	0	0	0	103	0	0	0	0
Required Fund (Stage II)											
Production Cost	1,636	1,636	1,636	1,636	1,636	1,636	1,636	1,636	1,636	1,636	1,636
Living Expenses	310	310	310	310	310	310	310	310	310	310	310
Sub-total (F)	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946	1,946
Farm Income	4,040	4,880	5,720	6,200	6,680	6,680	6,680	6,680	6,680	6,680	6,680
Sub-total (G)	4,040	4,880	5,720	6,200	6,680	6,680	6,680	6,680	6,680	6,680	6,680
Term-end Fund											
Amortization (I)	1,814	1,814	1,814	4,332	3,879	3,426	2,972				
Amortization (II)	478	237	237	436	383	335	288	240			
O/M Charge	140	140	140	140	140	140	140	140	140	140	140
Interest (Short)	0	0	0	0	0	0	13	0	0	0	0
Repayment (Short)	0	0	0	0	0	0	103	0	0	0	0
Interest (Long)	156	372	422	309	495	559	559	550	62	0	0
Repayment (Long)	625	1,487	1,687	1,234	1,980	2,236	2,236	2,202	249	0	0
Sub-total (H)	3,213	4,050	4,300	6,445	6,877	6,695	6,311	3,132	451	140	140
Balance Carried Forward	1,607	1,260	2,045	753	187	34	369	3,750	8,037	12,409	16,781

(Unit: Col.\$1,000)

Table N-3-13 Estimation of Cash Flow of Model Farmer (Model: 8)

(Unit: Col. \$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	6,207	22,078	43,525	52,457	53,700	77,255	93,121	122,924	153,836	184,748
Farm Credit (Long)	2,262	215	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	10,904	5,775	0	0	0	0	0	0	0	0	0
Sub-total (A)	13,166	5,990	0	0	0	0	0	0	0	0	0
Required Fund (Stage I)	13,166	11,310	11,310	11,310	11,310	11,310	11,310	11,310	11,310	11,310	11,310
Production Cost	887	887	887	887	887	887	887	887	887	887	887
Living Expenses	14,053	12,197	12,197	12,197	12,197	12,197	12,197	12,197	12,197	12,197	12,197
Sub-total (B)	21,600	24,000	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400
Farm Income	21,600	24,000	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400	26,400
Sub-total (C)	1,363	722	0	0	0	0	0	0	0	0	0
Interest (Short)	10,904	5,775	0	0	0	0	0	0	0	0	0
Repayment (short)	12,267	6,497	0	0	0	0	0	0	0	0	0
Sub-total (D)	8,446	17,503	36,281	57,728	66,660	77,903	91,458	107,324	137,127	168,039	198,951
Balance Carried Forward	3,345	0	0	0	0	0	0	0	0	0	0
Farm Credit (Short)	3,345	0	0	0	0	0	0	0	0	0	0
Sub-total (E)	10,904	10,904	10,904	10,904	10,904	10,904	10,904	10,904	10,904	10,904	10,904
Required Fund (Stage II)	887	887	887	887	887	887	887	887	887	887	887
Production Cost	11,791	11,791	11,791	11,791	11,791	11,791	11,791	11,791	11,791	11,791	11,791
Living Expenses	24,084	26,808	29,208	29,208	29,208	29,208	29,208	29,208	29,208	29,208	29,208
Sub-total (F)	24,084	26,808	29,208	29,208	29,208	29,208	29,208	29,208	29,208	29,208	29,208
Farm Income	24,084	26,808	29,208	29,208	29,208	29,208	29,208	29,208	29,208	29,208	29,208
Sub-total (G)	8,370	8,370	8,370	19,995	17,903	15,810	13,718	1,109	708	708	708
Term-end Fund	2,208	1,095	1,095	1,985	1,766	1,547	1,328	1,109	708	708	708
Amortization (I)	708	708	708	708	708	708	708	708	708	708	708
Amortization (II)	418	0	0	0	0	0	0	0	0	0	0
Interest (Short)	3,345	0	0	0	0	0	0	0	0	0	0
Repayment (Short)	556	54	0	0	0	0	0	0	0	0	0
Interest (Long)	2,262	215	0	0	0	0	0	0	0	0	0
Repayment (Long)	17,877	10,442	10,173	22,688	20,377	18,065	15,754	1,817	708	708	708
Sub-total (H)	6,207	22,078	43,525	52,457	63,700	77,255	93,121	122,924	153,836	184,748	215,860
Balance Carried Forward											

Table N-3-14 Estimation of Cash Flow of Model Farmer (Model: 9)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	5,000	3,704	4,834	7,578	4,482	2,464	1,240	774	6,689	13,850	21,011
Farm Credit (Long)	25	140	0	0	0	439	735	847	0	0	0
Farm Credit (Short)	41	438	0	0	0	1,879	2,307	2,661	0	0	0
Sub-total (A)	66	578	0	0	0	1,818	3,042	3,508	0	0	0
Required Fund (Stage I)											
Production Cost	4,468	3,684	3,684	3,684	3,684	3,684	3,684	3,684	3,684	3,684	3,684
Living Expenses	598	598	598	598	598	598	598	598	598	598	598
Sub-total (B)	5,066	4,282	4,282	4,282	4,282	4,282	4,282	4,282	4,282	4,282	4,282
Farm Income	4,538	4,955	5,470	5,470	5,470	5,470	5,470	5,470	5,470	5,470	5,470
Sub-total (C)	4,538	4,955	5,470	5,470	5,470	5,470	5,470	5,470	5,470	5,470	5,470
Interest (Short)	5	55	0	0	0	172	288	333	0	0	0
Repayment (short)	41	438	0	0	0	1,379	2,307	2,661	0	0	0
Sub-total (D)	46	493	0	0	0	1,551	2,595	2,994	0	0	0
Balance Carried Forward	4,492	4,462	6,022	8,766	5,670	3,919	2,875	2,476	7,877	15,038	22,199
Farm Credit (Short)	0	0	0	0	0	23	1,067	1,466	0	0	0
Sub-total (E)	0	0	0	0	0	23	1,067	1,466	0	0	0
Required Fund (Stage II)											
Production Cost	3,344	3,344	3,344	3,344	3,344	3,344	3,344	3,344	3,344	3,344	3,344
Living Expenses	598	598	598	598	598	598	598	598	598	598	598
Sub-total (F)	3,942	3,942	3,942	3,942	3,942	3,942	3,942	3,942	3,942	3,942	3,942
Farm Income	8,385	9,170	10,179	10,179	10,179	10,179	10,179	10,179	10,179	10,179	10,179
Sub-total (G)	8,385	9,170	10,179	10,179	10,179	10,179	10,179	10,179	10,179	10,179	10,179
Term-end Fund											
Amortization (I)	3,906	3,906	3,906	9,331	8,355	7,378	6,402				
Amortization (II)	1,030	511	511	926	824	722	620	518			
O/M Charge	264	264	264	264	264	264	264	264	264	264	264
Interest (Short)	0	0	0	0	0	3	133	183	0	0	0
Repayment (Short)	0	0	0	0	0	23	1,067	1,466	0	0	0
Interest (Long)	6	35	0	0	0	110	184	212	0	0	0
Repayment (Long)	25	140	0	0	0	439	735	847	0	0	0
Sub-total (H)	5,231	4,856	4,681	10,521	9,443	8,939	9,405	3,490	264	264	264
Balance Carried Forward	3,704	4,834	7,578	4,482	2,464	1,240	774	6,689	13,850	21,011	28,172

(Unit: Col.\$1,000)

Table N-3-15 Profit and Loss Statement of Model Farmers  
(Alternative)

(Unit: Col. \$1,000)

Description	Case - 1		Case - 2		Case - 3		Case - 4		Case - 5		Case - 6		Case - 7		Case - 8		Case - 9	
	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with	without	with
Holding Area (ha)	120		30		17		89		36		16		13		100		43	
Production Value	26,400	96,280	12,834	26,400	7,751	14,980	9,542	42,626	15,064	27,880	2,419	10,448	6,059	11,040	17,738	55,608	5,824	23,440
Production Cost	15,174	41,388	7,692	10,904	4,953	6,179	5,997	18,355	8,662	10,927	1,403	4,528	3,619	5,116	9,332	22,215	3,151	9,669
Living Expenses	1,773	1,773	1,196	1,196	619	619	1,773	1,773	1,196	1,196	619	619	619	619	1,773	1,773	1,196	1,196
Interest (credit)	1,897	5,174	962	1,363	619	772	871	2,487	1,216	1,551	249	678	472	779	1,238	2,828	459	1,320
O/M Charge		1,350		354		201		512		392		169		140		708		239
Net Return	7,556	48,595	2,984	12,583	1,560	7,189	901	19,499	3,990	13,814	148	4,454	1,349	4,366	5,385	28,084	1,018	11,016

Table N-3-16 Estimation of Cash Flow of Model Farmer  
(Model: 4, Alternative)

Year	(Unit: Col.\$1,000)										
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0	828	7,908	19,946	20,067	22,461	27,128	34,068	54,712	76,447	98,182
Farm Credit (Long)	2,470	1,542	426	0	0	0	0	0	0	0	0
Farm Credit (Short)	8,163	8,163	2,258	0	0	0	0	0	0	0	0
Sub-total (A)	10,633	9,705	2,684	0	0	0	0	0	0	0	0
Required Fund (Stage I)											
Production Cost	10,633	9,705	9,705	9,705	9,705	9,705	9,705	9,705	9,705	9,705	9,705
Living Expenses	887	887	887	887	887	887	887	887	887	887	887
Sub-total (B)	11,520	10,592	10,592	10,592	10,592	10,592	10,592	10,592	10,592	10,592	10,592
Farm Income	15,505	17,170	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900
Sub-total (C)	15,505	17,170	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900	18,900
Interest (Short)	1,020	1,020	282	0	0	0	0	0	0	0	0
Repayment (short)	8,163	8,163	2,258	0	0	0	0	0	0	0	0
Sub-total (D)	9,183	9,183	2,540	0	0	0	0	0	0	0	0
Balance Carried Forward	5,435	7,928	16,360	28,254	28,375	30,769	35,436	42,376	63,020	84,755	106,490
Farm Credit (Short)	3,861	1,368	0	0	0	0	0	0	0	0	0
Sub-total (E)	3,861	1,368	0	0	0	0	0	0	0	0	0
Required Fund (Stage II)											
Production Cost	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409	8,409
Living Expenses	887	887	887	887	887	887	887	887	887	887	887
Sub-total (F)	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296	9,296
Farm Income	19,305	21,326	23,366	23,366	23,366	23,366	23,366	23,366	23,366	23,366	23,366
Sub-total (G)	19,305	21,326	23,366	23,366	23,366	23,366	23,366	23,366	23,366	23,366	23,366
Term-end Fund											
Amortization (I)	8,231	8,231	8,231	19,662	17,604	15,547	13,489				
Amortization (II)	2,171	1,077	1,077	1,952	1,737	1,521	1,306	1,091			
O/M Charge	643	643	643	643	643	643	643	643	643	643	643
Interest (Short)	483	171	0	0	0	0	0	0	0	0	0
Repayment (Short)	3,881	1,368	0	0	0	0	0	0	0	0	0
Interest (Long)	618	386	107	0	0	0	0	0	0	0	0
Repayment (Long)	2,470	1,542	426	0	0	0	0	0	0	0	0
Sub-total (H)	18,477	18,418	10,484	22,257	19,984	17,711	15,438	1,734	643	643	643
Balance Carried Forward	828	7,908	19,946	20,067	22,461	27,128	34,068	54,712	76,447	98,182	119,917



Table N-3-17 Estimation of Cash Flow of Model Farmer  
(Model: 7, Alternative)

(Unit: Col.\$1,000)

Year	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
Initial Fund	0										
Farm Credit (Long)	1,118	1,118	1,102	346	2,452	3,182	4,536	6,433	11,350	16,507	21,964
Farm Credit (Short)	1,999	1,999	1,969	620	625	157	0	0	0	0	0
Sub-total (A)	3,117	3,117	3,071	966	975	245	0	0	0	0	0
Required Fund (Stage I)											
Production Cost	3,117	3,117	3,117	3,117	3,117	3,117	3,117	3,117	3,117	3,117	3,117
Living Expenses	310	310	310	310	310	310	310	310	310	310	310
Sub-total (B)	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427	3,427
Farm Income	3,960	4,400	4,840	4,840	4,840	4,840	4,840	4,840	4,840	4,840	4,840
Sub-total (C)	3,960	4,400	4,840	4,840	4,840	4,840	4,840	4,840	4,840	4,840	4,840
Interest (Short)	250	250	246	77	78	20	0	0	0	0	0
Repayment (short)	1,999	1,999	1,969	620	625	157	0	0	0	0	0
Sub-total (D)	2,249	2,249	2,215	697	703	177	0	0	0	0	0
Balance Carried Forward	1,401	1,342	2,625	4,143	4,137	4,663	5,949	7,846	12,763	17,920	23,077
Farm Credit (Short)	908	967	0	0	0	0	0	0	0	0	0
Sub-total (E)	908	967	0	0	0	0	0	0	0	0	0
Required Fund (Stage II)											
Production Cost	1,999	1,999	1,999	1,999	1,999	1,999	1,999	1,999	1,999	1,999	1,999
Living Expenses	310	310	310	310	310	310	310	310	310	310	310
Sub-total (F)	2,309	2,309	2,309	2,309	2,309	2,309	2,309	2,309	2,309	2,309	2,309
Farm Income	4,360	5,040	5,720	5,960	6,200	6,200	6,200	6,200	6,200	6,200	6,200
Sub-total (G)	4,360	5,040	5,720	5,960	6,200	6,200	6,200	6,200	6,200	6,200	6,200
Term-end Fund											
Amortization (I)	1,814	1,814	1,814	4,332	3,879	3,426	2,972				
Amortization (II)	478	237	237	430	383	335	288	240			
O/M Charge	147	147	147	147	147	147	147	147	147	147	147
Interest (Short)	114	121	0	0	0	0	0	0	0	0	0
Repayment (Short)	908	967	0	0	0	0	0	0	0	0	0
Interest (Long)	280	280	275	87	87	22	0	0	0	0	0
Repayment (Long)	1,118	1,118	1,102	346	350	88	0	0	0	0	0
Sub-total (H)	4,859	4,684	3,575	5,342	4,846	4,018	3,407	387	147	147	147
Balance Carried Forward	-499	336	2,461	2,452	3,182	4,536	6,433	11,350	16,507	21,964	26,821