

## Figures



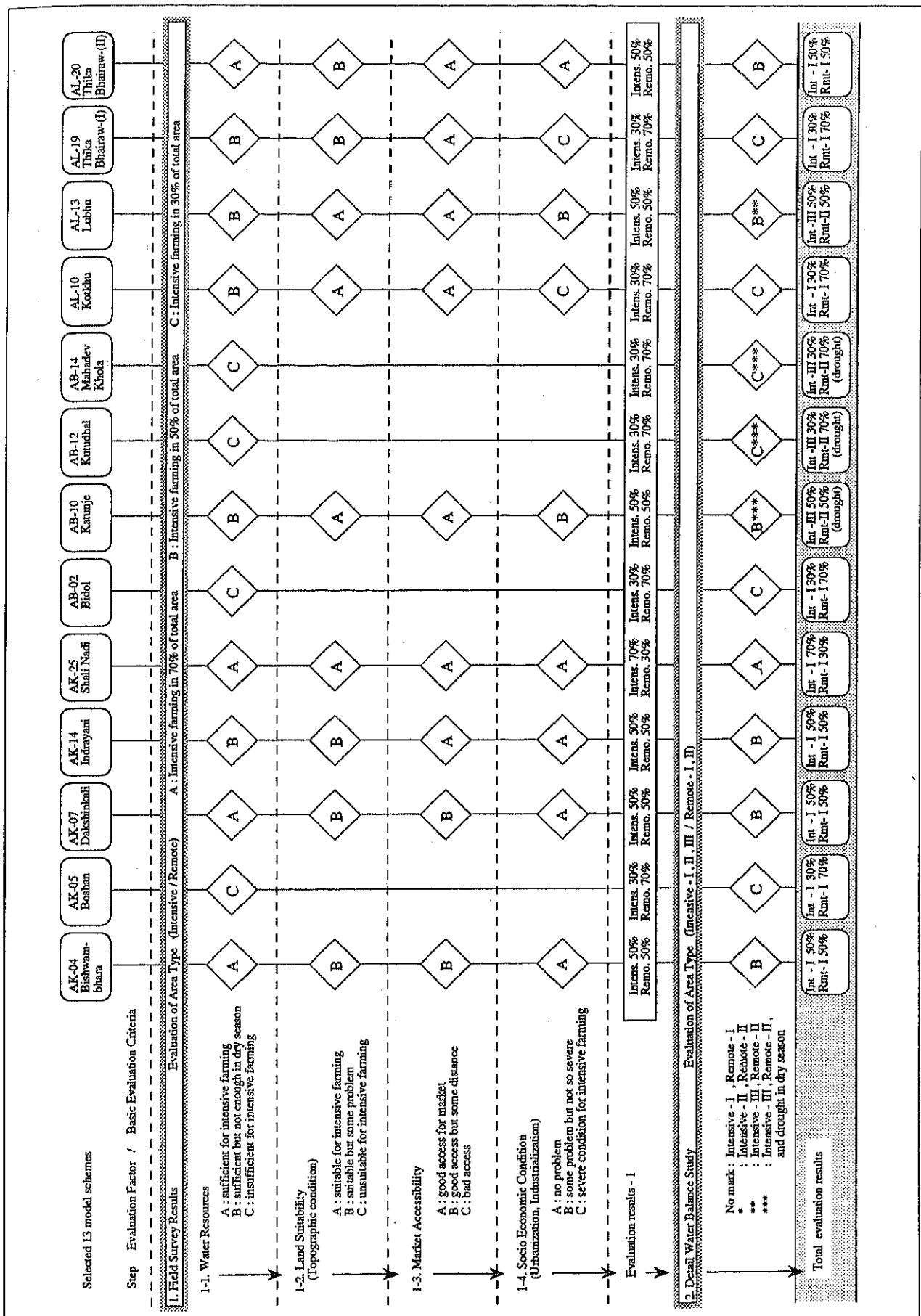


Figure 6-1  
 Criteria and Procedure of Evaluation  
 For Crop Diversification Potential

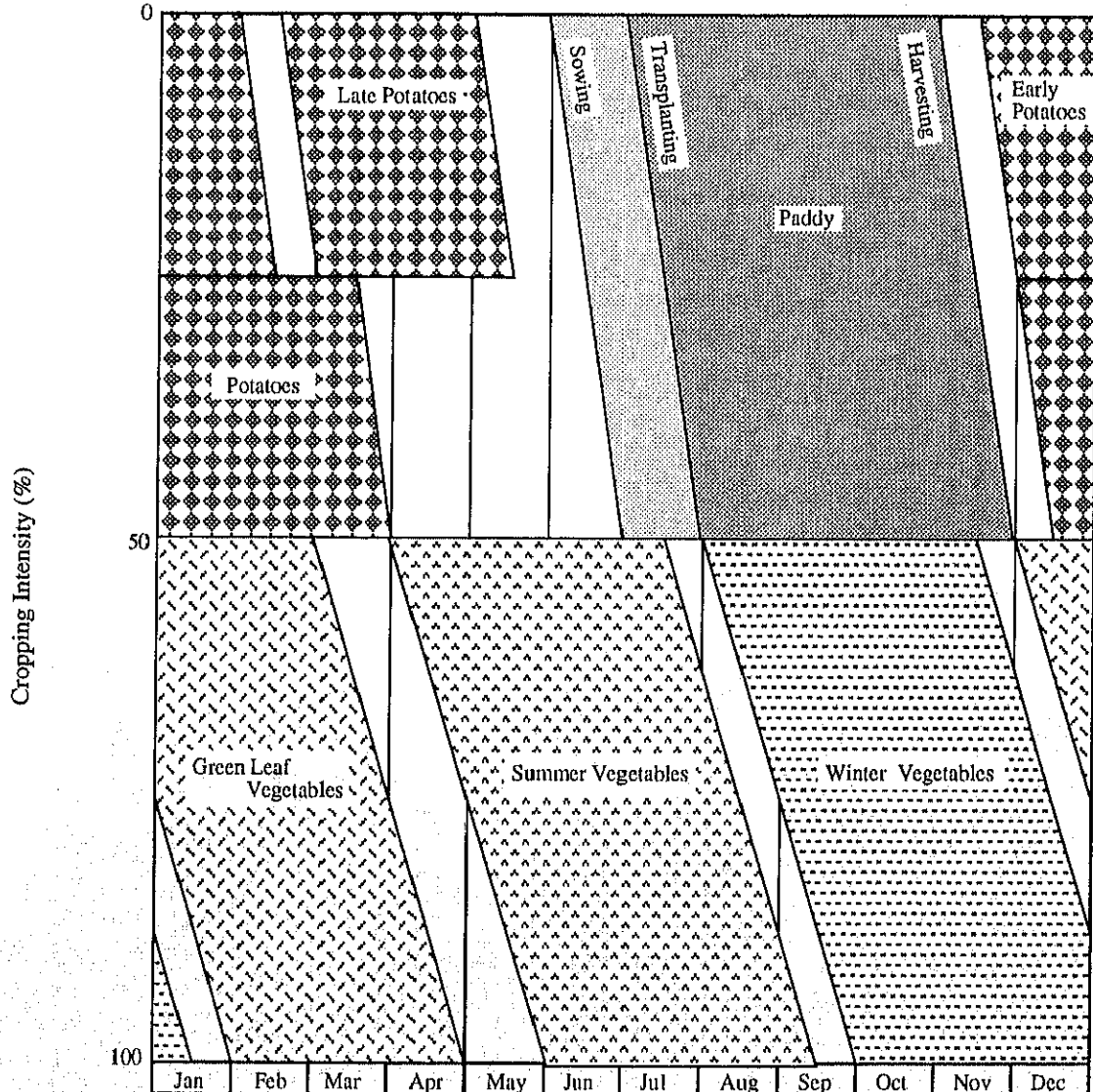
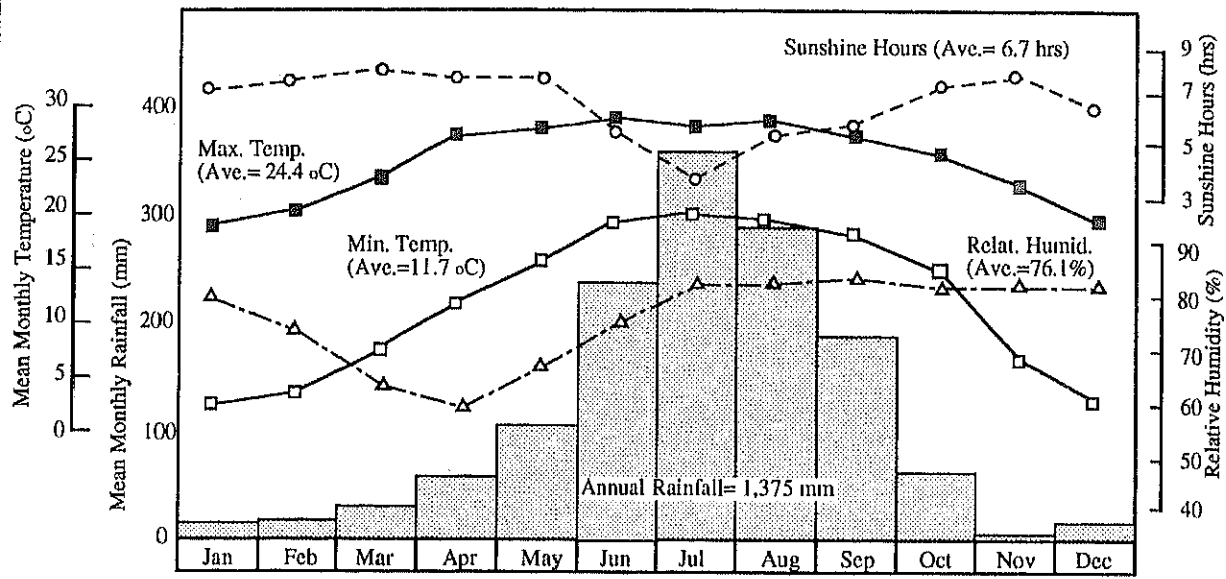


Figure 6-2 Proposed Cropping Pattern (1/5)  
< Intensive - I area >

HIS MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
 THE REHABILITATION OF GOVERNMENT DEVELOPED  
 IRRIGATION SCHEMES IN THE KATHMANDU VALLEY  
 JAPAN INTERNATIONAL COOPERATION AGENCY

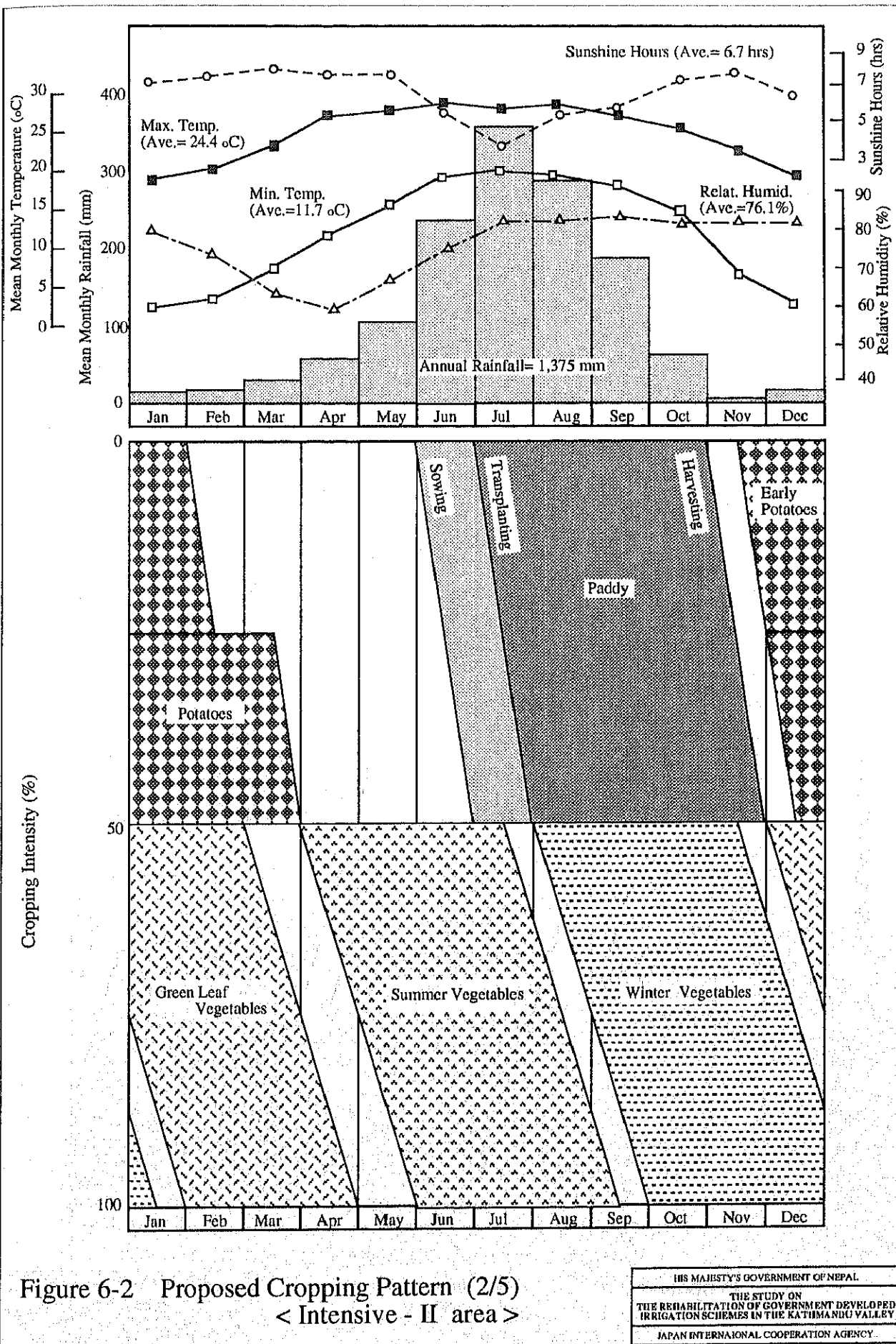


Figure 6-2 Proposed Cropping Pattern (2/5)  
 < Intensive - II area >

HER MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
 THE REHABILITATION OF GOVERNMENT DEVELOPED  
 IRRIGATION SCHEMES IN THE KATHMANDU VALLEY  
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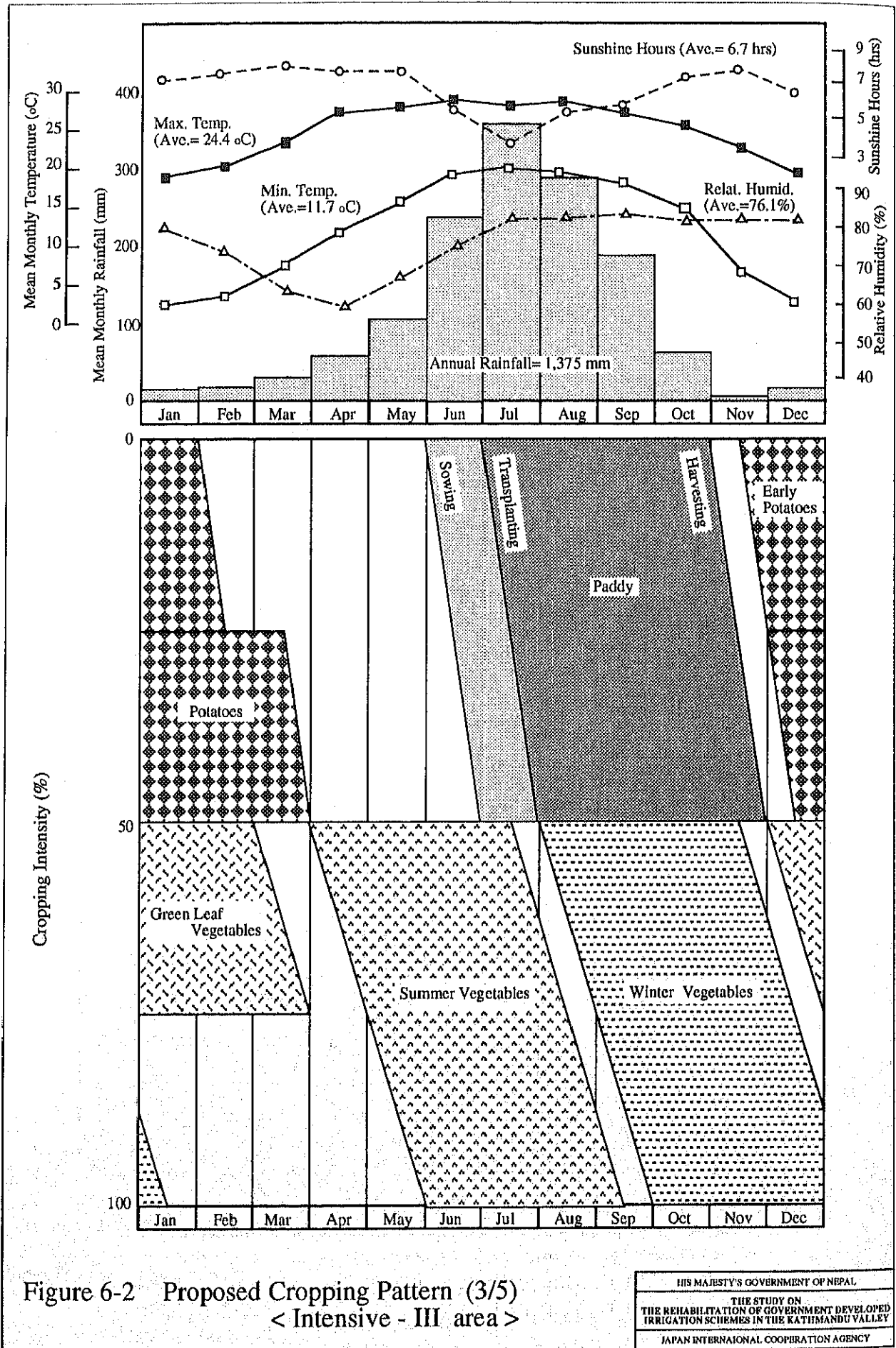


Figure 6-2 Proposed Cropping Pattern (3/5)  
< Intensive - III area >

HIS MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
 THE REHABILITATION OF GOVERNMENT DEVELOPED  
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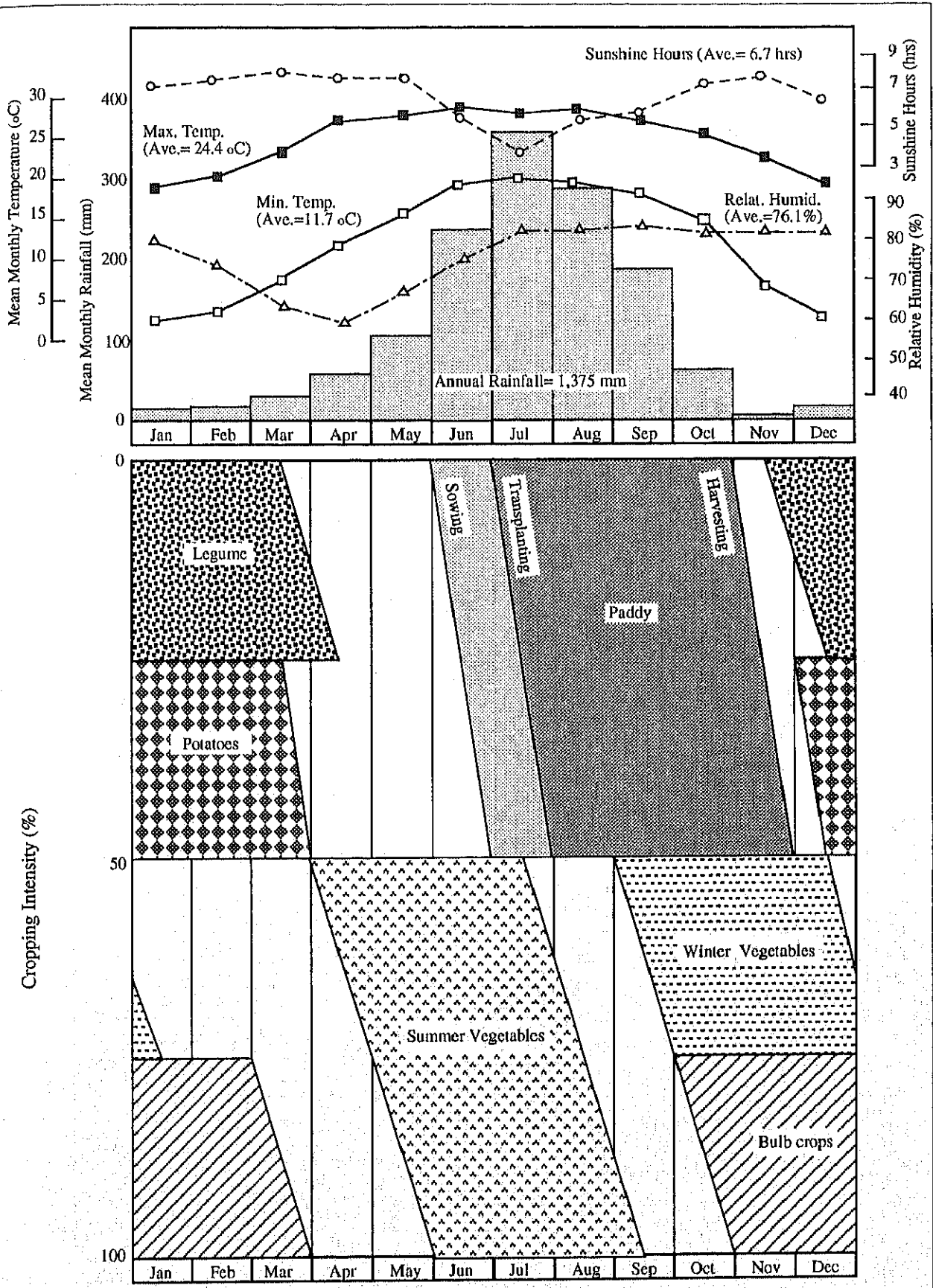


Figure 6-2 Proposed Cropping Pattern (4/5)  
 < Remote - I area >

HER MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
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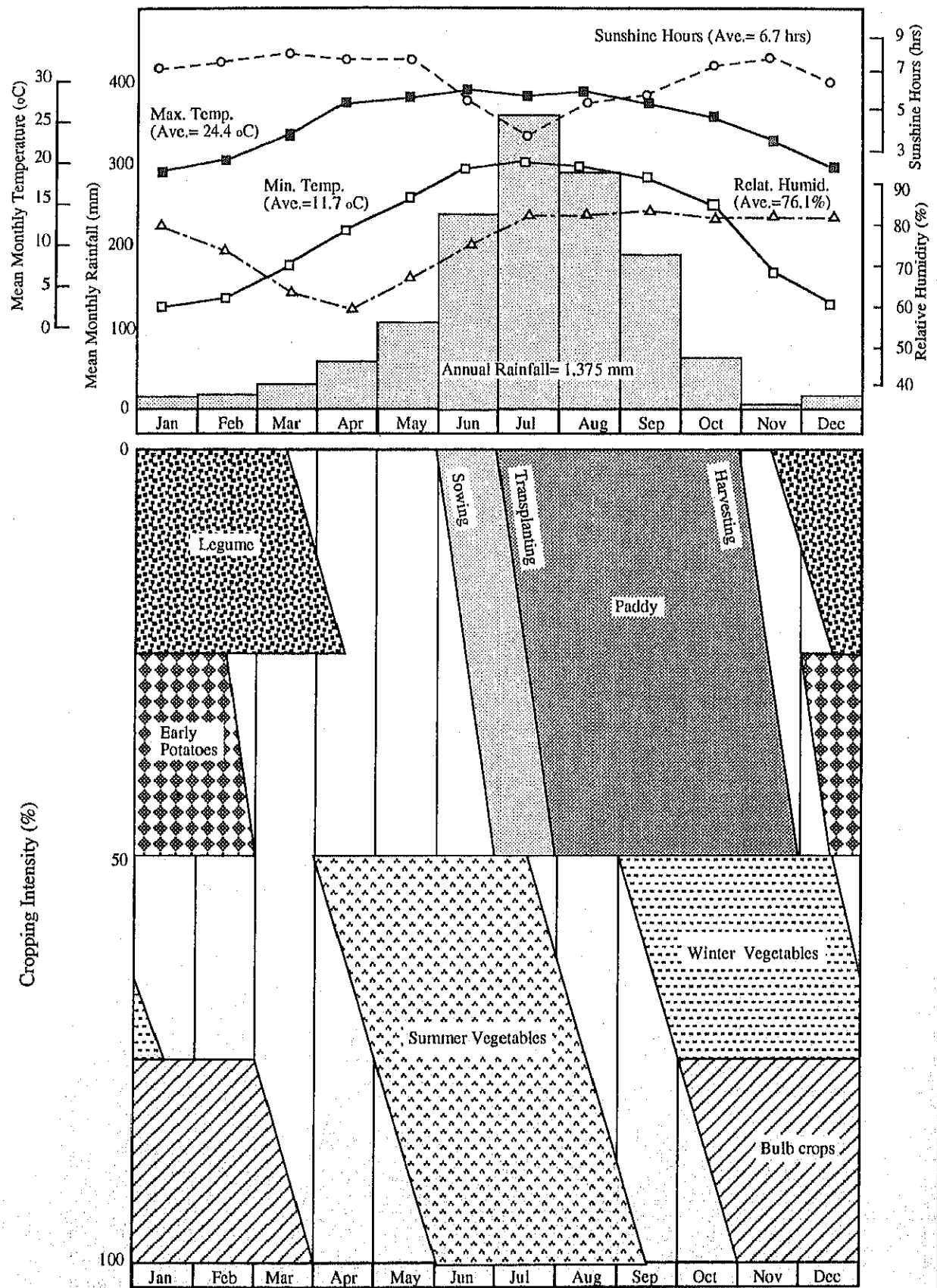


Figure 6-2 Proposed Cropping Pattern (5/5)  
 < Remote - II area >

HER MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
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 IRRIGATION SCHEMES IN THE KATHMANDU VALLEY  
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Rotation Type	Month																		
	Jan.	Feb.	Mar.	April	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	Jun.	Jul.
<b>Triple Cropping</b>	Late Potatoes							French bean			Cauliflower					Spinach			Paddy
	Late Potatoes							French bean			Radish					Cauliflower			Paddy
	Late Potatoes							Onion Leaf			Cauliflower					Radish			Paddy
	Late Potatoes							Onion Leaf			Radish					Broad leaf mustard			Paddy
<b>Double Cropping</b>	Potatoes							Tomato			Cauliflower					Radish			Paddy
	Potatoes							Tomato			Radish					Broad leaf mustard			Paddy
	Potatoes							Cabbage			Radish					Broad leaf mustard			Paddy
	Potatoes							Cucumber			Radish					Garden pea			Paddy
	Potatoes							Cucumber			Spinach					Radish			Paddy
	Potatoes							Cabbage			Radish					Radish			Paddy
	Potatoes							Cucumber			Cauliflower					Radish			Paddy
	Potatoes							Cucumber			Cauliflower					Radish			Paddy
	Potatoes							Tomato			Radish					Radish			Paddy
	Potatoes							French bean			Cauliflower					Onion			Paddy
	Potatoes							French bean			Garlic					Garlic			Paddy
	Broad bean							Cucumber			Cauliflower					Cauliflower			Paddy
Broad bean							Cabbage			Radish					Radish			Paddy	
Broad bean							Cabbage			Garlic					Garlic			Paddy	
Broad bean							Summer squash			Onion					Onion			Paddy	

Figure 6-3 Vegetable Cropping Rotation Menu

HIS MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
 THE REHABILITATION OF GOVERNMENT DEVELOPED  
 IRRIGATION SCHEMES IN THE KATHMANDU VALLEY  
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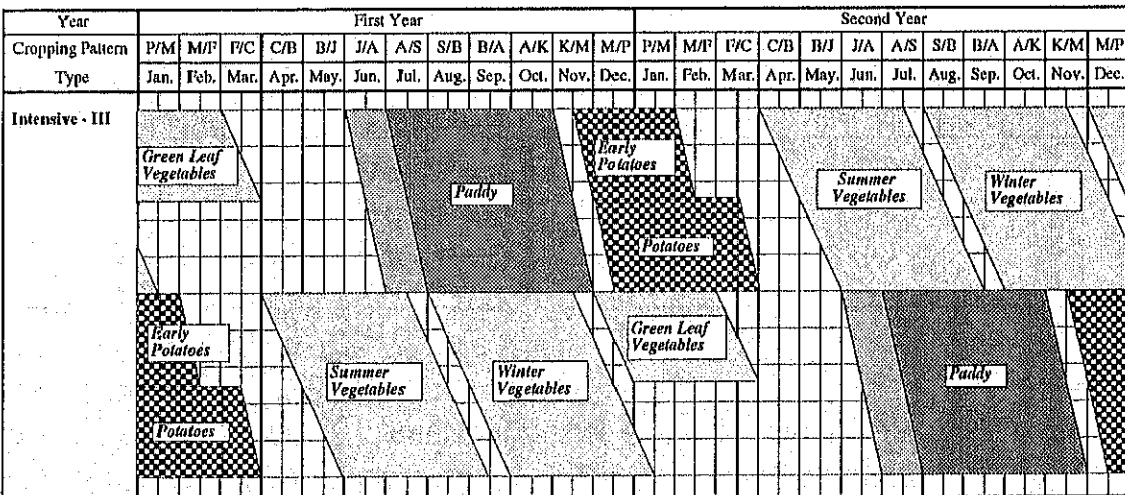
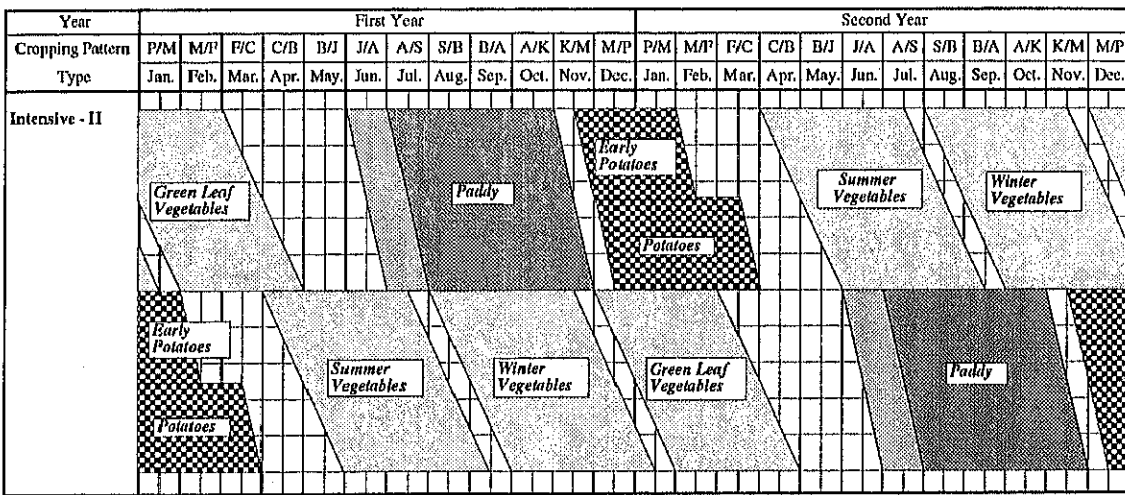
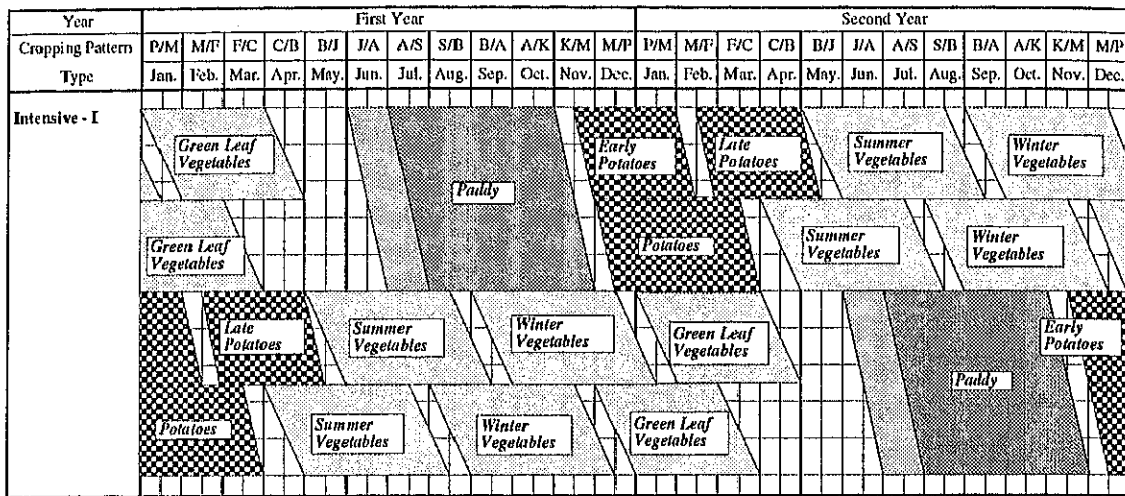


Figure 6 - 4 Cropping Rotation Calendar for 2 years (1/2)

HIS MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
 THE REHABILITATION OF GOVERNMENT DEVELOPED  
 IRRIGATION SCHEMES IN THE KATHIMANDU VALLEY  
 JAPAN INTERNATIONAL COOPERATION AGENCY

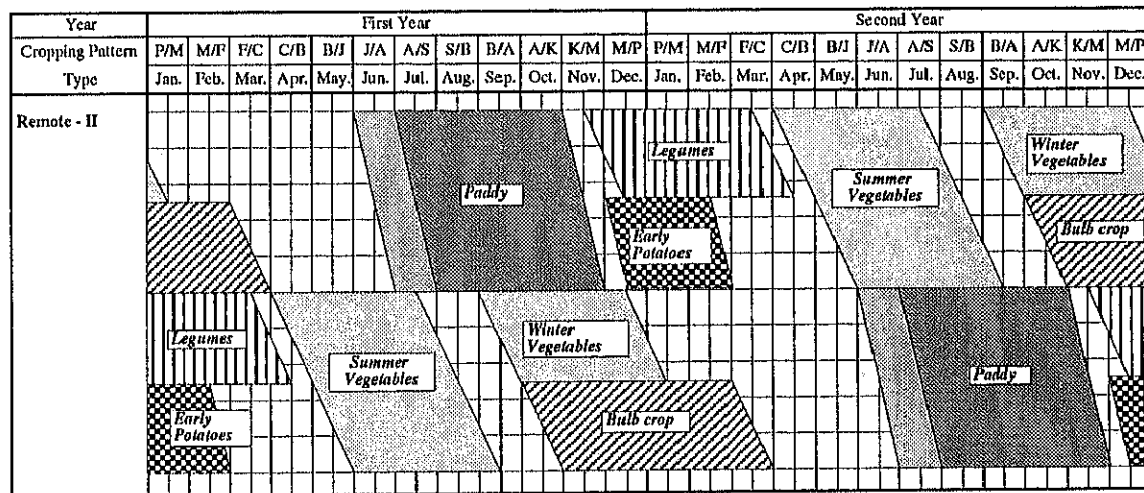
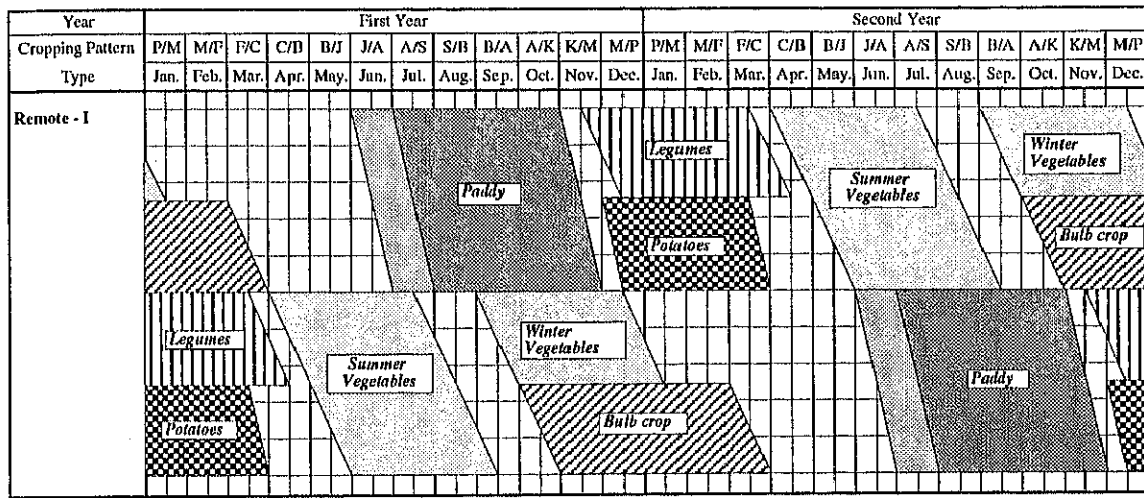


Figure 6 - 4 Cropping Rotation Calendar for 2 years (2/2)

HIS MAJESTY'S GOVERNMENT OF NEPAL  
 THE STUDY ON  
 THE REHABILITATION OF GOVERNMENT DEVELOPED  
 IRRIGATION SCHEMES IN THE KATIMANDU VALLEY  
 JAPAN INTERNATIONAL COOPERATION AGENCY



## **ANNEX - 7**

### **PROJECT EVALUATION**



## ANNEX - 7

## PROJECT EVALUATION

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## ANNEX- 7 PROJECT EVALUATION

### 7.1 General

The Project was evaluated by assessing the feasibility of the 13 selected schemes in the economic, financial, and socio-economic. The economic feasibility was assessed on the basis of the economic internal rate of return (EIRR), benefit-cost ratio (B/C), and the net present value (NPV).

The financial evaluation was carried out by analyzing the effect of the Project on a typical farm budget in each of the 13 schemes. The indirect benefits and socio-economic impacts of the Project were also briefly studied.

### 7.2 Economic Evaluation

#### 7.2.1 Basic Assumptions

The economic evaluation was carried out based on the following assumptions:

- 1) The Project implementation period is three years for the Thika Bhairaw-I scheme ; two and a half years for the Boshan, Shali Nadi, Kotkhu, and Thika Bhairaw-II schemes ; and two years for the other 8 schemes : Biswambhara, Dakshinkali, Indrayani, Bidol, Katunje, Kutudhal, Mahadev Khola, and Lubhu, including one year for the detailed design and preparatory works.
- 2) The economic useful life of the Project is 30 years.
- 3) All prices are at constant 1994 prices.
- 4) The exchange rate of US\$1.00 = NRs.49.0 = ¥100.0 as of July 1994 is applied.

#### 7.2.2 Evaluation of Economic Factors

The economic prices and costs were evaluated according to the following criteria :

- 1) The standard conversion factor (SCF) is fixed at 0.89, as shown in Table 8-1.
- 2) Transfer payments are excluded from the Project cost in the economic evaluation.
- 3) Economic prices for agricultural outputs and inputs are determined considering the international prices, SCF, etc, as shown in Table 8-2 and summarized in Table 8-3.
- 4) The economic opportunity cost of farm labour and unskilled construction labour is priced at NRs.63/man-day by adopting the shadow wage factor of 0.7, considering the actual employment opportunity in the area.
- 5) The economic construction cost for major project facilities is estimated by applying a construction conversion factor (CCF).

#### 7.2.3 Economic Benefits

Crop budget data per unit area were used to estimate the production cost and benefit in the Project Areas at the full development stage as detailed in Annex 6. The irrigation benefit will be generated and increased from year to year, depending on the progress of the Project rehabilitation and the supply of irrigation water. It is expected that the total irrigation benefit will attain the expected level five years after the completion of rehabilitation of the irrigation facilities, and the generation of benefit will be continuously sustained afterwards.

At the full development stage, the economic irrigation benefits under the " without " and " with " Project conditions are estimated as shown in Table 8-4 and summarized below :

(unit : NRs.1,000)

Schemes	Farmland area (ha)	Without Project	With Project	Increment Benefit	Increment per ha
<b>Kathmandu District</b>					
AK-04 Biswambhara	92	4,141	13,112	8,971	97.5
AK-05 Boshan	122	5,427	15,548	10,121	83.0
AK-07 Dakshinkali	67	2,612	9,549	6,937	103.5
AK-14 Indrayani	101	5,019	14,395	9,376	92.8
AK-25 Shali Nadi	157	8,859	24,227	15,368	97.9
<b>Bhaktapur</b>					
AB-02 Bidol	32	1,510	4,078	2,568	80.3
AB-10 Katunje	40	1,890	4,823	2,933	73.3
AB-12 Kutudhal	23	2,084	4,522	2,438	106.0
AB-14 Mahadev Khola	112	5,047	12,388	7,341	65.5
<b>Lalitpur</b>					
AL-10 Kotkhu	246	10,845	31,351	20,506	83.4
AL-13 Lubhu	130	5,470	16,228	10,758	82.8
AL-19 Thika Bhairaw-I	497	21,501	63,340	41,839	84.2
AL-20 Thika Bhairaw-II	88	3,940	12,542	8,602	97.8

#### 7.2.4 Economic Costs

##### (1) Economic Construction Cost

The economic costs were derived from the financial costs by applying CCFs for each of the major components , as shown below :

(unit : %)

Items	CCF
Construction Cost	94
Engineering Cost	97
Admini. Cost	97
O & M Equipment	95
Contingencies	95

The disbursement of the economic construction cost is shown in Table 8-5 and the financial and economic construction costs are summarized below :

(unit : NRs.1,000)

Schemes	Financial Cost			Economic Cost		
	Local	Foreign	Total	Local	Foreign	Total
<b>Kathmandu District</b>						
AK-04 Biswambhara	11,737	9,873	21,610	9,404	9,573	18,977
AK-05 Boshan	14,225	11,802	26,027	11,066	11,339	22,405
AK-07 Dakshinkali	10,723	9,191	19,914	8,592	8,911	17,503
AK-14 Indrayani	11,050	9,216	20,266	8,853	8,936	17,789
AK-25 Shali Nadi	18,515	14,534	33,049	14,403	13,966	28,369
<b>Bhaktapur</b>						
AB-02 Bidol	8,926	4,978	13,904	7,029	4,836	11,865
AB-10 Katunje	5,492	4,697	10,189	4,400	4,554	8,954
AB-12 Kutudhal	7,525	6,278	13,803	6,029	6,087	12,116
AB-14 Mahadev Khola	19,233	16,239	35,472	15,409	15,745	31,154
<b>Lalitpur</b>						
AL-10 Kotkhu	32,312	25,943	58,255	25,072	24,914	49,986
AL-13 Lubhu	19,457	15,889	35,346	15,587	15,408	30,998
AL-19 Thika Bhairaw-I	84,558	64,929	149,487	64,319	61,944	126,263
AL-20 Thika Bhairaw-II	21,030	16,900	37,930	16,447	16,258	32,705

## (2) Annual O&amp;M Cost

The annual O&M costs include repair and maintenance cost of the facilities, administration cost, fuel and operation cost of O&M equipment, and office operation cost. The average annual O&M cost was estimated at NRs.3,170/ha, as shown in Table 8-6 and 8-7. The annual O&M costs for the respective schemes were converted to the economic O&M costs by applying CCFs.

## (3) Replacement Costs

In general, some of the facilities such as gates for intake and canal structures and O&M equipment have a shorter useful life than the civil works and therefore, require replacement at a certain time within the Project life. In this Project, no heavy O&M equipment is included. And most of the important equipment such as vehicles, motorcycles, survey equipment and portable concrete mixers would be procured for strengthening DIOs in order to support O&M activities of the farmers. Accordingly, replacement cost of the O&M equipment is included in the annual O&M cost, and only the replacement cost of gates for intake and canal structures is considered with an assumed useful life of 20 years.

Economic replacement costs were estimated by adopting a salvage value of 10% and CCFs, as shown in Table 8-7.

## 7.2.5 EIRR, B/C, and NPV

The EIRR, B/C, and NPV of each scheme were calculated on the basis of the flows of economic benefits and costs mentioned above. The Project costs and benefits flows of the 13 selected model schemes are shown in Table 8-8 and summarized below :

Schemes	EIRR (%)	B/C*	NPV* (NRs.10 <sup>6</sup> )
<b>Kathmandu District</b>			
AK-04 Biswambhara	31.4	3.41	43.5
AK-05 Boshan	25.1	3.00	41.1
AK-07 Dakshinkali	28.2	2.93	31.7
AK-14 Indrayani	33.2	3.75	46.7
AK-25 Shali Nadi	27.7	3.56	66.6
<b>Bhaktapur</b>			
AB-02 Bidol	15.7	1.54	6.1
AB-10 Katunje	22.2	2.27	11.0
AB-12 Kutudhal	14.0	1.38	4.4
AB-14 Mahadev Khola	16.9	1.68	19.8
<b>Lalitpur</b>			
AL-10 Kotkhu	24.0	2.77	80.7
AL-13 Lubhu	24.4	2.54	44.4
AL-19 Thika Bhairaw-I	21.0	2.30	144.4
AL-20 Thika Bhairaw-II	17.3	1.78	23.4

Remarks : \* Calculated at a discount rate of 10%

### 7.2.6 Sensitivity Analysis of EIRR

Sensitivity analysis is made with respect to changes in yield of farm products, market price of products and the Project cost, for the following conditions, as shown in Table 7-8.

Benefit Down : -10% (Increase), 0 (No change), 10% and 20% Decrease  
 Cost Up : -10% and -5% (Decrease), 0 (No change), 5%, 10% and 15% (Increase)

### 7.3 Financial Evaluation

In order to assess the irrigation rehabilitation Project from the farmers' economic viewpoint, an analysis of the farm budget for typical farmers was made under the both " with " and " without " Project conditions. The analysis result indicates that the farm income of typical farms under the " with " Project condition is expected to be much higher than that under the "without " Project condition. Farm budgets of the typical farm size in each model scheme area are described in Table 8-9 and the average annual net reserve or capacity to pay is summarized below :

Unit : NRs.1,000

Schemes	Farm Size (ha)	No. of Families	Without Project	With Project		
				Intensive	Remote	
<b>Kathmandu District</b>						
AK-04	Biswambhara	0.41	5.9	13	74	40
AK-05	Boshan	0.28	5.6	3	44	21
AK-07	Dakshinkali	0.28	5.9	6	47	24
AK-14	Indrayani	0.37	5.7	16	69	39
AK-25	Shali Nadi	0.27	6.4	12	47	25
<b>Bhaktapur District</b>						
AB-02	Bidol	0.19	6.0	1	26	10
AB-10	Katunje	0.24	5.9	9	34	18*
AB-12	Kutudhal	0.30	5.6	6	38	18*
AB-14	Mahadev Khola	0.26	5.9	1	26	9*
<b>Lalitpur District</b>						
AL-10	Kotkhu	0.19	5.3	1	25	9
AL-13	Lubhu	0.23	6.2	4	29	18
AL-19	Thika Bhairaw-I	0.25	5.8	1	35	15
AL-20	Thika Bhairaw-II	0.13	5.9	1	16	5

Note \* : For conservative estimation, the farmers' budget in remote areas is taken as that in the downstream area where no irrigation water will be available in the dry season due to the shortage of available water.

Judging from the analysis result, each scheme can be justified financially from the beneficiaries' viewpoint.

#### 7.4 Indirect Benefits and Socio-economic Impacts

##### (1) Increase of Employment Opportunities

The Project will create a demand for farm labour which will be accrued from increased farming activities as a result of the increase in irrigation area as well as intensive use of the land. The incremental farm requirement was estimated to reach 574 million man-days annually.

##### (2) Increase of Crop Production and Stable Supply of Products to Kathmandu

The Project will increase the production of vegetables (30,710 tons), which will bring about considerable profit to the beneficiaries in the Project Area. These products will be marketed in Kathmandu City for domestic use. People in Kathmandu City will enjoy those fresh and stable supply of the products from the Project Area due to the locational advantage.

##### (3) Increase of Farmers' Income

The farmers' income will be expected to improve considerably due to the increase of crop production, as described in the previous chapter. This increase in income will contribute to the improvement of their living standards.



## Tables





Table 7-1 Standard Conversion Factor (SCF)

Fiscal year	Unit : NRs. million						
	Export Value (E)	Import Value (I)	Export Subsidy (Es)	Export Tax (Et)	Import Subsidy (Is)	Import Tax (It)	SCF *1
1987/88	4,015	13,213	0	181	0	3,333	0.85
1988/89	4,129	15,668	0	118	0	2,307	0.90
1989/90	5,161	17,453	544	33	0	2,654	0.88
1990/91	7,604	24,197	9	77	0	5,415	0.86
1991/92	13,939	32,951	0	116	0	3,246	0.94
Average	34,848	103,482	553	525	0	16,956	0.89

Remark : \*1  $SCF = (E+I)/\{(E+Es-Et)+(I-Is+It)\}$

Source : Department of Customs, Ministry of Finances.  
Nepal Rastra Bank

Table 7-2 Economic Prices for Major Tradable Crops  
And Chemical Fertilizers

Item	Unit	(Unit: ton)		
		Paddy	Wheat	Maize
<b>I. Major Traded Crops</b>				
1 Projected World Market Price (in 2000) /1	US\$	286	171	104
2 Quality Adjustment	%	85	100	100
3 Projected Price Adjusted for Quality Difference	US\$	243	171	104
4 International Shipping and Handling	US\$	45	70	60
5 FOB/CIF Price at Calcutta Port	US\$	288	241	164
6 Transport and Handling from/to Nepal Border	US\$	45	45	45
7 Equivalent in NRs./ton /2		16,330	14,000	10,240
8 Domestic Transport and Handling from/to Wholesale Point or Mill /3	NRs.	365	365	365
9 Processing Ratio	%	63	100	100
10 Processing Cost /3	NRs.	151	0	0
11 Transport/handling from/to Farmgate /3	NRs.	73	73	73
12 Farmgate Price	NRs.	10,296	14,292	10,532

Item	Unit	(Unit: ton)		
		Urea	T.S.P	KCl
<b>II. Fertilizer</b>				
1 Projected World Market Price (in 2000) /1	US\$	153	141	113
2 International Shipping and Handling	US\$	50	60	60
3 FOB/CIF Price at Calcutta Port	US\$	203	235	173
4 Transport and Handling from/to Nepal Border	US\$	45	45	45
5 Equivalent in NRs./ton /2		12,140	13,720	10,700
6 Domestic Transport and Handling from/to Wholesale Point or Mill /3	NRs.	360	360	360
7 Transport/handling from/to Farmgate /3	NRs.	73	73	73
8 Farmgate Price	NRs.	12,573	14,153	11,133
9 Price of nutrient content /4	NRs.	27,330	29,490	18,550

- Remarks : /1 Based on the IBRD Commodity Price Projection, June 1994.  
The IBRD estimated are given in 1985 constant US\$, in which have been adjusted by the factor of 1.0603 (MUV) to allow for price escalation between 1990 and 1994.
- Paddy : Rice : Thai, milled, 5% broken, FOB Bangkok  
Wheat : Canadian No.1, Western Red Spring, FOB Thunder Bay  
Maize : US No.2, Milo Yellow, FOB Gulf Ports  
Urea : Bagged, FOB N.W Europe  
T.S.P : Bulk, FOB US Gulf  
KCL : Bulk, FOB Vancouver
- /2 Exchange rate between US\$ and NRs. : US\$ 1.00 = NRs. 49.0 (July 1994)  
/3 Adjusted with SCF of 0.89  
/4 Nutrient content is 46 %, 48 %, and 60 %, respectively.

Table 7-3 Summary of Economic and Financial Price of Farm Inputs and Outputs

				Unit : NRs.			
Items	Unit	Financial	Economic	Items	Unit	Financial	Economic
<b>Output</b>				<b>Inputs</b>			
Paddy	/1 ton	8,500	10,300	<b>Seed</b>			
Wheat	/1 ton	8,000	14,300	Paddy	/3 kg	16.80	16.80
Maize	/1 ton	7,500	10,500	Wheat	/3 kg	12.00	12.00
Mustard	/3 ton	16,000	16,000	Maize	/3 kg	10.00	10.00
Potato	/3 ton	7,000	7,000	Mustard	/3 kg	18.00	18.00
Broad bean	/3 ton	12,000	12,000	Potato	/3 kg	16.80	16.80
Cauliflower	/3 ton	8,730	8,730	Broad bean	/3 kg	12.00	12.00
Tomato	/3 ton	7,650	7,650	Broad leaf mustard	/3 kg	80.00	80.00
Broad leaf mustard	/3 ton	5,900	5,900	Cauliflower	/3 kg	300.00	300.00
Onion	/3 ton	5,400	5,400	Onion	/3 kg	225.00	225.00
				Tomato	/3 Seedling	0.10	0.10
				<b>Fertilizer /5</b>			
				Urea (46:0:0)	/1 kg	5.72	12.57
				Complex (20:20:0)	/1 kg	10.20	11.36
				KCl (0:0:60)	/1 kg	8.50	11.13
				Manure	/2 ton	500.00	450.00
				<b>Chemicals</b>			
				BHC Dust	/3 kg	6.00	6.00
				Hinosan	/3 100ml	50.80	50.80
				Metacid	/3 100ml	59.95	59.95
				<b>Human power</b>			
					m/d		
				Male	/4	90.00	63.00
				Female	/4	45.00	31.50

- Remarks :
- /1 Economic farm gate price is derived from the data of IBRD Commodity Price Forecasts.
  - /2 Financial value is adjusted by a SCF of 0.89 to convert to economic value.
  - /3 Based on the corresponding outputs price.
  - /4 A shadow wage rate of 0.7 is applied to convert to economic value.
  - /5 Figure in parenthesis shows the price in nutrient.

Table 7-4 Economic Irrigation Benefit under Without and With Project Condition

<Without Project Condition>

Crops	Farm Land (ha)	Paddy	Wheat	Maize	Mustard	Potatoes	Early Potatoes	Late Potatoes	Broad Bean	Garden Pea	Summer Vege.	Winter Vege.	Green Leaf Veg.	Bulb crop	Total Area ('000 NRs.)	Incremental Benefit per ha ('000 NRs.)
Return by crop (NRs./ha)	(ha)	29,901	16,540	6,640	3,337	40,520	29,880	29,880	6,608	8,284	.	.	.	.	(000 NRs.)	(000 NRs.)
<b>Kathmandu District</b>																
AK - 04 Biswambhara	92	2,476	1,126	61	31	447	0	0	0	0					4,141	45
AK - 03 Boshan	122	3,648	1,170	0	114	494	0	0	0	0					5,427	44
AK - 07 Dakshinkali	67	2,003	244	0	78	81	0	0	0	205					2,612	39
AK - 14 Indrayani	101	2,960	1,303	13	7	737	0	0	0	0					5,019	50
AK - 25 Shali Nadi	157	4,694	1,298	0	26	1,527	657	657	0	0					8,859	56
Sub-total	539	15,781	5,142	75	256	3,287	657	657	0	205					26,059	48
<b>Bhaktapur District</b>																
AB - 02 Bidol	32	957	423	0	0	130	0	0	0	0					1,510	47
AB - 10 Katunje	40	1,136	490	13	8	243	0	0	0	0					1,890	47
AB - 12 Kusudhal	43	1,286	569	0	3	227	0	0	0	0					2,084	48
AB - 14 Mahadev Khola	112	3,282	1,482	15	19	227	0	0	22	0					5,047	45
Sub-total	227	6,661	2,964	28	30	826	0	0	22	0					10,531	46
<b>Lalitpur District</b>																
AL - 10 Kotku	246	6,767	2,685	98	99	1,196	0	0	0	0					10,845	44
AL - 13 Lubhu	130	3,615	1,398	43	22	263	0	0	129	0					5,470	42
AL - 19 Thika Bhairaw-(I)	497	12,929	6,165	363	131	1,812	0	0	99	0					21,501	43
AL - 20 Thika Bhairaw-(II)	88	2,579	1,237	0	6	107	0	0	12	0					3,940	45
Sub-total	961	25,890	11,486	504	259	3,379	0	0	239	0					41,756	43
Total	1,727	48,332	19,591	607	544	7,492	657	657	261	205					78,346	45

<With Project Condition>

Crops	Farm Land (ha)	Paddy	Wheat	Maize	Mustard	Potatoes	Early Potatoes	Late Potatoes	Broad Bean	Garden Pea	Summer Vege.	Winter Vege.	Green Leaf Veg.	Bulb crop	Total Area ('000 NRs.)	Incremental Benefit per ha ('000 NRs.)
Return by crop (NRs./ha)	(ha)	38,730	.	.	.	50,586	36,586	36,586	7,343	.	63,660	105,240	90,931	51,357	(000 NRs.)	(000 NRs.)
<b>Kathmandu District</b>																
AK - 04 Biswambhara	92	1,782				1,163	421	421	84		2,928	3,631	2,091	391	13,112	143
AK - 03 Boshan	122	2,363				1,543	335	335	157		3,883	4,173	1,664	1,096	15,548	127
AK - 07 Dakshinkali	67	1,297				847	306	306	61		2,133	2,644	1,523	430	9,549	143
AK - 14 Indrayani	101	1,956				1,277	462	462	93		3,215	3,986	2,296	648	14,395	143
AK - 25 Shali Nadi	157	3,040				1,986	718	718	144		4,997	7,022	4,997	605	24,227	154
Sub-total	539	10,438				6,816	2,242	2,242	540		17,156	21,456	12,571	3,370	76,831	143
<b>Bhaktapur District</b>																
AB - 02 Bidol	32	620				405	88	88	41		1,019	1,094	436	288	4,078	127
AB - 10 Katunje	40	775				253	366	0	15	*	1,273	1,579	455	108	4,823	121
AB - 12 Kusudhal	43	833				163	393	0	0	#	1,369	1,471	293	0	4,422	105
AB - 14 Mahadev Khola	112	2,169				425	1,024	0	76	*	3,565	3,831	764	533	12,388	111
Sub-total	227	4,396				1,246	1,871	88	133		7,225	7,975	1,948	929	25,811	114
<b>Lalitpur District</b>																
AL - 10 Kotku	246	4,764				3,111	675	675	316		7,830	8,414	3,355	2,211	31,351	127
AL - 13 Lubhu	130	2,517				822	1,189	0	119		4,138	5,130	1,478	835	16,228	125
AL - 19 Thika Bhairaw-(I)	497	9,624				6,285	1,364	1,364	639		15,820	16,999	6,779	4,467	63,340	127
AL - 20 Thika Bhairaw-(II)	88	1,704				1,113	402	402	81		2,801	3,473	2,000	565	12,542	143
Sub-total	961	18,610				11,331	3,630	2,441	1,155		30,589	34,016	13,612	8,077	123,462	128
Total	1,727	33,443				19,393	7,743	4,771	1,827		54,970	63,447	28,132	12,376	226,103	131

<Incremental Benefit>

Crops	Farm Land (ha)	Paddy	Wheat	Maize	Mustard	Potato	Potatoes	Early Potatoes	Late Potatoes	Garden Pea	Summer Vege.	Winter Vege.	Green Leaf Veg.	Bulb crop	Total Area ('000 NRs.)	Incremental Benefit per ha ('000 NRs.)
<b>Kathmandu District</b>																
AK - 04 Biswambhara	92	-694	-1,126	-61	-31	716	421	421	84	0	2,928	3,631	2,091	391	8,971	98
AK - 03 Boshan	122	-1,285	-1,170	0	-114	1,049	335	335	157	0	3,883	4,173	1,664	1,096	10,122	83
AK - 07 Dakshinkali	67	-706	-244	0	-78	766	306	306	61	-205	2,133	2,644	1,523	430	6,937	104
AK - 14 Indrayani	101	-1,004	-1,303	-13	-7	541	462	462	93	0	3,215	3,986	2,296	648	9,375	93
AK - 25 Shali Nadi	157	-1,654	-1,298	0	-26	459	61	61	144	0	4,997	7,022	4,997	605	15,367	98
Sub-total	539	-5,343	-5,142	-75	-256	3,530	1,585	1,585	540	-203	17,156	21,456	12,571	3,370	50,772	94
<b>Bhaktapur District</b>																
AB - 02 Bidol	32	-337	-423	0	0	275	88	88	41	0	1,019	1,094	436	288	2,368	80
AB - 10 Katunje	40	-362	-490	-13	-8	10	366	0	15	0	1,273	1,579	455	108	2,933	73
AB - 12 Kusudhal	43	-453	-569	0	-3	-63	393	0	0	0	1,369	1,471	293	0	2,438	57
AB - 14 Mahadev Khola	112	-1,113	-1,482	-15	-19	198	1,024	0	54	0	3,565	3,831	764	533	7,341	66
Sub-total	227	-2,265	-2,964	-28	-30	419	1,871	88	111	0	7,225	7,975	1,948	929	15,280	67
<b>Lalitpur District</b>																
AL - 10 Kotku	246	-2,003	-2,685	-98	-99	1,915	675	675	316	0	7,830	8,414	3,355	2,211	20,506	83
AL - 13 Lubhu	130	-1,098	-1,398	-43	-22	559	1,189	0	-10	0	4,138	5,130	1,478	835	10,759	83
AL - 19 Thika Bhairaw-(I)	497	-3,304	-6,165	-363	-133	4,473	1,364	1,364	540	0	15,820	16,999	6,779	4,467	41,839	84
AL - 20 Thika Bhairaw-(II)	88	-875	-1,237	0	-6	1,006	402	402	69	0	2,801	3,473	2,000	565	8,602	98
Sub-total	961	-7,280	-11,486	-504	-259	7,952	3,630	2,441	916	0	30,589	34,016	13,612	8,077	81,705	85
Total	1,727	-14,888	-19,591	-607	-544	11,902	7,886	4,114	1,566	-205	54,970	63,447	28,132	12,376	147,757	86
Potato Total :							23,102	Legume :		1,361	Vegetable Total :					158,935

Remarks : \* : Due to the limitation of irrigable area in dry season, Yield is reduced in the 58% of total planted area.  
# : Due to the limitation of irrigable area in dry season, Yield is reduced in the whole planted area.  
\* : Due to the limitation of irrigable area in dry season, Yield is reduced in the 47% of total planted area.

Table 7-5

## Disbursement of Economic Construction Cost (1/2)

Area	Item	Farm Land Area (ha)	1st year			2nd year			3rd year			Total			Cost Total per ha		
			LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	(NRs.)	(US\$)Rs.)	
AK-04	Bishmambhara	92															
	1 Construction Cost		0	0	0	7,830	6,466	14,296	0	0	0	7,830	6,466	14,296	155	3,171	
	2 Engineers Cost		228	598	826	57	150	207	0	0	0	285	748	1,033	11	229	
	3 Adminl. Cost		490	1,282	1,772	122	321	443	0	0	0	611	1,603	2,214	24	491	
	4 O & M equipment		0	0	0	442	562	1,004	0	0	0	442	562	1,004	11	223	
	Sub-total		717	1,880	2,597	8,451	7,499	15,950	0	0	0	9,169	9,379	18,548	202	4,114	
	5 Contingencies		0	0	0	235	194	429	0	0	0	235	194	429	5	95	
	Total		717	1,880	2,597	8,686	7,693	16,379	0	0	0	9,404	9,573	18,977	206	4,210	
AK-05	Boshan	122															
	1 Construction Cost		0	0	0	6,744	5,631	12,375	2,466	2,041	4,507	9,210	7,672	16,882	138	2,824	
	2 Engineers Cost		236	618	854	68	176	244	34	88	122	337	882	1,219	10	204	
	3 Adminl. Cost		506	1,324	1,830	144	379	523	72	189	261	722	1,892	2,614	21	437	
	4 O & M equipment		0	0	0	522	663	1,185	0	0	0	522	663	1,185	10	198	
	Sub-total		741	1,942	2,683	7,477	6,849	14,326	2,572	2,318	4,890	10,790	11,109	21,899	180	3,663	
	5 Contingencies		0	0	0	202	169	371	74	61	135	276	230	506	4	85	
	Total		741	1,942	2,683	7,679	7,018	14,697	2,646	2,379	5,025	11,066	11,339	22,405	184	3,748	
AK-07	Daksinkall	67															
	1 Construction Cost		0	0	0	7,143	6,045	13,188	0	0	0	7,143	6,045	13,188	197	4,017	
	2 Engineers Cost		210	552	762	53	138	191	0	0	0	263	690	953	14	290	
	3 Adminl. Cost		451	1,182	1,633	113	295	408	0	0	0	564	1,477	2,041	30	622	
	4 O & M equipment		0	0	0	408	518	926	0	0	0	408	518	926	14	282	
	Sub-total		661	1,734	2,395	7,716	6,996	14,712	0	0	0	8,378	8,730	17,108	255	5,211	
	5 Contingencies		0	0	0	214	181	395	0	0	0	214	181	395	6	120	
	Total		661	1,734	2,395	7,931	7,177	15,108	0	0	0	8,592	8,911	17,503	261	5,331	
AK-14	Indrayanl	101															
	1 Construction Cost		0	0	0	7,375	6,024	13,399	0	0	0	7,375	6,024	13,399	133	2,708	
	2 Engineers Cost		214	561	775	53	140	193	0	0	0	268	701	969	10	196	
	3 Adminl. Cost		458	1,203	1,661	115	300	415	0	0	0	573	1,503	2,076	21	420	
	4 O & M equipment		0	0	0	415	527	942	0	0	0	415	527	942	9	190	
	Sub-total		673	1,764	2,437	7,958	6,991	14,949	0	0	0	8,631	8,755	17,386	172	3,513	
	5 Contingencies		0	0	0	222	181	403	0	0	0	222	181	403	4	81	
	Total		673	1,764	2,437	8,180	7,172	15,352	0	0	0	8,853	8,936	17,789	176	3,594	
AK-25	Shali Nadi	157															
	1 Construction Cost		0	0	0	8,777	6,809	15,586	3,253	2,519	5,772	12,030	9,328	21,358	136	2,776	
	2 Engineers Cost		299	783	1,082	85	224	309	43	112	155	427	1,119	1,546	10	201	
	3 Adminl. Cost		641	1,679	2,320	183	479	662	92	240	332	916	2,398	3,314	21	431	
	4 O & M equipment		0	0	0	661	841	1,502	0	0	0	661	841	1,502	10	195	
	Sub-total		940	2,462	3,402	9,707	8,353	18,060	3,387	2,871	6,258	14,034	13,686	27,720	177	3,603	
	5 Contingencies		0	0	0	263	204	467	105	76	181	368	280	648	4	84	
	Total		940	2,462	3,402	9,971	8,557	18,528	3,492	2,947	6,439	14,403	13,966	28,369	181	3,688	
AB-02	Bldol	32															
	1 Construction Cost		0	0	0	6,104	2,890	8,994	0	0	0	6,104	2,890	8,994	281	5,736	
	2 Engineers Cost		146	382	528	36	95	131	0	0	0	182	477	659	21	421	
	3 Adminl. Cost		312	819	1,131	78	204	282	0	0	0	391	1,023	1,414	44	902	
	4 O & M equipment		0	0	0	169	359	528	0	0	0	169	359	528	17	337	
	Sub-total		458	1,201	1,659	6,388	3,548	9,936	0	0	0	6,846	4,749	11,595	362	7,395	
	5 Contingencies		0	0	0	183	87	270	0	0	0	183	87	270	8	172	
	Total		458	1,201	1,659	6,571	3,635	10,206	0	0	0	7,029	4,836	11,865	371	7,567	
AB-10	Katunje	40															
	1 Construction Cost		0	0	0	0	3,087	3,087	0	0	0	0	3,087	3,087	77	1,575	
	2 Engineers Cost		0	282	282	0	71	71	0	0	0	0	353	353	9	180	
	3 Adminl. Cost		0	605	605	0	151	151	0	0	0	0	756	756	19	386	
	4 O & M equipment		0	0	0	0	265	265	0	0	0	0	265	265	7	135	
	Sub-total		0	887	887	0	3,574	3,574	0	0	0	0	4,461	4,461	112	2,276	
	5 Contingencies		0	0	0	0	93	93	0	0	0	0	93	93	2	47	
	Total		0	887	887	0	3,667	3,667	0	0	0	0	4,554	4,554	114	2,323	
AB-12	Kutudhal	43															
	1 Construction Cost		0	0	0	0	4,105	4,105	0	0	0	0	4,105	4,105	95	1,948	
	2 Engineers Cost		0	382	382	0	95	95	0	0	0	0	477	477	11	226	
	3 Adminl. Cost		0	819	819	0	204	204	0	0	0	0	1,023	1,023	24	486	
	4 O & M equipment		0	0	0	0	359	359	0	0	0	0	359	359	8	170	
	Sub-total		0	1,201	1,201	0	4,763	4,763	0	0	0	0	5,964	5,964	139	2,831	
	5 Contingencies		0	0	0	0	123	123	0	0	0	0	123	123	3	58	
	Total		0	1,201	1,201	0	4,886	4,886	0	0	0	0	6,087	6,087	142	2,889	
AB-14	Mahadev Khola	112															
	1 Construction Cost		0	0	0	0	10,645	10,645	0	0	0	0	10,645	10,645	95	1,940	
	2 Engineers Cost		0	982	982	0	246	246	0	0	0	0	1,228	1,228	11	224	
	3 Adminl. Cost		0	2,105	2,105	0	526	526	0	0	0	0	2,631	2,631	23	479	
	4 O & M equipment		0	0	0	0	922	922	0	0	0	0	922	922	8	168	
	Sub-total		0	3,087	3,087	0	12,339	12,339	0	0	0	0	15,426	15,426	138	2,811	
	5 Contingencies		0	0	0	0	319	319	0	0	0	0	319	319	3	58	
	Total		0	3,087	3,087	0	12,658	12,658	0	0	0	0	15,745	15,745	141	2,869	

(continued)

Table 7-5 Disbursement of Economic Construction Cost (2/2)

Scheme	Item	Farm Land Area (ha)	1st year			2nd year			3rd year			Total			Cost per ha		
			LC	FC	Total	LC	FC	Total	LC	FC	Total	LC	FC	Total	(NRs)	(US\$)	
AL-10	Kotku	246															
	1 Construction Cost		0	0	0	14,821	11,899	26,720	6,094	4,837	10,931	20,915	16,736	37,651	153	3,124	
	2 Engineers Cost		527	1,380	1,907	150	394	544	76	197	273	753	1,971	2,724	11	226	
	3 Admini. Cost		1,129	2,957	4,086	322	845	1,167	161	422	583	1,612	4,224	5,836	24	484	
	4 O & M equipment		0	0	0	1,165	1,481	2,646	0	0	0	1,165	1,481	2,646	11	220	
	Sub-total		1,655	4,337	5,992	16,459	14,619	31,078	6,331	5,456	11,787	24,445	24,412	48,857	199	4,053	
	5 Contingencies		0	0	0	445	357	802	182	145	327	627	502	1,129	5	94	
	<b>Total</b>		<b>1,655</b>	<b>4,337</b>	<b>5,992</b>	<b>16,904</b>	<b>14,976</b>	<b>31,880</b>	<b>6,513</b>	<b>5,601</b>	<b>12,114</b>	<b>25,072</b>	<b>24,914</b>	<b>49,986</b>	<b>203</b>	<b>4,147</b>	
AL-13	Lubhu	130															
	1 Construction Cost		0	0	0	13,008	10,337	23,345	0	0	0	13,008	10,337	23,345	180	3,665	
	2 Engineers Cost		373	979	1,352	93	244	337	0	0	0	466	1,223	1,689	13	265	
	3 Admini. Cost		799	2,096	2,895	200	524	724	0	0	0	999	2,620	3,619	28	568	
	4 O & M equipment		0	0	0	723	918	1,641	0	0	0	723	918	1,641	13	258	
	Sub-total		1,172	3,075	4,247	14,025	12,023	26,048	0	0	0	15,197	15,098	30,295	233	4,756	
	5 Contingencies		0	0	0	390	310	700	0	0	0	390	310	700	5	110	
	<b>Total</b>		<b>1,172</b>	<b>3,075</b>	<b>4,247</b>	<b>14,414</b>	<b>12,333</b>	<b>26,747</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>15,587</b>	<b>15,408</b>	<b>30,995</b>	<b>238</b>	<b>4,866</b>	
AL-19	Thika Bhairaw-I	497															
	1 Construction Cost		0	0	0	28,583	21,909	50,492	25,201	19,387	44,588	53,784	41,296	95,080	191	3,904	
	2 Engineers Cost		1,141	2,991	4,132	380	997	1,377	380	997	1,377	1,901	4,985	6,886	14	283	
	3 Admini. Cost		2,445	6,408	8,853	815	2,136	2,951	815	2,136	2,951	4,075	10,680	14,755	30	606	
	4 O & M equipment		0	0	0	2,946	3,744	6,690	0	0	0	2,946	3,744	6,690	13	275	
	Sub-total		3,586	9,399	12,985	32,724	28,786	61,510	26,397	22,520	48,917	62,707	60,705	123,412	248	5,068	
	5 Contingencies		0	0	0	857	657	1,514	756	582	1,338	1,613	1,239	2,852	6	117	
	<b>Total</b>		<b>3,586</b>	<b>9,399</b>	<b>12,985</b>	<b>33,581</b>	<b>29,443</b>	<b>63,024</b>	<b>27,152</b>	<b>23,102</b>	<b>50,254</b>	<b>64,319</b>	<b>61,944</b>	<b>126,263</b>	<b>254</b>	<b>5,185</b>	
AL-20	Thika Bhairaw-II	88															
	1 Construction Cost		0	0	0	10,798	8,452	19,250	2,927	2,455	5,382	13,726	10,907	24,633	280	5,713	
	2 Engineers Cost		344	903	1,247	99	258	357	49	129	178	492	1,290	1,782	20	413	
	3 Admini. Cost		738	1,935	2,673	211	553	764	106	276	382	1,055	2,764	3,819	43	886	
	4 O & M equipment		0	0	0	763	969	1,732	0	0	0	763	969	1,732	20	402	
	Sub-total		1,082	2,838	3,920	11,871	10,232	22,103	3,082	2,860	5,942	16,035	15,930	31,965	363	7,413	
	5 Contingencies		0	0	0	324	254	578	88	74	162	412	328	740	8	172	
	<b>Total</b>		<b>1,082</b>	<b>2,838</b>	<b>3,920</b>	<b>12,195</b>	<b>10,486</b>	<b>22,681</b>	<b>3,170</b>	<b>2,934</b>	<b>6,104</b>	<b>16,447</b>	<b>16,258</b>	<b>32,705</b>	<b>372</b>	<b>7,585</b>	

Table 7-6 Economic O & M Cost

Area	Item	Office Staff		Expenditure		Fuel		Maintenance Cost		Total				
		LC	FC	LC	FC	LC	FC	LC	FC	LC	FC			
Bishmambhara	100,800	0	100,800	11,941	5,750	17,691	0	828	78,302	64,660	142,962	191,043	71,238	262,281
Boshan	100,800	0	100,800	15,887	7,650	23,537	0	1,102	92,097	76,720	168,817	208,784	85,472	294,256
Daksinkali	67,200	0	67,200	8,722	4,200	12,922	0	605	71,431	60,450	131,881	147,353	65,255	212,608
Indrayani	100,800	0	100,800	13,083	6,300	19,383	0	907	73,754	60,240	133,994	187,637	67,447	255,084
Shali Nadi	134,400	0	134,400	20,352	9,800	30,152	0	1,411	120,301	93,280	213,581	275,053	104,491	379,544
Bidol	67,200	0	67,200	4,154	2,000	6,154	0	288	61,036	28,900	89,936	132,390	31,188	163,578
Katunje	67,200	0	67,200	5,191	2,500	7,691	0	360	36,597	30,870	67,467	108,988	33,730	142,718
Kumdbal	67,200	0	67,200	5,607	2,700	8,307	0	389	50,232	41,050	91,282	123,039	44,139	167,178
Mahadev Khola	100,800	0	100,800	14,536	7,000	21,536	0	1,008	128,276	106,450	234,726	243,612	114,458	358,070
Kotkhu	134,400	0	134,400	31,980	15,400	47,380	0	2,218	209,150	167,360	376,510	375,530	184,978	560,508
Lubhu	100,800	0	100,800	16,925	8,150	25,075	0	1,174	130,082	103,370	233,452	247,808	112,694	360,502
Thika Bhairaw-I	134,400	0	134,400	64,481	31,050	95,531	0	4,471	537,845	412,960	950,805	736,725	448,481	1,185,206
Thika Bhairaw-II	100,800	0	100,800	11,421	5,500	16,921	0	792	137,256	109,070	246,326	249,477	115,362	364,839
Total	1,276,800	0	1,276,800	224,280	108,000	332,280	0	15,553	1,726,360	1,355,380	3,081,740	3,227,440	1,478,933	4,706,373

Table 7-7 Annual O&M Cost and Replacement Cost for Selected Irrigation Schemes

Selected Model Scheme	Irrigation Area		Financial Cost						Economic Cost				CCF = 0.940			
	Gross (ha)	Net (ha)	O&M Cost (NRs.1,000)	Total NRs./ha	Unit O&M Cost US\$/ha	Cost of Gates* (NRs.1,000)		L/C	F/C	Total	O&M Cost (NRs.1,000)			L/C	F/C	Total
						L/C	F/C				L/C	F/C				
<b>Kathmandu District</b>																
AK-04 Biswambhara	115	92	245	317	3,442	70.25	100	151	251	191	71	262	85	128	212	
AK-05 Boshan	153	122	265	351	2,876	58.69	198	297	495	209	85	294	168	251	419	
AK-07 Dakshinkali	84	67	186	251	3,751	76.56	49	67	116	147	65	213	41	57	98	
AK-14 Indrayani	126	101	242	309	3,060	62.45	108	163	271	188	67	255	91	138	229	
AK-25 Shali Nadi	196	157	350	455	2,895	59.09	167	250	417	275	104	380	141	212	353	
Sub-total	674	539	1,289	1,683	3,122	63.70	622	928	1,550	1,010	394	1,404	526	785	1,311	
<b>Bhaktapur District</b>																
AB-02 Bidol	40	32	169	200	6,264	127.84	53	80	133	132	31	164	45	68	113	
AB-10 Katunje	50	40	143	177	4,417	90.15	53	80	133	109	34	143	45	68	113	
AB-12 Kutudhal	54	43	159	203	4,719	96.30	53	80	133	123	44	167	45	68	113	
AB-14 Mahadev Khola	140	112	305	419	3,741	76.34	594	891	1,485	244	114	358	503	754	1,256	
Sub-total	284	227	775	999	4,401	89.81	753	1,131	1,884	608	224	832	637	957	1,594	
<b>Lalitpur District</b>																
AL-10 Kotkhu	308	246	463	648	2,634	53.76	216	325	541	376	185	561	183	275	458	
AL-13 Lubhu	163	130	309	422	3,246	66.23	167	250	417	248	113	361	141	212	353	
AL-19 Thika Bhairaw-I	621	497	869	1,317	2,651	54.10	911	1,367	2,278	737	448	1,185	771	1,156	1,927	
AL-20 Thika Bhairaw-II	110	88	311	426	4,846	98.90	152	229	381	249	115	365	129	194	322	
Sub-total	1,202	961	1,952	2,814	2,928	59.76	1,446	2,171	3,617	1,610	862	2,471	1,223	1,837	3,060	
13 schemes																
Total	2,160	1,727	4,016	5,495	3,182	64.94	2,821	4,230	7,051	3,227	1,479	4,706	2,387	3,579	5,965	

Note \*: Replacement cost would be mainly for gates for intake and canal structures.



Table 7-8 Project Costs and Benefits Flows (1/13)

AK-04 Biswambhara

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	2,597	0		2,597	0	-2,597
2	1997	16,379	131		16,510	-4,141	-20,651
3	1998		262		262	6,280	6,018
4	1999		262		262	7,177	6,915
5	2000		262		262	8,074	7,812
6	2001		262		262	8,522	8,260
7	2002		262		262	8,971	8,709
8	2003		262		262	8,971	8,709
9	2004		262		262	8,971	8,709
10	2005		262		262	8,971	8,709
11	2006		262		262	8,971	8,709
12	2007		262		262	8,971	8,709
13	2008		262		262	8,971	8,709
14	2009		262		262	8,971	8,709
15	2010		262		262	8,971	8,709
16	2011		262		262	8,971	8,709
17	2012		262		262	8,971	8,709
18	2013		262		262	8,971	8,709
19	2014		262		262	8,971	8,709
20	2015		262		262	8,971	8,709
21	2016		262		262	8,971	8,709
22	2017		262	212	474	8,971	8,497
23	2018		262		262	8,971	8,709
24	2019		262		262	8,971	8,709
25	2020		262		262	8,971	8,709
26	2021		262		262	8,971	8,709
27	2022		262		262	8,971	8,709
28	2023		262		262	8,971	8,709
29	2024		262		262	8,971	8,709
30	2025		262		262	8,971	8,709
31	2026						
32	2027						
33	2028						
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35	2030						
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46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

18,976

NPV(10%) = 18,047

61,519

43,473

Sensitivity data:

ITEM	%	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	36.5%	34.0%	31.4%	28.7%
Benefit DOWN	0	-5	35.1%	32.7%	30.1%	27.5%
		0	33.8%	31.4%	29.0%	26.3%
		5	32.6%	30.3%	27.9%	25.3%
EIRR	31.4%	10	31.4%	29.2%	26.8%	24.4%
		15	30.4%	28.2%	25.9%	23.5%

B-C: 43,473  
B/C: 3.41

Table 7-8 Project Costs and Benefits Flows (2/13)

AK-05 Boshan

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	2,683	0		2,683	0	-2,683
2	1997	14,697	0		14,697	-5,427	-20,124
3	1998	5,025	147		5,172	15	-5,157
4	1999		294		294	7,085	6,791
5	2000		294		294	8,098	7,804
6	2001		294		294	9,110	8,816
7	2002		294		294	9,616	9,322
8	2003		294		294	10,122	9,828
9	2004		294		294	10,122	9,828
10	2005		294		294	10,122	9,828
11	2006		294		294	10,122	9,828
12	2007		294		294	10,122	9,828
13	2008		294		294	10,122	9,828
14	2009		294		294	10,122	9,828
15	2010		294		294	10,122	9,828
16	2011		294		294	10,122	9,828
17	2012		294		294	10,122	9,828
18	2013		294		294	10,122	9,828
19	2014		294		294	10,122	9,828
20	2015		294		294	10,122	9,828
21	2016		294		294	10,122	9,828
22	2017		294		294	10,122	9,828
23	2018		294	419	713	10,122	9,409
24	2019		294		294	10,122	9,828
25	2020		294		294	10,122	9,828
26	2021		294		294	10,122	9,828
27	2022		294		294	10,122	9,828
28	2023		294		294	10,122	9,828
29	2024		294		294	10,122	9,828
30	2025		294		294	10,122	9,828
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
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45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

22,405

NPV(10%) = 20,558 61,611 41,053

Sensitivity data:

ITEM	Cost up (%)	Benefit Down (%)				
		-10	0	10	20	
Cost UP	0	-10	28.6%	26.9%	25.1%	23.2%
Benefit DOWN	0	-5	27.6%	26.0%	24.3%	22.4%
		5	26.8%	25.1%	23.4%	21.6%
		10	25.9%	24.3%	22.6%	20.8%
EIRR	25.1%	10	25.1%	23.6%	21.9%	20.1%
		15	24.4%	22.9%	21.2%	19.4%

B-C: 41,053  
B/C: 3.00

Table 7-8 Project Costs and Benefits Flows (3/13)

AK-07 Dakshinkali

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	2,395	0		2,395	0	-2,395
2	1997	15,108	107		15,215	-2,612	-17,827
3	1998		213		213	4,856	4,643
4	1999		213		213	5,550	5,337
5	2000		213		213	6,243	6,030
6	2001		213		213	6,590	6,377
7	2002		213		213	6,937	6,724
8	2003		213		213	6,937	6,724
9	2004		213		213	6,937	6,724
10	2005		213		213	6,937	6,724
11	2006		213		213	6,937	6,724
12	2007		213		213	6,937	6,724
13	2008		213		213	6,937	6,724
14	2009		213		213	6,937	6,724
15	2010		213		213	6,937	6,724
16	2011		213		213	6,937	6,724
17	2012		213		213	6,937	6,724
18	2013		213		213	6,937	6,724
19	2014		213		213	6,937	6,724
20	2015		213		213	6,937	6,724
21	2016		213		213	6,937	6,724
22	2017		213	98	311	6,937	6,626
23	2018		213		213	6,937	6,724
24	2019		213		213	6,937	6,724
25	2020		213		213	6,937	6,724
26	2021		213		213	6,937	6,724
27	2022		213		213	6,937	6,724
28	2023		213		213	6,937	6,724
29	2024		213		213	6,937	6,724
30	2025		213		213	6,937	6,724
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
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43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

17,503

NPV(10%) = 16,402 48,059 31,657

Sensitivity data:

ITEM	ITEM (%)	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	33.1%	30.7%	28.2%	25.6%
		-5	31.7%	29.4%	27.0%	24.4%
Benefit DOWN	0	0	30.5%	28.2%	25.8%	23.4%
		5	29.3%	27.1%	24.8%	22.4%
		10	28.2%	26.1%	23.8%	21.5%
EIRR	28.2%	15	27.2%	25.1%	22.9%	20.7%

B-C: 31,657  
B/C: 2.93

Table 7-8 Project Costs and Benefits Flows (4/13)

AK-14 Indrayani

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	2,437	0		2,437	0	-2,437
2	1997	15,352	128		15,480	-5,019	-20,499
3	1998		255		255	6,563	6,308
4	1999		255		255	7,500	7,245
5	2000		255		255	8,438	8,183
6	2001		255		255	8,906	8,651
7	2002		255		255	9,375	9,120
8	2003		255		255	9,375	9,120
9	2004		255		255	9,375	9,120
10	2005		255		255	9,375	9,120
11	2006		255		255	9,375	9,120
12	2007		255		255	9,375	9,120
13	2008		255		255	9,375	9,120
14	2009		255		255	9,375	9,120
15	2010		255		255	9,375	9,120
16	2011		255		255	9,375	9,120
17	2012		255		255	9,375	9,120
18	2013		255		255	9,375	9,120
19	2014		255		255	9,375	9,120
20	2015		255		255	9,375	9,120
21	2016		255		255	9,375	9,120
22	2017		255	229	484	9,375	8,891
23	2018		255		255	9,375	9,120
24	2019		255		255	9,375	9,120
25	2020		255		255	9,375	9,120
26	2021		255		255	9,375	9,120
27	2022		255		255	9,375	9,120
28	2023		255		255	9,375	9,120
29	2024		255		255	9,375	9,120
30	2025		255		255	9,375	9,120
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
39	2034						
40	2035						
41	2036						
42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

17,789

NPV(10%) = 16,998 63,718 46,720

Sensitivity data:

ITEM	ITEM (%)	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	38.3%	35.8%	33.2%	30.4%
Benefit DOWN	0	-5	36.9%	34.5%	31.9%	29.2%
		0	35.6%	33.2%	30.7%	28.1%
EIRR	33.2%	5	34.3%	32.0%	29.6%	27.0%
		10	33.2%	30.9%	28.6%	26.0%
		15	32.1%	29.9%	27.6%	25.1%

B-C: 46,720  
B/C: 3.75

Table 7-8 Project Costs and Benefits Flows (5/13)

AK-25 Shali Nadi

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	3,402	0		3,402	0	-3,402
2	1997	18,528	0		18,528	-8,859	-27,387
3	1998	6,439	190		6,629	-380	-7,009
4	1999		380		380	10,757	10,377
5	2000		380		380	12,294	11,914
6	2001		380		380	13,830	13,450
7	2002		380		380	14,599	14,219
8	2003		380		380	15,367	14,987
9	2004		380		380	15,367	14,987
10	2005		380		380	15,367	14,987
11	2006		380		380	15,367	14,987
12	2007		380		380	15,367	14,987
13	2008		380		380	15,367	14,987
14	2009		380		380	15,367	14,987
15	2010		380		380	15,367	14,987
16	2011		380		380	15,367	14,987
17	2012		380		380	15,367	14,987
18	2013		380		380	15,367	14,987
19	2014		380		380	15,367	14,987
20	2015		380		380	15,367	14,987
21	2016		380		380	15,367	14,987
22	2017		380		380	15,367	14,987
23	2018		380	353	733	15,367	14,634
24	2019		380		380	15,367	14,987
25	2020		380		380	15,367	14,987
26	2021		380		380	15,367	14,987
27	2022		380		380	15,367	14,987
28	2023		380		380	15,367	14,987
29	2024		380		380	15,367	14,987
30	2025		380		380	15,367	14,987
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
39	2034						
40	2035						
41	2036						
42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

28,369

NPV(10%) = 26,062 92,722 66,660

Sensitivity data:

ITEM	(%)	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	31.1%	29.5%	27.7%	25.7%
Benefit DOWN	0	-5	30.2%	28.6%	26.8%	24.9%
		0	29.3%	27.7%	25.9%	24.0%
EIRR	27.7%	5	28.5%	26.9%	25.1%	23.3%
		10	27.7%	26.1%	24.4%	22.5%
		15	26.9%	25.4%	23.7%	21.9%

B-C:  
66,660  
B/C:  
3.56

Table 7-8 Project Costs and Benefits Flows (6/13)

AB-02 Bidol

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	1,659			1,659	0	-1,659
2	1997	10,206	82		10,288	-1,510	-11,798
3	1998		164		164	1,798	1,634
4	1999		164		164	2,054	1,890
5	2000		164		164	2,311	2,147
6	2001		164		164	2,440	2,276
7	2002		164		164	2,568	2,404
8	2003		164		164	2,568	2,404
9	2004		164		164	2,568	2,404
10	2005		164		164	2,568	2,404
11	2006		164		164	2,568	2,404
12	2007		164		164	2,568	2,404
13	2008		164		164	2,568	2,404
14	2009		164		164	2,568	2,404
15	2010		164		164	2,568	2,404
16	2011		164		164	2,568	2,404
17	2012		164		164	2,568	2,404
18	2013		164		164	2,568	2,404
19	2014		164		164	2,568	2,404
20	2015		164		164	2,568	2,404
21	2016		164		164	2,568	2,404
22	2017		164	113	277	2,568	2,291
23	2018		164		164	2,568	2,404
24	2019		164		164	2,568	2,404
25	2020		164		164	2,568	2,404
26	2021		164		164	2,568	2,404
27	2022		164		164	2,568	2,404
28	2023		164		164	2,568	2,404
29	2024		164		164	2,568	2,404
30	2025		164		164	2,568	2,404
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
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42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

11,865

NPV(10%) = 11,286 17,342 6,056

Sensitivity data:

ITEM	Cost up (%)	Benefit Down (%)				
		-10	0	10	20	
Cost UP	0	-10	18.9%	17.4%	15.7%	14.0%
Benefit DOWN	0	-5	18.0%	16.5%	15.0%	13.3%
		0	17.2%	15.7%	14.2%	12.6%
		5	16.5%	15.0%	13.5%	12.0%
EIRR	15.7%	10	15.7%	14.4%	12.9%	11.4%
		15	15.1%	13.7%	12.3%	10.8%

B-C: 6,056  
B/C: 1.54

Table 7-8 Project Costs and Benefits Flows (7/13)

AB-10 Katunje

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	1,225			1,225	0	-1,225
2	1997	7,729			7,800	-1,890	-9,690
3	1998		71		143	2,053	1,910
4	1999		143		143	2,346	2,203
5	2000		143		143	2,640	2,497
6	2001		143		143	2,786	2,643
7	2002		143		143	2,933	2,790
8	2003		143		143	2,933	2,790
9	2004		143		143	2,933	2,790
10	2005		143		143	2,933	2,790
11	2006		143		143	2,933	2,790
12	2007		143		143	2,933	2,790
13	2008		143		143	2,933	2,790
14	2009		143		143	2,933	2,790
15	2010		143		143	2,933	2,790
16	2011		143		143	2,933	2,790
17	2012		143		143	2,933	2,790
18	2013		143		143	2,933	2,790
19	2014		143		143	2,933	2,790
20	2015		143		143	2,933	2,790
21	2016		143		143	2,933	2,790
22	2017		143	113	256	2,933	2,677
23	2018		143		143	2,933	2,790
24	2019		143		143	2,933	2,790
25	2020		143		143	2,933	2,790
26	2021		143		143	2,933	2,790
27	2022		143		143	2,933	2,790
28	2023		143		143	2,933	2,790
29	2024		143		143	2,933	2,790
30	2025		143		143	2,933	2,790
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
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43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

8,954

NPV(10%) =

8,674

19,670

10,997

Sensitivity data:

ITEM	(%)	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	26.0%	24.2%	22.2%	20.1%
Benefit DOWN	0	-5	24.9%	23.1%	21.2%	19.2%
		0	24.0%	22.2%	20.3%	18.4%
		5	23.0%	21.3%	19.5%	17.6%
		10	22.2%	20.5%	18.7%	16.8%
EIRR	22.2%	15	21.4%	19.7%	18.0%	16.2%

B-C:  
10,997  
B/C:  
2.27

Table 7-8 Project Costs and Benefits Flows (8/13)

AB-12 Kutduhal

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	1,659			1,659	0	-1,659
2	1997	10,457	84		10,541	-2,084	-12,625
3	1998		167		167	1,707	1,540
4	1999		167		167	1,950	1,783
5	2000		167		167	2,194	2,027
6	2001		167		167	2,316	2,149
7	2002		167		167	2,438	2,271
8	2003		167		167	2,438	2,271
9	2004		167		167	2,438	2,271
10	2005		167		167	2,438	2,271
11	2006		167		167	2,438	2,271
12	2007		167		167	2,438	2,271
13	2008		167		167	2,438	2,271
14	2009		167		167	2,438	2,271
15	2010		167		167	2,438	2,271
16	2011		167		167	2,438	2,271
17	2012		167		167	2,438	2,271
18	2013		167		167	2,438	2,271
19	2014		167		167	2,438	2,271
20	2015		167		167	2,438	2,271
21	2016		167		167	2,438	2,271
22	2017		167	113	280	2,438	2,158
23	2018		167		167	2,438	2,271
24	2019		167		167	2,438	2,271
25	2020		167		167	2,438	2,271
26	2021		167		167	2,438	2,271
27	2022		167		167	2,438	2,271
28	2023		167		167	2,438	2,271
29	2024		167		167	2,438	2,271
30	2025		167		167	2,438	2,271
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
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40	2035						
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43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

12,116

NPV(10%) = 11,518 15,927 4,409

Sensitivity data:

ITEM	%	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	16.8%	15.5%	14.0%	12.5%
Benefit DOWN	0	-5	16.0%	14.7%	13.3%	11.8%
		0	15.3%	14.0%	12.7%	11.2%
EIRR	14.0%	5	14.7%	13.4%	12.0%	10.6%
		10	14.0%	12.8%	11.5%	10.1%
		15	13.4%	12.2%	10.9%	9.6%

B-C: 4,409  
B/C: 1.38



Table 7-8 Project Costs and Benefits Flows (9/13)

AB-14 Mahadev Khola

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	4,264			4,264	0	-4,264
2	1997	26,890	179		27,069	-5,047	-32,116
3	1998		358		358	5,139	4,781
4	1999		358		358	5,873	5,515
5	2000		358		358	6,607	6,249
6	2001		358		358	6,974	6,616
7	2002		358		358	7,341	6,983
8	2003		358		358	7,341	6,983
9	2004		358		358	7,341	6,983
10	2005		358		358	7,341	6,983
11	2006		358		358	7,341	6,983
12	2007		358		358	7,341	6,983
13	2008		358		358	7,341	6,983
14	2009		358		358	7,341	6,983
15	2010		358		358	7,341	6,983
16	2011		358		358	7,341	6,983
17	2012		358		358	7,341	6,983
18	2013		358		358	7,341	6,983
19	2014		358		358	7,341	6,983
20	2015		358		358	7,341	6,983
21	2016		358		358	7,341	6,983
22	2017		358	1,256	1,614	7,341	5,727
23	2018		358		358	7,341	6,983
24	2019		358		358	7,341	6,983
25	2020		358		358	7,341	6,983
26	2021		358		358	7,341	6,983
27	2022		358		358	7,341	6,983
28	2023		358		358	7,341	6,983
29	2024		358		358	7,341	6,983
30	2025		358		358	7,341	6,983
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
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37	2032						
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44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

31,154

NPV(10%) = 29,155      48,971      19,816

Sensitivity data:

ITEM	%	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	20.1%	18.5%	16.9%	15.2%
Benefit DOWN	0	-5	19.2%	17.7%	16.1%	14.4%
		0	18.4%	16.9%	15.4%	13.7%
EIRR	16.9%	5	17.6%	16.2%	14.7%	13.1%
		10	16.9%	15.5%	14.0%	12.5%
		15	16.2%	14.9%	13.4%	11.9%

B-C: 19,816  
B/C: 1.68

Table 7-8 Project Costs and Benefits Flows (10/13)

AL-10 Kotkhu

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	5,992			5,992	0	-5,992
2	1997	31,880	281		32,161	-10,845	-43,006
3	1998	12,114	561		12,675	1,695	-10,980
4	1999		561		561	14,354	13,793
5	2000		561		561	16,405	15,844
6	2001		561		561	18,455	17,894
7	2002		561		561	19,481	18,920
8	2003		561		561	20,506	19,945
9	2004		561		561	20,506	19,945
10	2005		561		561	20,506	19,945
11	2006		561		561	20,506	19,945
12	2007		561		561	20,506	19,945
13	2008		561		561	20,506	19,945
14	2009		561		561	20,506	19,945
15	2010		561		561	20,506	19,945
16	2011		561		561	20,506	19,945
17	2012		561		561	20,506	19,945
18	2013		561		561	20,506	19,945
19	2014		561		561	20,506	19,945
20	2015		561		561	20,506	19,945
21	2016		561		561	20,506	19,945
22	2017		561	458	1,019	20,506	19,487
23	2018		561		561	20,506	19,945
24	2019		561		561	20,506	19,945
25	2020		561		561	20,506	19,945
26	2021		561		561	20,506	19,945
27	2022		561		561	20,506	19,945
28	2023		561		561	20,506	19,945
29	2024		561		561	20,506	19,945
30	2025		561		561	20,506	19,945
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
39	2034						
40	2035						
41	2036						
42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

49,986

NPV(10%) = 45,499 126,192 80,693

Sensitivity data:

ITEM	(%)	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	27.5%	25.8%	24.0%	22.1%
Benefit DOWN	0	-5	26.6%	24.9%	23.2%	21.3%
		0	25.7%	24.0%	22.3%	20.5%
EIRR	24.0%	5	24.8%	23.2%	21.5%	19.7%
		10	24.0%	22.5%	20.8%	19.0%
		15	23.3%	21.8%	20.1%	18.4%

B-C: 80,693  
B/C: 2.77

Table 7-8 Project Costs and Benefits Flows (11/13)

AL-13 Lubhu

(Unit: Rs.1,000)

No	Year	Costs				Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement	Total (C)		
1	1996	4,247			4,247	0	-4,247
2	1997	26,747	181		26,928	-5,470	-32,398
3	1998		361		361	7,531	7,170
4	1999		361		361	8,607	8,246
5	2000		361		361	9,683	9,322
6	2001		361		361	10,221	9,860
7	2002		361		361	10,759	10,398
8	2003		361		361	10,759	10,398
9	2004		361		361	10,759	10,398
10	2005		361		361	10,759	10,398
11	2006		361		361	10,759	10,398
12	2007		361		361	10,759	10,398
13	2008		361		361	10,759	10,398
14	2009		361		361	10,759	10,398
15	2010		361		361	10,759	10,398
16	2011		361		361	10,759	10,398
17	2012		361		361	10,759	10,398
18	2013		361		361	10,759	10,398
19	2014		361		361	10,759	10,398
20	2015		361		361	10,759	10,398
21	2016		361		361	10,759	10,398
22	2017		361	353	714	10,759	10,045
23	2018		361		361	10,759	10,398
24	2019		361		361	10,759	10,398
25	2020		361		361	10,759	10,398
26	2021		361		361	10,759	10,398
27	2022		361		361	10,759	10,398
28	2023		361		361	10,759	10,398
29	2024		361		361	10,759	10,398
30	2025		361		361	10,759	10,398
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
39	2034						
40	2035						
41	2036						
42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

30,994

NPV(10%) = 28,935 73,364 44,429

Sensitivity data:

ITEM	%	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost	0	-10	28.7%	26.6%	24.4%	22.2%
UP		-5	27.5%	25.5%	23.4%	21.2%
Benefit	0	0	26.4%	24.4%	22.4%	20.3%
DOWN		5	25.4%	23.5%	21.5%	19.4%
		10	24.4%	22.6%	20.7%	18.6%
EIRR	24.4%	15	23.6%	21.8%	19.9%	17.9%

B-C: 44,429  
B/C: 2.54

Table 7-8 Project Costs and Benefits Flows (12/13)

AL-19 Thika Bhatraw - I

(Unit: Rs.1,000)

No	Year	Costs			Total (C)	Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement			
1	1996	12,985			12,985	0	-12,985
2	1997	63,024	593		63,617	-21,501	-85,118
3	1998	50,254	1,185		51,439	668	-50,771
4	1999		1,185		1,185	29,287	28,102
5	2000		1,185		1,185	33,471	32,286
6	2001		1,185		1,185	37,655	36,470
7	2002		1,185		1,185	39,747	38,562
8	2003		1,185		1,185	41,839	40,654
9	2004		1,185		1,185	41,839	40,654
10	2005		1,185		1,185	41,839	40,654
11	2006		1,185		1,185	41,839	40,654
12	2007		1,185		1,185	41,839	40,654
13	2008		1,185		1,185	41,839	40,654
14	2009		1,185		1,185	41,839	40,654
15	2010		1,185		1,185	41,839	40,654
16	2011		1,185		1,185	41,839	40,654
17	2012		1,185		1,185	41,839	40,654
18	2013		1,185		1,185	41,839	40,654
19	2014		1,185		1,185	41,839	40,654
20	2015		1,185		1,185	41,839	40,654
21	2016		1,185		1,185	41,839	40,654
22	2017		1,185	1,927	3,112	41,839	38,727
23	2018		1,185		1,185	41,839	40,654
24	2019		1,185		1,185	41,839	40,654
25	2020		1,185		1,185	41,839	40,654
26	2021		1,185		1,185	41,839	40,654
27	2022		1,185		1,185	41,839	40,654
28	2023		1,185		1,185	41,839	40,654
29	2024		1,185		1,185	41,839	40,654
30	2025		1,185		1,185	41,839	40,654
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
39	2034						
40	2035						
41	2036						
42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

126,263

NPV(10%) = 111,488      255,894      144,406

Sensitivity data:

ITEM	ITEM (%)	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	24.3%	22.7%	21.0%	19.2%
		-5	23.4%	21.8%	20.2%	18.4%
Benefit DOWN	0	0	22.5%	21.0%	19.4%	17.7%
		5	21.8%	20.3%	18.7%	17.0%
		10	21.0%	19.6%	18.0%	16.3%
EIRR	21.0%	15	20.3%	18.9%	17.4%	15.7%

B-C:  
144,406  
B/C:  
2.30

Table 7-8 Project Costs and Benefits Flows (13/13)

AL-20 Thika Bhaloraw - II

(Unit: Rs.1,000)

No	Year	Costs			Total (C)	Gross Benefit (B)	Balance (B-C)
		Capital	O&M	Replacement			
1	1996	3,920			3,920	0	-3,920
2	1997	22,681	183		22,864	-3,940	-26,804
3	1998	6,104	365		6,469	450	-6,019
4	1999		365		365	6,021	5,656
5	2000		365		365	6,882	6,517
6	2001		365		365	7,742	7,377
7	2002		365		365	8,172	7,807
8	2003		365		365	8,602	8,237
9	2004		365		365	8,602	8,237
10	2005		365		365	8,602	8,237
11	2006		365		365	8,602	8,237
12	2007		365		365	8,602	8,237
13	2008		365		365	8,602	8,237
14	2009		365		365	8,602	8,237
15	2010		365		365	8,602	8,237
16	2011		365		365	8,602	8,237
17	2012		365		365	8,602	8,237
18	2013		365		365	8,602	8,237
19	2014		365		365	8,602	8,237
20	2015		365		365	8,602	8,237
21	2016		365		365	8,602	8,237
22	2017		365	322	687	8,602	7,915
23	2018		365		365	8,602	8,237
24	2019		365		365	8,602	8,237
25	2020		365		365	8,602	8,237
26	2021		365		365	8,602	8,237
27	2022		365		365	8,602	8,237
28	2023		365		365	8,602	8,237
29	2024		365		365	8,602	8,237
30	2025		365		365	8,602	8,237
31	2026						
32	2027						
33	2028						
34	2029						
35	2030						
36	2031						
37	2032						
38	2033						
39	2034						
40	2035						
41	2036						
42	2037						
43	2038						
44	2039						
45	2040						
46	2041						
47	2042						
48	2043						
49	2044						
50	2045						

32,705

NPV(10%) = 29,892 53,243 23,351

Sensitivity data:

ITEM	%	Cost up (%)	Benefit Down (%)			
			-10	0	10	20
Cost UP	0	-10	20.2%	18.8%	17.3%	15.6%
Benefit DOWN	0	-5	19.4%	18.0%	16.5%	14.9%
EIRR	17.3%	0	18.6%	17.3%	15.8%	14.2%
		5	17.9%	16.6%	15.1%	13.6%
		10	17.3%	15.9%	14.5%	13.0%
		15	16.6%	15.3%	14.0%	12.5%

B-C:  
23,351  
B/C:  
1.78

Table 7-9 Farm Budget of Typical Farm in the Project Areas

(Unit : NRS.)

Scheme No.	AK-04	AK-05	AK-07	AK-14	AK-25	AB-02	AB-10	AB-12	AB-14	AL-10	AL-13	AL-19	AL-20
Farm Size	0.41	0.28	0.28	0.37	0.27	0.19	0.24	0.30	0.26	0.19	0.23	0.25	0.13
Ave. Family No.	5.9	5.6	5.9	5.7	6.4	6.0	5.9	5.6	5.9	5.3	6.2	5.8	5.9

**Without Project**

Farm Income	30,950	18,520	20,720	26,910	21,940	14,080	17,610	24,480	16,430	11,470	12,470	14,460	7,490
Non Farm Income	19,790	18,560	19,770	25,800	29,400	20,270	25,890	18,560	19,260	19,750	23,100	21,610	27,100
<b>Total Income</b>	<b>50,740</b>	<b>37,080</b>	<b>40,490</b>	<b>52,710</b>	<b>51,340</b>	<b>34,350</b>	<b>43,500</b>	<b>43,040</b>	<b>35,690</b>	<b>31,220</b>	<b>35,570</b>	<b>36,070</b>	<b>34,590</b>
Farm Expense	7,340	4,820	3,810	7,300	6,700	3,470	4,490	5,690	4,510	3,300	3,740	4,290	2,230
Living Expense	30,680	28,860	30,410	29,640	32,990	30,300	29,890	31,520	29,900	26,860	27,640	30,740	30,980
Reserve	12,720	3,400	6,270	15,770	11,650	580	9,120	5,830	1,280	1,060	4,190	1,040	1,380

**With Project**

**Intensive area**

Farm Income	113,800	74,940	78,620	99,350	71,750	52,220	53,660	69,370	56,740	50,020	48,620	65,660	34,150
Non Farm Income	19,790	18,560	19,770	25,800	29,400	20,270	25,890	18,560	19,260	19,750	23,100	21,610	27,100
<b>Total Income</b>	<b>133,590</b>	<b>93,500</b>	<b>98,390</b>	<b>125,150</b>	<b>101,150</b>	<b>72,490</b>	<b>79,550</b>	<b>87,930</b>	<b>76,000</b>	<b>69,770</b>	<b>71,720</b>	<b>87,270</b>	<b>61,250</b>
Farm Expense	24,274	16,577	16,577	21,906	15,985	11,249	10,988	13,375	11,904	11,249	10,530	14,801	7,697
Living Expense	35,280	33,190	34,970	34,090	37,940	35,570	34,370	36,250	37,840	33,980	31,790	36,980	37,620
Reserve	74,036	43,733	46,843	69,154	47,225	25,671	34,192	38,305	26,256	24,541	29,400	35,489	15,933
(Increment)	61,316	40,333	40,573	53,384	35,575	25,091	25,072	32,475	24,976	23,481	25,210	34,449	14,553

**Remote area**

Farm Income	71,320	45,920	49,600	61,010	43,770	32,530	39,650	51,860	41,560	30,330	35,190	39,760	20,680
Non Farm Income	19,790	18,560	19,770	25,800	29,400	20,270	25,890	18,560	19,260	19,750	23,100	21,610	27,100
<b>Total Income</b>	<b>91,110</b>	<b>64,480</b>	<b>69,370</b>	<b>86,810</b>	<b>73,170</b>	<b>52,800</b>	<b>65,540</b>	<b>70,420</b>	<b>60,820</b>	<b>50,080</b>	<b>58,290</b>	<b>61,370</b>	<b>47,780</b>
Farm Expense	15,735	10,746	10,746	14,200	10,362	7,292	9,211	11,513	9,978	7,292	8,827	9,594	4,989
Living Expense	35,280	33,190	34,970	34,090	37,940	35,570	34,370	36,250	37,840	33,980	31,790	36,980	37,620
Reserve	40,095	20,544	23,654	38,520	24,868	9,938	21,959	22,657	13,002	8,808	17,673	14,796	5,171
(Increment)	27,375	17,144	17,384	22,750	13,218	9,358	12,839	16,827	11,722	7,748	13,483	13,756	3,791

**Remote area (drought)**

Farm Income	36,110	47,440	37,730
Non Farm Income	25,890	18,560	19,260
<b>Total Income</b>	<b>62,000</b>	<b>66,000</b>	<b>56,990</b>
Farm Expense	9,211	11,513	9,978
Living Expense	34,370	36,250	37,840
Reserve	18,419	18,237	9,172
(Increment)	9,299	12,407	7,892









