FIGURES

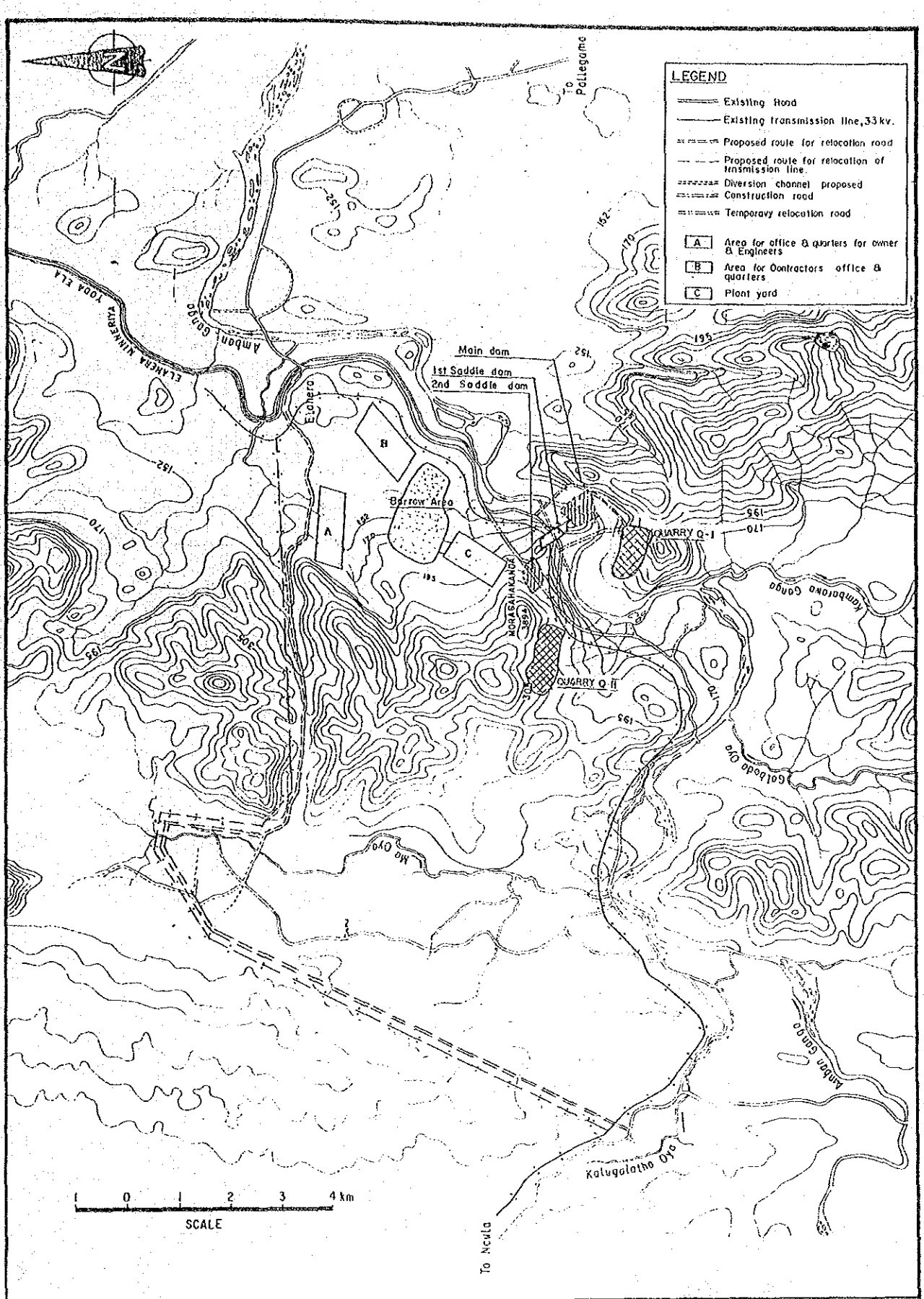

Fig. L.1-1 Layout of Temporary Facilities

GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT
THE STUDY ON EXTENSION OF THE MORAGAHAKANDA AGRICULTURAL DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

FIG. L.1-2 CONSTRUCTION TIME SCHEDULE

GOVERNMENT OF DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA
MINISTRY OF MAHAWELI DEVELOPMENT
THE STUDY ON EXTENSION OF THE MORAGAHAKANDA AGRICULTURAL DEVELOPMENT PROJECT
JAPAN INTERNATIONAL COOPERATION AGENCY

ANNEX M

PROJECT EVALUATION

ANNEX - M

PROJECT EVALUATION

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ANNEX-M PROJECT EVALUATION

M.1 ECONOMIC EVALUATION

M.1.1 Evaluation Methodology

An evaluation analysis is carried out to ascertain the economic viability of the proposed development scheme from the economic point of view. The economic viability is evaluated by factors of investment efficiency such as Net Present Value (NPV), Benefit Cost ratio (B/C) and Economic Internal Rate of Return (EIRR).

To estimate economic cost and benefit which are basic figures for calculation of evaluation factors, the economic prices and evaluation conditions are assumed as follows:

(1) Foreign exchange rates are applied at US$1.00 = Rs. 30.50 = J. Yen 140.00;

(2) The base period for the cost estimation is set in February 1988;

(3) Economic price of unskilled workers is estimated to be 70% of the actual market wage for them with reference to the studies of related projects;

(4) Transfer payments such as tax and duty are assumed that goods and services procured locally would include transfer payment of 10% of their prices, and those imported from abroad exclude any transfer payments;

(5) The opportunity cost of capital is taken to be 10% for the standard analysis case; and

(6) The economic life of the project is taken as 50 years after completion of the project.

Economic cost of construction works is estimated by making the adjustment of the aforesaid economic prices to the financial cost estimated on the basis of the proposed physical design. Economic annual O&M costs are estimated through the same procedure as the costs of construction works.

Economic benefit accrues from two schemes: (1) Irrigation development scheme and (2) Hydropower development scheme. The economic benefit is given by a following formula on the basis of tangible economic benefit.

$$B = B_I + B_P = (C_I - C_O) + (P_I - P_O)$$

where:
- B : Economic benefit owing to the project
- B_I : Benefit from irrigation development
- B_P : Benefit from hydropower development
- C_I : Crop production after implementation of the irrigation development scheme
- C_O : Crop production under present conditions
- P_I : Power generation after completion of the proposed hydropower scheme
- P_O : Power generation of the cheapest alternative power generating system.

M.1.2 Conversion Factor

All of the costs involved in every project and its alternatives have to be measured as economic costs, i.e., the real costs or "opportunity costs" incurred from the viewpoint of the nation's economy. The measurement of economic cost of a commodity, therefore, depends on how it is likely to be procured whether by increasing import, decreasing export, expanding domestic production or diverting from other uses. Clearly it is impracticable to trace procurement sources for all the project inputs. Thus in this study, the following principles are applied to those project inputs that constitute a major part of the projects costs.

All equipment and materials to be newly imported for the project were estimated at their C.I.F. prices. Competitive rates applicable to services provided by the expatriate were used as economic costs of foreign labour. In fact the foreign currency of the project costs has been estimated in the ways described above. Thus it can be used as economic costs without any conversion. On the other hand, for tradable (exportable) goods to be procured in local markets, their F.O.B prices represent the shadow prices to be used in economic analysis, rather than purchase prices in local markets used in financial analysis. Moreover, for un-tradable goods in local markets, their prices should be presented in economic prices, as well. In general, Standard Conversion Factor (SCF) is used to convert them into international market prices, i.e., economic prices.

In this study, furthermore, the combined effects of eliminating internal transfer portions and the shadow pricing mentioned in the previous section have been deducted instead of adjusting financial costs by each cost element to calculate the economic costs. That is, the local currency portion of economic costs was estimated to be approximately 85% (SCF) of the financial costs, as shown in Table M.1.1.

M.1.3 Economic Construction Cost

The economic evaluation was carried out from a socio-economic view point, while the financial evaluation was made from the point of view of the individual implementing agency. The estimated financial cost based on the market price was adjusted to the economic cost by the SCF as mentioned in the previous section. Based on the above

conversion factor and annual financial cost disbursement, the economic capital costs were obtained as presented in Table M.1.2. The total economic capital cost was calculated at US$257.1 x 10^6, consisting of US$94.0 x 10^6 for dam cost, US$21.7 x 10^6 for hydropower plant cost, US$70.2 x 10^6 for irrigation scheme cost, US$9.0 x 10^6 for settlement cost, US$1.7 x 10^6 for land acquisition and compensation in reservoir site, US$9.4 x 10^6 for local government administration cost and US$17.6 x 10^6 for engineering service fee. These costs are arranged into three main schemes as follows: (1) US$125.2 x 10^6 for dam scheme; (2) US$28.3 x 10^6 for hydropower scheme; and (3) US$103.6 x 10^6 for irrigation scheme including settlement. Hence, settlement cost is estimated at a half of the total construction cost, because another half portion corresponding natural increase of population should be settled by the implementing agencies instead of the project office. Incidentally, the annual disbursement of aforesaid capital costs are tabulated in Table M.1.3.

As regards sugar cane plantation, the management of the plantation is unprofitable at present. From the national economic point of view, it is also negative as seen in ANNEX-E. Thus in this study, it is eliminated from the economic evaluation, although the water volume is indemnified to cover the sugar cane field.

M.1.4 Annual Operation and Maintenance Cost

The O&M cost for the project is estimated at Rs.58 x 10^6 (US$1.9 x 10^6) in economic value at the stage of project completion. This value is converted from the financial O&M cost as follows: (1) one-third of the financial value is assumed to be constituted as a foreign portion, which is applied to economic value directly, (2) two-thirds (US$1.37 x 10^6) are assumed to be a local portion, which is converted into the economic value (US$1.2 x 10^6) by the SCF. The financial O&M costs (US$2.06 x 10^6) are estimated in ANNEX-L.

As regards hydropower generation, the plant will begin full operations just after completion. So, the O&M cost of hydropower scheme is added up in full amount (US$0.4 x 10^6) after 6th year (1994).

Crop fields covered by proposed irrigation system will increase year by year as the system is enlarged. Increment of irrigated areas is assumed to be shown in Table M.1.4. Thus, the O&M costs of irrigation system will be assumed to increase in proportion to this increment. The O&M costs of irrigation system are estimated at US$1.5 x 10^6 at the stage of project completion.

M.1.5 Replacement Cost

While the economic project life was assumed to be 50 years, some of facilities have shorter life than the civil works. Then, they are assumed to be 30 years for hydromechanical works and generating equipment, 25 years for transmission line and irrigation gates and 10 years for O&M equipment. The replacement cost was considered to be 90% for investment value at the end of each life, because of salvage value of 10% would

be remained. The investment values are enumerated in Table M.1.5, which are values before reduction of salvage values.

M.1.6 Economic Benefit

M.1.6.1 Agricultural Benefit

The agricultural benefit is estimated in terms of incremental benefit by a balance of "with" and "without" project conditions as mentioned before. For economic evaluation, economic prices of farm input and products have been estimated by referring to the IBRD price forecast. For estimating the economic costs of production, the SCF is applied. The economic net return is first estimated for each crop and then for each area in accordance with the proposed cropping area. The proposed cropping area and economic benefit accruing from the harvest after completion of the project are shown in Table M.1.6. The agricultural economic benefit accruable from the project is summarized as follows:

(Unit: 10^6 US$)

Item		Without Project		With Project		Net Economic Benefit
		Existing Area	Extension Area	Existing Area	Extension Area	
Paddy	Maha	19.9	0.1	27.0	9.1	16.1
	Yala	19.9	0.0	21.6	7.3	9.0
Onion	Yala	0.0	0.0	5.1	1.7	6.8
Chillies	Yala	0.0	0.0	1.8	0.6	2.4
Others	Yala	0.1	0.0	1.0	0.4	1.4
Total		39.8	0.1	56.5	19.1	35.7

The net economic benefit amounts to US$35.7 x 10^6 per annum, comprising US$25.1 x 10^6 from paddy production, US$6.8 x 10^6 from onion, US$ x 10^6 from chillies and US$1.4 x 10^6 from other diversified crops. The matured benefit will be attained after a building-up period of five years.

By the time of project completion, the annual benefit increases as the irrigation system is enlarged, as shown in Table M.1.4. Thus, the annual benefit is increased as shown in Table M.1.7.

M.1.6.2 Power Benefit

The conventional approach to economic analysis of a hydropower project is to define its benefit as the cost saved in construction and operation (fuel cost) of the cheapest alternative facility that could provide a power supply of equivalent quality and quantity to the intended beneficiaries.

There is the cheapest alternative thermal facility to meet system load sharing apportionment, i.e., gas turbine and diesel generator for peak load, oil-fired steam plant for middle load and coal-fired steam plant for base load. For this project, diesel generation, likewise considered as the most viable alternative to hydropower by the CEB, is selected as the cheapest alternative energy source, since the Moragahakanda powerplant is characterized by peak generation, 5.5 hours a day. The necessary construction and operation costs for such facilities required to replace the project are adopted as the project benefit.

Accordingly, peak generation supply under the project will be evaluated on the basis of alternative diesel. Namely, for power output (KW) and firm energy (GWh) which correspond to supply for peak load, a diesel station is considered as an alternative. While for secondary energy, fuel costs of coal thermal stations which are to be introduced before the project are considered as the alternative, since the secondary energy of hydropower will save fuel consumption at coal thermal stations.

As for the secondary energy of the project, the full amount is assumed to be effective for fuel cost saved in coal thermal generation, as there will be abundant thermal generation which can effectively be replaced by generation under the project.

The unit benefit values are calculated to be US$93.04 per KW for capacity value and US$0.0674 per kWh and US$0.0298 per kWh for firm energy value and secondary energy value, respectively. Based on the above unit benefit values, dependable peak power and annual energy, the annual benefit is calculated as follows and is expected to be derived from the first year from commissioning:

- Capacity benefit:
  US$93.04/kW x 16,100 kW = US$1,498 x 10^3

- Firm energy benefit:
  US$0.0674/kWh x 66.4 x 10^6 kWh = US$4,475 x 10^3

- Secondary energy benefit:
  US$0.0298/kWh x 78.9 x 10^6 kWh = US$2,351 x 10^3

- Total annual benefit US$8,325 x 10^3

M.1.7 Economic Internal Rate of Return (EIRR)

Applying the economic costs and benefits estimated in the preceding Sub-sections, the cost and benefit streams of the integrated project of agriculture and power generation are shown in Table M.1.8.

The results of the economic analysis for the project are shown in the following:

	EIRR (%)	Net Present Value (Discount Rate:10%) (10^6 US$)	B/C Ratio (Discount Rate:10%)
Value	13.0	62.3	1.32

Economic returns from project implementation amount to US$62.3 x 10^6 in terms of net present value, while the benefit- cost ratio discounted at the rate of 10% is 1.32. Economic internal rate of return (EIRR) is 13.0%. Thus, the implementation of the proposed project can be deemed economically viable.

M.1.8 Sensitivity Analysis

In order to determine the economic viability of the project, sensitivity analysis are carried out by changing the following factors:

- Capital costs : 10% higher
- Capital costs : 5% higher
- Benefit : 5% lower
- Benefit : 10% lower

Results of the sensitivity analysis can be summarized as shown in the following:

Item	Sensitivity Case					
	A	B	C	D	E	F
Capital Costs	0%	+10%	+5%	0%	0%	+10%
Benefit	0%	0%	0%	-5%	-10%	-10%
EIRR (%)	13.0	11.9	12.5	12.4	11.8	10.8
NPV (10^6 US$)	62.3	42.8	52.4	49.3	36.6	17.4
B/C Ratio	1.32	1.20	1.26	1.24	1.19	1.08

The analysis indicates that the level of these benefits is enough to show that the proposed project will be economically feasible.

M.2 FINANCIAL EVALUATION

M.2.1 Fund Requirement for Project Implementation

The project costs estimated in ANNEX-L are taken as the fund requirements for project implementation. The annual disbursement schedule of the fund is also shown in Table M.1.3. The detailed disbursement is depicted in ANNEX-L.

M.2.2 Capacity to Pay

In order to evaluate the project from the standpoint of farmer's economy, farm budget analysis of a typical existing farmer having 1.1 ha of farm size and new settlers having 1.0 ha is made under both future with and without project conditions.

After the completion of the project, the project will provide bases for introduction of improved irrigation farming through year round irrigation. Under such situations increase of unit yield of crops and cropping intensity will be much expected in the future with project conditions. Crop yields are expected to be 6 tons of paddy per ha, 1.9 tons of chillie per ha, 15 tons of onion per ha, 12 tons of vegetables per ha and 1.5 tons of pulses per ha. Cropping intensity will increase about 200% from 146% at present. Under such situations drastic increase on farm income in the future with project condition can be expected for the farmers in the project area.

It is estimated that net farm incomes on a typical existing farmer having 1.1 ha of farm size and a new settler under with project condition amount to Rs. 33,130 per annum and Rs. 30,140 per annum respectively as shown in Table M.2.1. This net farm income is about 1.9 times of that under without project condition. And capacity to pay for both typical farmers in the project area is calculated at Rs. 16,210 for the existing farmer and Rs. 13,220 for the new settler.

M.2.3 Financial Evaluation

Financial evaluation is made by the analysis of the financial balance of public investment and procurement. In irrigation project, the water charge on the settlers generally comes into conflict with the subsidy of the government to the project. To give an incentive to high productivity to new settlers, water charge is liable to be kept into low level. Yet, in that case, the government has to burden itself with the deficit of project management. Accordingly in this section, the financial balance of the irrigation project is discussed hereinafter.

In financial analysis, though price escalation is an important factor, which affects costs as well as benefit, it is ignored. As a result, prices of water charge and other costs are easily understood and discussed under present conditions. Thus, market prices at the time of project cost estimation are applied as fixed prices. In this light, it must be noted that financial costs in this section are different from actual costs required in the future for project implementation.

As regards unit water charge, the following alternatives are assumed to estimate the subsidy of the government:

Case-1 : Existing unit water charge applied to national irrigation system

Case-2 : Unit water charge covering O&M costs of the project

Case-3 : Unit water charge covering both O&M costs and loan repayment for the construction costs.

Existing unit water charge will be set at Rs.500/ha by the year 1991. Table M.2.2 shows cash flow statement under Case-1 condition. In this case, the government has to be burdened with Rs. 10.7×10^9 by the time of loan repayment completion. In Case-2, unit water charge is estimated at Rs. 920/ha. The government has to subsidize the capital investment costs and its interest of Rs. 10.0×10^9 in total, as shown in Table M.2.2. In Case-3, unit water charge goes up to Rs. 6,600/ha. The government subsidy, however, would be eliminated, as shown in Table M.2.3., although the shifting funds for local portion are prerequisite in this case as well as other cases. The unit water charge and the burden of the government by the time of repayment completion are summarized as follows:

Case	Capacity to Pay	Unit Water Charge	Burden of the Government
Case-1	Rs. 13,320 - 16,200	Rs. 500/ha	Rs. 10.7×10^9
Case-2	Rs. 13,320 - 16,200	Rs. 920/ha	Rs. 10.0×10^9
Case-3	Rs. 13,320 - 16,200	Rs. 6,600/ha	-

Unit water charge to be the beneficiaries should be within the reasonable range that can still give to the farmer's sufficient incentives for agricultural production increase in the irrigation development area. It is, therefore, considered that less than 20% of the capacity to pay would be the unit water charge at the maximum. In this sense, Case-3 is not realistic from the farmer's view point. However, in order to decrease the burden of the government, the unit water charge should be raised to more than the level of Case-2. In other words, not only O&M cost but also some portion of capital cost should be recovered by the water charge.

On second thoughts, in the case of the cash flow statements, including the both schemes of irrigation and hydropower, the burden of the government would be mitigated more than in the case of the irrigation scheme only. In Case-4, the burden of the government reduces from Rs. 10.7×10^9 (Case-1) to 3.7×10^9, as shown in Table M.2.5. In Case-5, it also reduces from Rs. 10.0×10^9 (Case-2) to Rs. 3.0×10^9, as shown in Table M.2.6. This mitigation of the burden comes from the advantageous proceeds of the hydropower project.

TABLES

Table M.1.1 STANDARD CONVERSION FACTOR

(Unit: Rs. million)

Item	1982	1983	1984	1985	1986
Value of imports (M) (C.I.F.)	41,420	45,201	49,047	55,528	54,898
Value of exports (X) (F.O.B.)	21,098	25,038	37,198	35,728	33,881
Value of trade (M + X)	62,618	70,239	86,245	91,256	88,779
Average import-tariff	3,222	4,856	7,945	8,396	8,080
Average export duty	2,484	2,459	3,175	1,873	1,574
SCF *1	0.988	0.966	0.948	0.933	0.931
- Five year average of SCF					0.953
- SCF (allowing for non-tariff restriction such as internal transfer payment)					0.850

Note: *1 $SCF = (M + X)/\{M(1 + tm) + X(1 - tx)\}$

where tm: the average tax rate on imports

tx: the average tax rate on exports

Source: REVIEW OF THE ECONOMY 1986, Central Bank of Sri lanka

Table M.1.2 ECONOMIC COST AND FINANCIAL COST

(Unit:US$ Million)

Item	Financial Cost				
	Foreign Portion	Local Portion			Total
		Major Work	Labour	Total	
1. Dam	76.00	17.60	4.40	22.00	98.00
2. Power Generation	20.00	1.80	0.20	2.00	22.00
3. Irrigation	55.00	8.00	12.00	20.00	75.00
4. Settlement	12.00	3.20	4.80	8.00	20.00
5. Land Aquisition and Compensation	0.00	2.00	0.00	2.00	2.00
Direct Cost	163.00	32.60	21.40	54.00	217.00
6. Government Administ:	0.00	11.02	0.00	11.02	11.02
7. Engineering Service	15.00	3.00	0.00	3.00	18.00
8. Physical Contingency	26.70	10.20	0.00	10.20	36.90
9. Price Contingency	0.00	18.88	8.67	27.55	27.55
Total	204.70	75.70	30.07	105.77	310.47

Item	Economic Cost				
	Foreign Portion	Local Portion			Total
		Major Work	Labour	Total	
1. Dam	76.00	14.96	3.08	18.04	94.04
2. Power Generation	20.00	1.53	0.14	1.67	21.67
3. Irrigation	55.00	6.80	8.40	15.20	70.20
4. Settlement	6.00	1.36	1.68	3.04	9.04
5. Land Aquisition and Compensation	0.00	1.70	0.00	1.70	1.70
Direct Cost	157.00	26.35	13.30	39.65	196.65
6. Government Administ:	0.00	9.36	0.00	9.36	9.36
7. Engineering Service	15.00	2.55	0.00	2.55	17.55
8. Physical Contingency	25.80	7.73	0.00	7.73	33.53
9. Price Contingency	0.00	0.00	0.00	0.00	0.00
Total	197.80	45.99	13.30	59.29	257.09

Table M.1.3 ANNUAL DISBURSEMENT OF CAPITAL COST

(Unit: million US$)

Item	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	Total
Financial Cost								
A) Dam	0.00	33.81	22.54	22.54	22.54	11.27	0.00	112.70
B) Power	0.00	0.00	3.45	3.45	12.08	6.33	0.00	25.30
C) Irrigation	0.00	16.11	17.25	17.25	17.25	13.51	4.89	86.25
D) Settlement	0.00	2.30	4.60	4.60	4.60	4.60	2.30	23.00
E) Compensation	2.30	0.00	0.00	0.00	0.00	0.00	0.00	2.30
F) Government	0.91	3.39	2.64	1.43	1.43	1.43	1.43	12.67
G) Engineering	5.99	3.04	3.04	3.04	3.04	1.86	0.69	20.70
H) Price Conti.	0.32	2.77	3.95	5.05	6.58	6.08	2.79	27.55
Total	9.52	61.42	57.47	57.37	67.52	45.08	12.09	310.47
Economic Cost								
A) Dam	0.00	13.52	27.04	27.04	27.04	13.52	0.00	108.15
B) Power	0.00	0.00	3.36	3.36	11.98	6.23	0.00	24.92
C) Irrigation	0.00	15.08	16.15	16.15	16.15	12.64	4.57	80.73
D) Settlement	0.00	1.04	2.08	2.08	2.08	2.08	1.04	10.40
E) Compensation	1.96	0.00	0.00	0.00	0.00	0.00	0.00	1.96
F) Government	0.77	2.88	2.24	1.22	1.22	1.22	1.22	10.77
G) engineering	5.87	2.96	2.96	2.96	2.96	1.81	0.66	20.18
H) Price conti.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	8.59	35.49	53.82	52.80	61.42	37.49	7.48	257.10

Note:Each item includes physical contingency.

Table M.1.4 INCREMENT OF IRRIGATED AREA

(Unit: ha)

No.	Year	Increment of Irrigated Area			Accumulation of Irrigated Area		
		Existing	Extension		Existing	Extension	
			Maha	Yala		Maha	Yala
1.	1989	-	-	-	-	-	-
2.	1990	-	-	-	-	-	-
3.	1991	5.0	-	-	5.0	-	-
4.	1992	10.0	2.0	0.6	15.0	2.0	0.6
5.	1993	10.0	4.0	1.2	25.0	6.0	1.8
6.	1994	10.0	4.0	1.2	35.0	10.0	3.0
7.	1995	6.1	3.9	10.9	41.1	13.9	13.9
8.	1996	-	-	-	41.1	13.9	13.9

Table M.1.5 REPLACEMENT COST

(Unit: million US$)

Item	Durable Period (Year)	Direct Cost			Other Cost			Total		
		F/C	L/C	Total	F/C	L/C	Total	F/C	L/C	Total
Financial Cost										
1. Dam & Hydropower										
Hydromechanical	30	6,129	681	6,810	1,483	635	2,118	7,612	1,316	8,928
Generat. Equipment	30	14,400	1,600	16,000	3,485	1,491	4,976	17,885	3,091	20,976
Transmission	25	896	224	1,120	227	121	348	1,123	345	1,468
2. Irrigation										
Gate	25	1,232	308	1,540	312	167	479	1,544	475	2,019
O/M Equipment	10	6,750	750	7,500	1,634	699	2,333	8,384	1,449	9,833
Economic Cost										
1. Dam & Hydropower										
Hydromechanical	30	6,129	569	6,698	1,474	609	2,083	7,603	1,178	8,781
Generat. Equipment	30	14,400	1,336	15,736	3,463	1,431	4,894	17,863	2,767	20,630
Transmission	25	896	187	1,083	224	113	337	1,120	300	1,420
2. Irrigation										
Gate	25	1,232	257	1,489	308	155	463	1,540	412	1,952
O/M Equipment	10	6,750	626	7,376	1,623	671	2,294	8,373	1,297	9,670

Table M.1.6 PROPOSED CROPPING AREA AND BENEFIT

CROPPING AREA (Unit: ha)

Item	Season	Without Project			With Project			Increment of Cultivated Area
		Existing Area	Extention Area	Total Area	Existing Area	Extension Area	Total Area	
Paddy	Maha	41,100	300	41,400	41,100	13,900	55,000	13,600
Sugar Cane	Maha	3,000	0	3,000	7,200	0	7,200	4,200
Not Utilized	Maha	4,200	13,600	17,800	0	0	0	-17,800
Total	Maha	48,300	13,900	62,200	48,300	13,900	62,200	0
Paddy-Kantala	Yala	7,400	0	7,400	7,400	0	7,400	0
Paddy-Other	Yala	33,700	0	33,700	25,480	11,120	36,600	2,900
Chillies	Yala	80	0	80	2,317	783	3,100	3,020
Onion	Yala	0	0	0	2,167	733	2,900	2,900
Pulses	Yala	370	0	370	1,270	430	1,700	1,330
Vegetable	Yala	0	0	0	2,242	758	3,000	3,000
Sweet Potatoes	Yala	0	0	0	224	76	300	300
Sugar Cane	Yala	3,000	0	3,000	7,200	0	7,200	4,200
Not Utilized	Yala	3,750	13,900	17,650	0	0	0	-17,650
Total	Yala	48,300	13,900	62,200	48,300	13,900	62,200	0

BENEFIT (Unit: million US$)

Item	Season	Without Project			With Project			Net Economic Benefit
		Existing Area	Extention Area	Total Area	Existing Area	Extension Area	Total Area	
Paddy	Maha	19.85	0.05	19.90	26.95	9.11	36.06	16.17
Total	Maha	19.85	0.05	19.90	26.95	9.11	36.06	16.17
Paddy-Kantalai	Yala	2.92	0.00	2.92	4.85	0.00	4.85	1.94
Paddy-Other	Yala	16.93	0.00	16.93	16.71	7.29	24.00	7.07
Chillies	Yala	0.03	0.00	0.03	1.79	0.61	2.40	2.36
Onion	Yala	0.00	0.00	0.00	5.09	1.72	6.81	6.81
Pulses	Yala	0.01	0.00	0.01	0.25	0.09	0.34	0.33
Vegetable	Yala	0.00	0.00	0.00	0.74	0.25	0.99	0.99
Sweet Potatoes	Yala	0.00	0.00	0.00	0.04	0.02	0.06	0.06
Total	Yala	19.89	0.00	19.89	29.48	9.97	39.45	19.56
Grand Total		39.74	0.05	39.79	56.42	19.08	75.51	35.73

Table M.1.7 ANNUAL BENEFIT STREAM OF AGRICULTURE

(Unit: million US$)

No	Year	Existing Area	Extension		Total
			Maha	Yala	
1.	1989	0.00	0.00	0.00	0.00
2.	1990	0.00	0.00	0.00	0.00
3.	1991	1.01	0.00	0.00	1.01
4.	1992	3.30	0.65	0.22	4.16
5.	1993	6.09	2.12	0.70	8.91
6.	1994	9.39	3.91	1.29	14.59
7.	1995	12.40	6.00	5.47	23.86
8.	1996	14.23	7.13	6.72	28.07
9.	1997	15.55	8.10	7.91	31.56
10.	1998	16.37	8.74	8.99	34.11
11.	1999	16.68	9.06	9.97	35.71
12.	2000	16.68	9.06	9.97	35.71

Table M.1.8 ECONOMIC COST AND BENEFIT STREAM

(Unit: million US$)

	Cost				Benefit			Benefit
	Construc-tion	Replace-ment	O&M	Total	Irriga-tion	Power	Total	- Cost
1. 1989	8.60	0.00	0.00	8.60	0.00	0.00	0.00	-8.60
2. 1990	35.48	0.00	0.00	35.48	0.00	0.00	0.00	-35.48
3. 1991	53.83	0.00	0.11	53.94	1.01	0.00	1.01	-52.93
4. 1992	52.81	0.00	0.35	53.16	4.16	0.00	4.16	-49.00
5. 1993	61.40	0.00	0.65	62.05	8.91	0.00	8.91	-53.14
6. 1994	37.50	0.00	1.09	38.59	14.59	4.16	18.75	-19.84
7. 1995	7.49	0.00	1.47	8.96	23.86	8.32	32.18	23.22
8. 1996	0.00	0.00	1.66	1.66	28.07	8.32	36.39	34.73
9. 1997	0.00	0.00	1.79	1.79	31.56	8.32	39.88	38.09
10. 1998	0.00	0.00	1.87	1.87	34.11	8.32	42.43	40.56
11. 1999	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
12. 2000	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
13. 2001	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
14. 2002	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
15. 2003	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
16. 2004	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
17. 2005	0.00	8.70	1.90	10.60	35.71	8.32	44.03	33.43
18. 2006	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
19. 2007	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
20. 2008	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
21. 2009	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
22. 2010	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
23. 2011	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
24. 2012	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
25. 2013	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
26. 2014	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
27. 2015	0.00	8.70	1.90	10.60	35.71	8.32	44.03	33.43
28. 2016	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
29. 2017	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
30. 2018	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
31. 2019	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
32. 2020	0.00	3.03	1.90	4.93	35.71	8.32	44.03	39.10
33. 2021	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
34. 2022	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
35. 2023	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
36. 2024	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
37. 2025	0.00	27.28	1.90	29.18	35.71	8.32	44.03	14.85
38. 2026	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
39. 2027	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
40. 2028	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
41. 2029	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
42. 2030	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
43. 2030	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
44. 2030	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
45. 2030	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
46. 2030	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
47. 2035	0.00	8.70	1.90	10.60	35.71	8.32	44.03	33.43
48. 2036	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
49. 2037	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
50. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
51. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
52. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
53. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
54. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
55. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13
56. 2038	0.00	0.00	1.90	1.90	35.71	8.32	44.03	42.13

Table M.2.1 NET FARM INCOME AND CAPACITY TO PAY OF TYPICAL FARMERS

	Yield (ton/ha)	Unit Price (Rs/ton)	Gross Income per ha (Rs/ha)	Production Cost per ha (Rs/ha)	Net Farm Income per ha (Rs/ha)	Planted Area (ha)	Net Farm Income (Rs)	Living Expense (Rs)	Capacity to Pay (Rs)
(A) A Typical Existing Farmer									
I. With-Project Condition									
Paddy	6.0	4,400	26,400	13,448	12,952	1.98	25,650		
Onion	15.0	8,300	124,500	42,174	82,326	0.058	4,770		
Chillie	1.9	31,000	58,900	30,758	28,142	0.062	1,740		
Pulses	1.5	14,000	21,000	14,377	6,623	0.04	270		
Vegetables	8.0	4,300	34,400	22,651	11,749	0.06	700		
Total						2.2	33,130	16,920	16,210
II. Without-Project Condition									
Paddy	5.0	4,400	22,000	13,065	8,935	1.98	17,690		
Upland Crops	1.0	14,000	14,000	14,084	-84	0.012	-1		
Total						1.992	17,689	16,920	769
III. Incremental Farm Income							15,441		
(B) A New Settler									
I. With-Project Condition									
Paddy	6.0	4,400	26,400	13,448	12,952	1.80	23,310		
Onion	15.0	8,300	124,500	42,174	82,326	0.053	4,360		
Chillie	1.9	31,000	58,900	30,758	28,142	0.056	1,580		
Pulses	1.5	14,000	21,000	14,377	6,623	0.036	240		
Vegetables	8.0	4,300	34,400	22,651	11,749	0.055	650		
Total						2.0	30,140	16,920	13,220

Remark: Average farm holding size; 1.1 ha for typial existing farmer and 1.0 ha for the new settler.
In without-project case, marjor irrigation systems excluding Kantalai are represented.
60% of average living expenditure in rural area is applied referring to itemized expenditure analysis by income group.
Living expense of Rs.960/month in 1982 is equivarent to Rs.1,410/month in 1988, applying inflation index of 164 during six years.

Table M.2.2 CASH FLOW STATEMENT FOR IRRIGATIN PROJECT: CASE 1

(Unit: million Rs.)

No.	Year	Cash Outflow							Cash Inflow					Government Burden
		Capital Cost		Loan Repayment *1			Replacement cost	Total	Construction Fund		Revenue	Government Subsidy	Total	
		Foreign Currency	Local Currency	Interest	Principal	O&M Cost			Foreign Curency	Local Curency				
1.	1989	119.41	100.62					220.03	119.41	100.62		0.00	220.03	100.62
2.	1990	1,096.46	435.81	3.58				1,535.85	1,096.46	435.81		3.58	1,535.85	439.39
3.	1991	923.47	371.80	60.60		1.42		1,357.29	923.47	371.80	2.50	59.52	1,357.29	431.32
4.	1992	923.47	342.34	83.11		5.85		1,354.77	923.47	342.34	16.40	73.66	1,355.87	416.00
5.	1993	923.47	342.34	77.52		12.54		1,355.87	596.82	244.10	19.00	121.12	981.04	365.22
6.	1994	923.47	342.34	119.59		20.53		2,417.92	140.39	94.58	27.50	143.57	406.05	238.15
7.	1995	596.82	244.10	137.49		33.58		406.05			27.50	143.57	171.07	238.15
8.	1996	140.39	94.58	141.70		39.51		602.30			27.50	153.71	181.21	153.71
9.	1997			141.70		44.42		375.83			27.50	158.62	186.12	158.62
10.	1998			141.70		48.01		387.64			27.50	162.21	189.71	162.21
11.	1999			141.70	5.97	50.26		450.51			27.50	170.44	197.94	170.44
12.	2000			141.53	60.79	50.26		549.51			27.50	225.08	252.58	225.08
13.	2001			139.70	106.97	50.26		636.82			27.50	269.43	296.93	269.43
14.	2002			136.49	153.14	50.26		721.36			27.50	312.39	339.89	312.39
15.	2003			131.90	199.31	50.26		786.81			27.50	353.97	381.47	353.97
16.	2004			125.92	229.16	50.26		405.33			27.50	377.83	405.33	377.83
17.	2005			119.04	236.17	50.26	269.92	1,073.78			27.50	647.89	675.39	647.89
18.	2006			111.96	236.17	50.26		789.69			27.50	370.89	398.39	370.89
19.	2007			104.87	236.17	50.26		391.31			27.50	363.81	391.31	363.81
20.	2008			97.79	236.17	50.26		761.35			27.50	356.72	384.22	356.72
21.	2009			90.70	236.17	50.26		377.14			27.50	349.64	377.14	349.64
22.	2010			83.62	236.17	50.26		733.01			27.50	342.55	370.05	342.55
23.	2011			76.53	236.17	50.26		362.97			27.50	335.47	362.97	335.47
24.	2012			69.45	236.17	50.26		704.67			27.50	328.38	355.88	328.38
25.	2013			62.36	236.17	50.26		348.80			27.50	321.30	348.80	321.30
26.	2014			55.28	236.17	50.26		946.25			27.50	314.21	341.71	314.21
27.	2015			48.19	236.17	50.26	269.92	932.08			27.50	577.04	604.54	577.04
28.	2016			41.11	236.17	50.26		647.99			27.50	300.04	327.54	300.04
29.	2017			34.02	236.17	50.26		320.46			27.50	292.96	320.46	292.96
30.	2018			26.94	236.17	50.26		613.68			27.50	285.87	313.37	285.87
31.	2019			19.85	230.20	50.26		300.32			27.50	272.82	300.32	272.82
32.	2020			12.95	175.38	50.26	55.42	481.16			27.50	266.51	294.01	266.51
33.	2021			7.68	129.21	50.26		324.25			27.50	159.65	187.15	159.65
34.	2022			3.81	83.03	50.26		225.54			27.50	109.60	137.10	109.60
35.	2023			1.32	36.86	50.26		145.93			27.50	60.94	88.44	60.95
36.	2024			0.21	7.02	50.26		16,335.89			27.50	29.99	57.49	29.99
	Total	4,723.50	1,931.58	2,791.94	4,723.50	1,512.63	595.25	16,278.39	4,723.50	1,931.58	871.70	8,751.62	16,278.39	10,683.20

Note: *1 Interest: 3.0 %
Grace period: 10 years

Table M.2.3 CASH FLOW STATEMENT FOR IRRIGATION PROJECT-CASE-2

(Unit : Rs. Million)

No.	Year	Cash Outflow							Cash Inflow					
		Capital Cost		Loan Repayment *1		O & M	Replacement		Construction Fund			Government		Government
		Foreign Currency	Local Currency	Interest	Principal	Cost	Cost	Total	Foreign Currency	Local Currency	Revenue	Subsidy	Total	Burden
1	1989	119.41	100.62					220.03	119.41	100.62		0.00	220.03	100.62
2	1990	1,096.46	435.81	3.58				1,535.85	1,096.46	435.81		3.58	1,535.85	439.39
3	1991	923.47	371.80	60.60		1.42		1,357.29	923.47	371.80	4.60	57.42	1,357.29	429.22
4	1992	923.47	342.34	83.11		5.85		1,354.77	923.47	342.34	16.19	72.78	1,354.77	415.11
5	1993	923.47	342.34	77.52		12.54		1,355.87	923.47	342.34	30.18	59.89	1,355.87	402.22
6	1994	596.82	244.10	119.59		20.53		981.04	596.82	244.10	34.96	105.16	981.04	349.26
7	1995	140.39	94.58	137.49		33.58		406.05	140.39	94.58	50.60	120.47	406.05	215.05
8	1996			141.70		39.51		181.21			50.60	130.61	181.21	130.61
9	1997			141.70		44.42		186.12			50.60	135.52	186.12	135.52
10	1998			141.70		48.01		189.71			50.60	139.11	189.71	139.11
11	1999			141.70	5.97	50.26		197.94			50.60	147.34	197.94	147.34
12	2000			141.53	60.79	50.26		252.58			50.60	201.98	252.58	201.98
13	2001			139.70	106.97	50.26		296.93			50.60	246.33	296.93	246.33
14	2002			136.49	153.14	50.26		339.89			50.60	289.29	339.89	289.29
15	2003			131.90	199.31	50.26		381.47			50.60	330.87	381.47	330.87
16	2004			125.92	229.16	50.26		405.33			50.60	354.73	405.33	354.73
17	2005			119.04	236.17	50.26	269.92	675.39			50.60	624.79	675.39	624.79
18	2006			111.96	236.17	50.26		398.39			50.60	347.79	398.39	347.79
19	2007			104.87	236.17	50.26		391.31			50.60	340.71	391.31	340.71
20	2008			97.79	236.17	50.26		384.22			50.60	333.62	384.22	333.62
21	2009			90.70	236.17	50.26		377.14			50.60	326.54	377.14	326.54
22	2010			83.62	236.17	50.26		370.05			50.60	319.45	370.05	319.45
23	2011			76.53	236.17	50.26		362.97			50.60	312.37	362.97	312.37
24	2012			69.45	236.17	50.26		355.88			50.60	305.28	355.88	305.28
25	2013			62.36	236.17	50.26		348.80			50.60	298.20	348.80	298.20
26	2014			55.28	236.17	50.26		341.71			50.60	291.11	341.71	291.11
27	2015			48.19	236.17	50.26	269.92	604.54			50.60	553.94	604.54	553.94
28	2016			41.11	236.17	50.26		327.54			50.60	276.94	327.54	276.94
29	2017			34.02	236.17	50.26		320.46			50.60	269.86	320.46	269.86
30	2018			26.94	236.17	50.26		313.37			50.60	262.77	313.37	262.77
31	2019			19.85	230.20	50.26		300.32			50.60	249.72	300.32	249.72
32	2020			12.95	175.38	50.26	55.42	294.01			50.60	243.41	294.01	243.41
33	2021			7.68	129.21	50.26		187.15			50.60	136.55	187.15	136.55
34	2022			3.81	83.03	50.26		137.10			50.60	86.50	137.10	86.50
35	2023			1.32	36.86	50.26		88.44			50.60	37.84	88.44	37.84
36	2024			0.21	7.02	50.26		57.49			50.60	6.89	57.49	6.89
	Total	4,723.50	1,931.58	2,791.94	4,723.50	1,512.63	595.25	16,278.39	4,723.50	1,931.58	1,603.93	8,019.39	16,278.39	9,950.97

Note :*1 Interest : 3.0%
Grace period : 10 years
Replayce period including grace period : 30 years

Table M.2.4 CASH FLOW STATEMENT FOR IRRIGATION PROJECT-CASE-3

(Unit : Rs. Million)

No.	Year	Cash Outflow							Cash Inflow					
		Capital Cost		Loan Repayment *1		O & M	eplacement		Construction Fund			Government		Government
		Foreign Currency	Local Currency	Interest	Principal	Cost	Cost	Total	Foreign Currency	Local Currency	Revenue	Subsidy*2	Total	Burden
1	1989	119.41	100.62					220.03	119.41	100.62		0.00	220.03	100.62
2	1990	1,096.46	435.81	3.58				1,535.85	1,096.46	435.81		3.58	1,535.85	439.39
3	1991	923.47	371.80	60.60		1.42		1,357.29	923.47	371.80	33.00	29.02	1,357.29	400.82
4	1992	923.47	342.34	83.11		5.85		1,354.77	923.47	342.34	116.16	-27.19	1,354.77	315.14
5	1993	923.47	342.34	77.52		12.54		1,355.87	923.47	342.34	216.48	-126.42	1,355.87	215.92
6	1994	596.82	244.10	119.59		20.53		981.04	596.82	244.10	250.80	-110.68	981.04	133.42
7	1995	140.39	94.58	137.49		33.58		406.05	140.39	94.58	363.00	-191.93	406.05	-97.35
8	1996			141.70		39.51		181.21			363.00	-181.79	181.21	-181.79
9	1997			141.70		44.42		186.12			363.00	-176.88	186.12	-176.88
10	1998			141.70		48.01		189.71			363.00	-173.29	189.71	-173.29
11	1999			141.70	5.97	50.26		197.94			363.00	-165.06	197.94	-165.06
12	2000			141.53	60.79	50.26		252.58			363.00	-110.42	252.58	-110.42
13	2001			139.70	106.97	50.26		296.93			363.00	-66.07	296.93	-66.07
14	2002			136.49	153.14	50.26		339.89			363.00	-23.11	339.89	-23.11
15	2003			131.90	199.31	50.26		381.47			363.00	18.47	381.47	18.47
16	2004			125.92	229.16	50.26		405.33			363.00	42.33	405.33	42.33
17	2005			119.04	236.17	50.26	269.92	675.39			363.00	312.39	675.39	312.39
18	2006			111.96	236.17	50.26		398.39			363.00	35.39	398.39	35.39
19	2007			104.87	236.17	50.26		391.31			363.00	28.31	391.31	28.31
20	2008			97.79	236.17	50.26		384.22			363.00	21.22	384.22	21.22
21	2009			90.70	236.17	50.26		377.14			363.00	14.14	377.14	14.14
22	2010			83.62	236.17	50.26		370.05			363.00	7.05	370.05	7.05
23	2011			76.53	236.17	50.26		362.97			363.00	-0.03	362.97	-0.03
24	2012			69.45	236.17	50.26		355.88			363.00	-7.12	355.88	-7.12
25	2013			62.36	236.17	50.26		348.80			363.00	-14.20	348.80	-14.20
26	2014			55.28	236.17	50.26		341.71			363.00	-21.29	341.71	-21.29
27	2015			48.19	236.17	50.26	269.92	604.54			363.00	241.54	604.54	241.54
28	2016			41.11	236.17	50.26		327.54			363.00	-35.46	327.54	-35.46
29	2017			34.02	236.17	50.26		320.46			363.00	-42.54	320.46	-42.54
30	2018			26.94	236.17	50.26		313.37			363.00	-49.63	313.37	-49.63
31	2019			19.85	230.20	50.26		300.32			363.00	-62.68	300.32	-62.68
32	2020			12.95	175.38	50.26	55.42	294.01			363.00	-68.99	294.01	-68.99
33	2021			7.68	129.21	50.26		187.15			363.00	-175.85	187.15	-175.85
34	2022			3.81	83.03	50.26		137.10			363.00	-225.90	137.10	-225.90
35	2023			1.32	36.86	50.26		88.44			363.00	-274.56	88.44	-274.56
36	2024			0.21	7.02	50.26		57.49			363.00	-305.51	57.49	-305.51
Total		4,723.50	1,931.58	2,791.94	4,723.50	1,512.63	595.25	16,278.39	4,723.50	1,931.58	11,506.44	-1,883.12	16,278.39	48.46

Note:*1 Interest : 3.0%
Grace period 10 years
Repayment period including grace period : 30 years
*2 Negative figures mean the repayment to the government

Table M.2.5 CASH FLOW STATEMENT FOR THE WHOLE PROJECT:CASE-4

(Unit : Rs. Million)

No.	Year	Cash Outflow							Cash Inflow					
		Capital Cost		Loan Repayment *1		O & M	Replacement		Construction Fund					
		Foreign Currency	Local Currency	Interest	Principal	Cost	Cost	Total	Foreign Currency	Local Currency	Revenue	Government Subsidy or Revenue *2	Total	Government Burden
1	1989	157.99	132.50					290.49	157.99	132.50		0.00	290.49	132.50
2	1990	1,280.39	593.10	4.74				1,878.23	1,280.39	593.10		4.74	1,878.23	597.84
3	1991	1,168.15	584.90	73.46		1.78		1,828.28	1,168.15	584.90	2.50	72.73	1,828.28	657.63
4	1992	1,168.15	581.60	113.02		7.32		1,870.09	1,168.15	581.60	8.80	111.54	1,870.09	693.14
5	1993	1,431.06	628.20	109.13		15.68		2,184.07	1,431.06	628.20	16.40	108.41	2,184.07	736.61
6	1994	873.52	501.60	156.17		25.67		1,556.96	873.52	501.60	200.63	-18.78	1,556.96	482.82
7	1995	165.01	204.00	182.38		41.98		593.36	165.01	204.00	390.75	-166.39	593.36	37.61
8	1996			187.33		49.39		236.72			390.75	-154.03	236.72	-154.03
9	1997			187.33		55.53		242.86			390.75	-147.89	242.86	-147.89
10	1998			187.33		60.01		247.34			390.75	-143.41	247.34	-143.41
11	1999			187.33	7.90	62.83		258.06			390.75	-132.69	258.06	-132.69
12	2000			187.09	71.92	62.83		321.84			390.75	-68.91	321.84	-68.91
13	2001			184.93	130.33	62.83		378.09			390.75	-12.66	378.09	-12.66
14	2002			181.02	188.73	62.83		432.59			390.75	41.84	432.59	41.84
15	2003			175.36	260.29	62.83		498.48			390.75	107.73	498.48	107.73
16	2004			167.55	303.96	62.83		534.35			390.75	143.60	534.35	143.60
17	2005			158.43	312.21	62.83	269.92	803.39			390.75	412.64	803.39	412.64
18	2006			149.07	312.21	62.83		524.11			390.75	133.36	524.11	133.36
19	2007			139.70	312.21	62.83		514.74			390.75	123.99	514.74	123.99
20	2008			130.33	312.21	62.83		505.38			390.75	114.63	505.38	114.63
21	2009			120.97	312.21	62.83		496.01			390.75	105.26	496.01	105.26
22	2010			111.60	312.21	62.83		486.65			390.75	95.90	486.65	95.90
23	2011			102.24	312.21	62.83		477.28			390.75	86.53	477.28	86.53
24	2012			92.87	312.21	62.83		467.91			390.75	77.16	467.91	77.16
25	2013			83.50	312.21	62.83		458.55			390.75	67.80	458.55	67.80
26	2014			74.14	312.21	62.83		449.18			390.75	58.43	449.18	58.43
27	2015			64.77	312.21	62.83	269.92	709.73			390.75	318.98	709.73	318.98
28	2016			55.40	312.21	62.83		430.45			390.75	39.70	430.45	39.70
29	2017			46.04	312.21	62.83		421.08			390.75	30.33	421.08	30.33
30	2018			36.67	312.21	62.83		411.71			390.75	20.96	411.71	20.96
31	2019			27.30	304.31	62.83		394.45			390.75	3.70	394.45	3.70
32	2020			18.18	240.29	62.83	55.42	376.72			390.75	-14.03	376.72	-14.03
33	2021			10.97	181.89	62.83		255.68			390.75	-135.07	255.68	-135.07
34	2022			5.51	123.48	62.83		191.82			390.75	-198.93	191.82	-198.93
35	2023			1.81	51.93	62.83		116.56			390.75	-274.19	116.56	-274.19
36	2024			0.25	8.25	62.83		71.33			390.75	-319.42	71.33	-319.42
	Total	6,244.27	3,225.90	3,713.92	6,244.27	1,890.93	595.25	21,914.53	6,244.27	3,225.90	11,950.83	493.54	21,914.53	3,719.44

Note : *1 Interest : 3.0%
Grace period : 10 years
Repayment period including grace period :30 years
*2 Negative fitures mean revenue of the government.

Table M.2.6 CASH FLOW STATEMENT FOR THE WHOLE PROJECT:CASE-5

(Unit : Rs. Million)

No.	Year	Cash Outflow							Cash Inflow					
		Capital Cost		Loan Repayment *1		O & M	Replacement	Total	Construction Fund		Revenue	Government Subsidy or Revenue *2	Total	Government Burden
		Foreign Currency	Local Currency	Interest	Principal	Cost	Cost		Foreign Currency	Local Currency				
1	1989	157.99	132.50					290.49	157.99	132.50		0.00	290.49	132.50
2	1990	1,280.39	593.10	4.74				1,878.23	1,280.39	593.10		4.74	1,878.23	597.84
3	1991	1,168.15	584.90	73.46		1.78		1,828.28	1,168.15	584.90	2.50	72.73	1,828.28	657.63
4	1992	1,168.15	581.60	113.02		7.32		1,870.09	1,168.15	581.60	8.80	111.54	1,870.09	693.14
5	1993	1,431.06	628.20	109.13		15.68		2,184.07	1,431.06	628.20	16.40	108.41	2,184.07	736.61
6	1994	873.52	501.60	156.17		25.67		1,556.96	873.52	501.60	216.59	-34.74	1,556.96	466.86
7	1995	165.01	204.00	182.38		41.98		593.36	165.01	204.00	413.85	-189.49	593.36	14.51
8	1996			187.33		49.39		236.72			413.85	-177.13	236.72	-177.13
9	1997			187.33		55.53		242.86			413.85	-170.99	242.86	-170.99
10	1998			187.33		60.01		247.34			413.85	-166.51	247.34	-166.51
11	1999			187.33	7.90	62.83		258.06			413.85	-155.79	258.06	-155.79
12	2000			187.09	71.92	62.83		321.84			413.85	-92.01	321.84	-92.01
13	2001			184.93	130.33	62.83		378.09			413.85	-35.76	378.09	-35.76
14	2002			181.02	188.73	62.83		432.59			413.85	18.74	432.59	18.74
15	2003			175.36	260.29	62.83		498.48			413.85	84.63	498.48	84.63
16	2004			167.55	303.96	62.83		534.35			413.85	120.50	534.35	120.50
17	2005			158.43	312.21	62.83	269.92	803.39			413.85	389.54	803.39	389.54
18	2006			149.07	312.21	62.83		524.11			413.85	110.26	524.11	110.26
19	2007			139.70	312.21	62.83		514.74			413.85	100.89	514.74	100.89
20	2008			130.33	312.21	62.83		505.38			413.85	91.53	505.38	91.53
21	2009			120.97	312.21	62.83		496.01			413.85	82.16	496.01	82.16
22	2010			111.60	312.21	62.83		486.65			413.85	72.80	486.65	72.80
23	2011			102.24	312.21	62.83		477.28			413.85	63.43	477.28	63.43
24	2012			92.87	312.21	62.83		467.91			413.85	54.06	467.91	54.06
25	2013			83.50	312.21	62.83		458.55			413.85	44.70	458.55	44.70
26	2014			74.14	312.21	62.83		449.18			413.85	35.33	449.18	35.33
27	2015			64.77	312.21	62.83	269.92	709.73			413.85	295.88	709.73	295.88
28	2016			55.40	312.21	62.83		430.45			413.85	16.60	430.45	16.60
29	2017			46.04	312.21	62.83		421.08			413.85	7.23	421.08	7.23
30	2018			36.67	312.21	62.83		411.71			413.85	-2.14	411.71	-2.14
31	2019			27.30	304.31	62.83		394.45			413.85	-19.40	394.45	-19.40
32	2020			18.18	240.29	62.83	55.42	376.72			413.85	-37.13	376.72	-37.13
33	2021			10.97	181.89	62.83		255.68			413.85	-158.17	255.68	-158.17
34	2022			5.51	123.48	62.83		191.82			413.85	-222.03	191.82	-222.03
35	2023			1.81	51.93	62.83		116.56			413.85	-297.29	116.56	-297.29
36	2024			0.25	8.25	62.83		71.33			413.85	-342.52	71.33	-342.52
	Total	6,244.27	3,225.90	3,713.92	6,244.27	1,890.93	595.25	21,914.53	6,244.27	3,225.90	12,659.79	-215.42	21,914.53	3,010.48

Note : *1 Interest : 3.0%
Grace period : 10 years
Repayment period including grace period :30 years
*2 Negative fitures mean revenue of the government.

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