Table 3-24 Prevailing Vegetable Prices in the Study Area (1992/93)

Unit: NRs./kg

Crops	Farm-gate	Wholesale	Retail
Potatoes	6.45	7.03	8.05
Radish	2.50	3.26	4.68
Cauliflower	12.00	12.26	16.50
Tomato	8.50	10.07	14.62
Brinjal	4.00	5.82	9.03
Beans	10.00	11.72	-
Cabbage	5.50	5.92	8.53
Onion	6.00	6.24	8.27
Ginger	14.53	-	19.06
Green chilli	9.00	20.82	
Pointed Gourd		12.03	12.58
Carrot	6.00		
Coriander	15.00		
Cress	10.00		
Spinach	10.00		
Lettuce	10.00		

Table 3-25 Food Balance Situation on Cereals

		87/88	88/89	89/90	90/91	91/92
Nepal	P	17,753	18,207	18,677	18,263 *1	18,661
	C	3,006	3,418	3,550	3,619	3,373
	N	2,726	2,921	3,559	3,487	3,562
	B	280	497	-9	132	-189
Lalitpur district	P	217	222	228	255	262
	C	24	27	26	29	29
	N	45	46	46	51	53
	B	-21	-19	-20	-22	-24
Bhaktapur district	P	189	194	199	172 *1	175 *1
	C	24	24	23	27	23
	N	23	25	40	34	35
	B	1	-1	-17	-7	-12
Kathmandu district	P	482	491	501	653	684
	C	44	48	43	46	39
	N	96	99	101	131	137
	B	-52	-51	-58	-85	-98
Kathmandu Valley	P	888	907	928	1,080	1,121
	C	92	99	92	102	91
	N	164	170	187	216	225
	B	-72	-71	-95	-114	-134

Note : P = Population midterm estimate (1,000)
C = Consumptive Production (1,000 tons)
N = Necessity of food based on calories (1,000 tons)
B = Balance (surplus or deficit; 1,000 tons)
*1 : From CBS in reduced form.
Source : Consumptive Cereals of Kingdom of Nepal 1987-1992
Agriculture Marketing Development Division, DoAD.

Table 3-26 Present Organization of Agricultural Cooperative Society in the Kathmandu Valley

Primary ACS	Nos. of Villages Covered	Nos. of Members	Total Nos. of Household in Village covered	Systematization Rate	Financial Balance in FY1991/92 NRs.1,000
Lalitpur District	41	15,574	28,951	54%	-
D. Co-op. Union	35	15,574	21,213	73%	-359
1	4	1,464	2,055	71%	-28
2	3	2,635	2,651	99%	-69
3	6	2,503	3,950	63%	-49
4	2	2,040	2,298	89%	-5
5	2	1,169	1,970	59%	-48
6	3	1,823	2,245	81%	-95
7	5	3,303	3,286	101%	-51
8	4	534	965	55%	-
9	6	103	1,793	6%	0
Bhaktapur district	22	547	22,725	2%	-
D. Co-op. Union	21	547	16,942	3%	-781
1	3	67	2,453	3%	-81
2	2	69	1,398	5%	-60
3	2	213	1,597	13%	-98
4	2	53	1,692	3%	-151
5	3	40	2,515	2%	-33
6	2	8	1,426	1%	-118
7	2	28	1,844	2%	-68
8	3	33	2,586	1%	-129
9	2	36	1,431	3%	-41
Kathmandu district	67	23,384	45,541	51%	-
D. Co-op. Union	66	23,384	37,344	63%	N.A.
1	5	1,147	3,177	36%	-24
2	2	936	1,158	81%	-32
3	5	1,588	2,669	59%	-41
4	5	1,761	2,422	73%	-56
5	4	1,520	2,203	69%	-79
6	3	1,446	1,615	90%	-47
7	4	1,285	1,750	73%	-14
8	3	1,325	2,329	57%	56
9	4	2,576	2,725	95%	-23
10	4	1,015	2,102	48%	-38
11	6	1,998	3,169	63%	-29
12	2	1,370	1,413	97%	-42
13	4	1,025	2,039	50%	-11
14	11	2,622	5,940	44%	-43
15	4	1,770	2,633	67%	-32

Source : District Co-operative Office in Lalitpur, Bhaktapur and Kathmandu.

Table 4-1 Evaluation of Priority Schemes

No.	Sub No.	Name of Schemes	Evaluation Items							Evaluation by JICA Study Team
			ISP	Farm land condition	Water sources	Farmer's intention	Urbanization	Priority by DOI	Accessibility	
AK-01	K-09	Balaju	○	X	△	X	X	X	○	X
AK-02	K-20	Balambu	X	--	--	--	--	--	--	ISP
AK-03	-----	Balkhu	○	X	△	X	X	X	○	X
AK-04	K-07	Biswambhara	○	○	○	◎	○	○	○	○
AK-05	K-3	Boshan	○	○	○	◎	○	○	△	○
AK-06	K-8	Budhanikantha	○	○	○	△	△	X	△	△
AK-07	K-1	Dakshinkali	○	○	○	◎	○	△	○	○
AK-09	K-17	Dhulopuro	X	--	--	--	--	--	--	ISP
AK-10	K-13	Gogal Indrayani Kulo	○	○	△	○	○	X	△	△
AK-12	K-6	Gokarna	○	△	X	△	X	○	○	X
AK-13	K-5	Ichadol	○	X	△	○	△	X	△	X
AK-14	K-11	Indrayani	○	○	○	◎	○	○	△	○
AK-24	K-2	Pharping Dhunge Dhara	○	△	X	○	○	X	△	X
AK-25	K-14	Shali Nadi	○	○	○	◎	○	○	○	○
AK-26	K-18	Sundarijal	○	X	○	○	○	X	△	X
AK-27	K-10	Tokha	○	○	△	◎	○	○	○	○
AB-01	B-05	Balakhu	○	△	△	△	X	X	△	X
AB-02	B-07	Bidol	○	○	○	◎	○	△	△	○
AB-03	B-04	Chakhu Khola	○	△	○	○	○	X	△	△
AB-04	B-10	Dhunge Dhara	○	◎	○	◎	○	○	△	○
AB-07	-----	Ghatte Kulo	○	○	△	○	△	X	△	△
AB-08	B-08	Hanumante	○	○	△	△	△	X	○	△
AB-10	B-02	Katunje	○	○	○	◎	△	○	△	○
AB-12	B-09	Kutudhal	○	○	○	◎	○	○	△	○
AB-13	-----	Lapsetar	○	△	△	○	○	X	○	△
AB-14	B-01	Mahadev Khola	○	◎	○	◎	△	○	△	○
AB-17	B-11	Nil Barahi	○	△	○	○	○	X	△	△
AB-18	B-03	Sipadol Katunje	○	○	△	○	○	X	△	△
AB-20	B-06	Sweety (shishaugari)	○	X	○	○	○	X	△	X
AL-02	L-06	Bhorle	X	--	--	--	--	--	--	ISP
AL-03	L-09	Champi	X	--	--	--	--	--	--	ISP
AL-05	L-03	Godawari	○	○	△	○	△	○	○	△
AL-08	L-07	Khokana	○	○	○	◎	○	○	△	○
AL-10	L-04	Kotkhu	○	◎	○	◎	△	○	○	○
AL-13	L-05	Lubhu	○	○	○	◎	△	○	△	○
AL-18	L-08	Saibu / Makal Kulo, Sara Kulo	X	--	--	--	--	--	--	ISP
AL-19	L-01	Thika Bhairaw-I	○	◎	○	◎	△	○	○	○
AL-20	L-02	Thika Bhairaw-II	○	◎	○	◎	△	○	△	○

Table 5-1.1 Unit Irrigation Water Requirement in Zone-A

Field Efficiency	Paddy	85%
	Dry Field	60%
Distribution Efficiency		80%
Deep Percolation	(mm/day)	5.0

ZONE A

Meteo. Station : Kathmandu Airport (1030)

Irrigation Water Requirement **[mm / half month]**

Crops	Jan 1	Jan 2	Feb 1	Feb 2	Mar 1	Mar 2	Apr 1	Apr 2	May 1	May 2	Jun 1	Jun 2	Jul 1	Jul 2	Aug 1	Aug 2	Sep 1	Sep 2	Oct 1	Oct 2	Nov 1	Nov 2	Dec 1	Dec 2
Paddy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	319.06	238.27	130.05	71.89	0.00	0.00	99.01	66.31	120.70	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.28	168.49	94.62	0.00	0.00	103.78	79.05	128.86	131.21	43.59	13.36	0.00	0.00	0.00
Wheat	17.05	18.00	28.60	35.81	119.92	34.29	42.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.89	18.14	34.67
Potatoes	49.76	49.37	55.98	43.36	6.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.10	35.23	44.44	50.50
Maize	0.00	0.00	0.00	20.48	54.60	78.29	131.94	117.78	100.59	15.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Summer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.04	89.25	69.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winter vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.93	80.16	53.19	14.25	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	40.44	68.53	60.86	37.55	11.13
	24.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	8.47	27.09	34.59	48.38	47.50
Mustard	42.73	44.54	25.98	5.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.19	31.88	52.53	46.13	50.00

Irrigation Water Requirement for the Project **[mm / half month.]**

Crops	Cropped Area (%)	Jan 1	Jan 2	Feb 1	Feb 2	Mar 1	Mar 2	Apr 1	Apr 2	May 1	May 2	Jun 1	Jun 2	Jul 1	Jul 2	Aug 1	Aug 2	Sep 1	Sep 2	Oct 1	Oct 2	Nov 1	Nov 2	Dec 1	Dec 2
Paddy	80%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	127.62	190.62	119.41	66.61	0.00	0.00	81.12	58.15	99.82	52.48	17.44	5.34	0.00	0.00	0.00
	40%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	127.62	95.31	52.02	28.76	0.00	0.00	39.61	26.53	48.28	0.00	0.00	0.00	0.00	0.00	0.00
	40%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.31	67.39	37.85	0.00	0.00	41.51	31.62	51.54	52.48	17.44	5.34	0.00	0.00	0.00
Wheat	40%	6.82	7.20	11.44	14.32	47.97	13.72	17.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.75	7.26	13.87
Potatoes	20%	9.95	9.87	11.20	8.67	1.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.02	7.05	8.89	10.10
Maize	10%	0.00	0.00	0.00	2.05	5.46	7.83	13.19	11.78	10.06	1.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Summer	20%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.70	8.93	6.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vegetables	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.70	8.93	6.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winter vegetables	20%	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	8.52	9.82	7.24	5.67	3.87
	6.60%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	5.29	3.51	0.94	0.00	0.00
	6.60%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67	4.52	4.02	2.48	0.73
	6.60%	1.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	1.79	2.28	3.19	3.14
Mustard	10%	4.27	4.45	2.60	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.72	3.19	5.25	4.61	5.00
TOTAL	[mm/hm]	**22.67**	**21.52**	**25.24**	**25.59**	**54.67**	**21.55**	**30.34**	**11.78**	**12.76**	**138.13**	**197.57**	**119.41**	**66.61**	**0.00**	**0.00**	**81.12**	**58.15**	**99.82**	**53.80**	**27.68**	**23.37**	**22.29**	**26.43**	**32.84**
TOTAL	[l/sec/ha]	**0.17**	**0.16**	**0.19**	**0.23**	**0.42**	**0.16**	**0.23**	**0.09**	**0.10**	**1.00**	**1.52**	**0.92**	**0.51**	**0.00**	**0.00**	**0.59**	**0.45**	**0.77**	**0.42**	**0.20**	**0.18**	**0.17**	**0.20**	**0.24**

Table 5-1.2 Unit Irrigation Water Requirement in Zone-B

Field Efficiency	Paddy	85%
	Dry Field	60%
Distribution efficiency		80%
Deep Percolation	(mm/day)	5.0

ZONE B

Meteo. Station : Changu Narayan (1059)

Irrigation Water Requirement **[mm / half month]**

	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Crops	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Paddy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	316.81	201.39	141.37	0.00	0.00	0.00	0.00	0.00	99.08	0.00	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	201.40	179.81	0.00	0.00	0.00	0.00	69.89	107.24	131.71	51.97	13.36	0.00	0.00	0.00
Wheat	28.38	19.78	24.00	31.21	116.90	45.98	36.45	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.89	18.14	34.67
Potatoes	61.09	51.14	51.38	38.75	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.17	25.10	35.23	44.44	50.50
Maize	0.00	0.00	0.00	15.88	51.58	89.98	142.21	112.11	109.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Summer	0.00	0.00	0.00	0.00	0.00	0.00	1.39	0.00	34.63	86.63	26.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winter vegetables	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.64	92.03	53.19	14.25	0.00	0.00
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	52.31	68.53	60.86	37.55	11.13
	36.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	20.34	27.09	34.59	48.38	47.50
Mustard	54.06	46.31	21.38	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.06	31.88	52.53	46.13	50.00

Irrigation Water Requirement for the Project **[mm / half month.]**

	Cropped	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
Crops	**Area (%)**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**
Paddy	80%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	126.72	161.12	128.47	0.00	0.00	0.00	0.00	27.96	82.53	52.68	20.79	5.34	0.00	0.00	0.00
	40%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	126.72	80.56	56.55	0.00	0.00	0.00	0.00	0.00	39.63	0.00	0.00	0.00	0.00	0.00	0.00
	40%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.56	71.92	0.00	0.00	0.00	0.00	27.96	42.90	52.68	20.79	5.34	0.00	0.00	0.00
Wheat	40%	11.35	7.91	9.60	12.48	46.76	18.39	14.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.75	7.26	13.87
Potatoes	20%	12.22	10.23	10.28	7.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.03	5.02	7.05	8.89	10.10
Maize	10%	0.00	0.00	0.00	1.59	5.16	9.00	14.22	11.21	10.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Summer	20%	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	3.46	8.66	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
vegetables	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	3.46	8.66	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	10%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Winter vegetables	20%	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.37	10.96	9.90	7.30	5.72	3.90
	6.66%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.37	6.13	3.54	0.95	0.00	0.00
	6.66%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.48	4.56	4.05	2.50	0.74
	6.66%	2.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.35	1.80	2.30	3.22	3.16
Mustard	10%	5.41	4.63	2.14	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.91	3.19	5.25	4.61	5.00
TOTAL	[mm/hm]	**31.38**	**22.77**	**22.02**	**21.91**	**51.92**	**27.39**	**28.94**	**11.21**	**14.44**	**135.38**	**163.77**	**128.47**	**0.00**	**0.00**	**0.00**	**0.00**	**27.96**	**82.53**	**54.05**	**36.69**	**23.45**	**22.35**	**26.48**	**32.87**
TOTAL	[l/sec/ha]	**0.24**	**0.16**	**0.17**	**0.20**	**0.40**	**0.20**	**0.22**	**0.09**	**0.11**	**0.98**	**1.26**	**0.99**	**0.00**	**0.00**	**0.00**	**0.00**	**0.22**	**0.64**	**0.42**	**0.27**	**0.18**	**0.17**	**0.20**	**0.24**
												*													*

Table 5-2 Irrigation Water Requirement for the Selected 16 Irrigation Schemes

Zone-A

No.	Name of Scheme	Area (ha)		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		Gross	Net	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L
Unit Water Requirement (l/sec/ha)				0.17	0.16	0.19	0.23	0.42	0.16	0.23	0.09	0.10	1.00	1.52	0.92	0.51	0.00	0.00	0.59	0.45	0.77	0.42	0.20	0.18	0.17	0.20	0.24
Water Requirement (m3/sec)																											
AB-10	Katunje	90	72	0.012	0.012	0.014	0.017	0.030	0.012	0.017	0.006	0.007	0.072	0.109	0.066	0.037	0.000	0.000	0.042	0.032	0.055	0.030	0.014	0.013	0.012	0.014	0.017
AB-14	Mahadev Khola	450	360	0.061	0.058	0.068	0.083	0.151	0.058	0.083	0.032	0.036	0.360	0.547	0.331	0.184	0.000	0.000	0.212	0.162	0.277	0.151	0.072	0.065	0.061	0.072	0.086
AL-8	Khokana	250	200	0.034	0.032	0.038	0.046	0.084	0.032	0.046	0.018	0.020	0.200	0.304	0.184	0.102	0.000	0.000	0.118	0.090	0.154	0.084	0.040	0.036	0.034	0.040	0.048
AL-10	Kotkhu	445	356	0.061	0.057	0.068	0.082	0.150	0.057	0.082	0.032	0.036	0.356	0.541	0.328	0.182	0.000	0.000	0.210	0.160	0.274	0.150	0.071	0.064	0.061	0.071	0.085
AL-13	Lubbu	165	132	0.022	0.021	0.025	0.030	0.055	0.021	0.030	0.012	0.013	0.132	0.201	0.121	0.067	0.000	0.000	0.078	0.059	0.102	0.055	0.026	0.024	0.022	0.026	0.032
AL-19	Thika Bhairaw-I	600	480	0.082	0.077	0.091	0.110	0.202	0.077	0.110	0.043	0.048	0.480	0.730	0.442	0.245	0.000	0.000	0.283	0.216	0.370	0.202	0.096	0.086	0.082	0.096	0.115
AL-20	Thika Bhairaw-II	400	320	0.054	0.051	0.061	0.074	0.134	0.051	0.074	0.029	0.032	0.320	0.486	0.294	0.163	0.000	0.000	0.189	0.144	0.246	0.134	0.064	0.058	0.054	0.064	0.077

Zone-B

No.	Name of Scheme	Area (ha)		Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec	
		Gross	Net	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L	E	L
Unit Water Requirement (l/sec/ha)				0.24	0.16	0.17	0.20	0.40	0.20	0.22	0.09	0.11	0.98	1.26	0.99	0.00	0.00	0.00	0.00	0.22	0.64	0.42	0.27	0.18	0.17	0.20	0.24
Water Requirement (m3/sec)																											
AK-4	Biswambhara	125	100	0.024	0.016	0.017	0.020	0.040	0.020	0.022	0.009	0.011	0.098	0.126	0.099	0.000	0.000	0.000	0.000	0.022	0.064	0.042	0.027	0.018	0.017	0.020	0.024
AK-5	Boshan	210	168	0.040	0.027	0.029	0.034	0.067	0.034	0.037	0.015	0.018	0.165	0.212	0.166	0.000	0.000	0.000	0.000	0.037	0.108	0.071	0.045	0.030	0.029	0.034	0.040
AK-7	Dakshinkali	100	80	0.019	0.013	0.014	0.016	0.032	0.016	0.018	0.007	0.009	0.078	0.101	0.079	0.000	0.000	0.000	0.000	0.018	0.051	0.034	0.022	0.014	0.014	0.016	0.019
AK-14	Indrayani	140	112	0.027	0.018	0.019	0.022	0.045	0.022	0.025	0.010	0.012	0.110	0.141	0.111	0.000	0.000	0.000	0.000	0.025	0.072	0.047	0.030	0.020	0.019	0.022	0.027
AK-25	Shali Nadi	300	240	0.058	0.038	0.041	0.048	0.096	0.048	0.053	0.022	0.026	0.235	0.302	0.238	0.000	0.000	0.000	0.000	0.053	0.154	0.101	0.065	0.043	0.041	0.048	0.058
AK-27	Tokha	90	72	0.017	0.012	0.012	0.014	0.029	0.014	0.016	0.006	0.008	0.071	0.091	0.071	0.000	0.000	0.000	0.000	0.016	0.046	0.030	0.019	0.013	0.012	0.014	0.017
AB-2	Bidol	60	48	0.012	0.008	0.008	0.010	0.019	0.010	0.011	0.004	0.005	0.047	0.060	0.048	0.000	0.000	0.000	0.000	0.011	0.031	0.020	0.013	0.009	0.008	0.010	0.012
AB-4	Dhunge Dhara	210	168	0.040	0.027	0.029	0.034	0.067	0.034	0.037	0.015	0.018	0.165	0.212	0.166	0.000	0.000	0.000	0.000	0.037	0.108	0.071	0.045	0.030	0.029	0.034	0.040
AB-12	Kutudhal	147	118	0.028	0.019	0.020	0.024	0.047	0.024	0.026	0.011	0.013	0.116	0.149	0.117	0.000	0.000	0.000	0.000	0.026	0.076	0.050	0.032	0.021	0.020	0.024	0.028

Table 5-3 Available Water at Intake Point

(1) Mean Discharge

Code No.	Name of Scheme	River & Tributary	Catchment Area (km2)	Available Water at Intake Point (Mean Discharge, Unit : m3/sec)											
				Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
AK-04	Biswambhara	Manohara River*	5.84	0.100	0.076	0.058	0.055	0.052	0.357	0.756	1.316	0.752	0.481	0.333	0.155
AK-05	Boshan	Boshan Khola	6.80	0.119	0.089	0.071	0.065	0.062	0.422	0.895	1.559	0.891	0.570	0.395	0.185
AK-07	Dakshinkali	Kharpa & Hundu Khola	10.00	0.202	0.142	0.107	0.103	0.082	0.672	1.560	2.710	1.528	0.972	0.683	0.311
AK-14	Indrayani	Ghatte/Manamatta Khola	5.20	0.100	0.074	0.058	0.054	0.047	0.348	0.763	1.330	0.755	0.482	0.335	0.156
AK-25	Sali Nadi	Sali Nadi Khola	12.00	0.239	0.179	0.138	0.129	0.116	0.834	1.800	3.140	1.794	1.145	0.799	0.368
AK-27	Tokha	Tokha Khola	0.30	0.005	0.004	0.003	0.003	0.003	0.018	0.039	0.068	0.039	0.025	0.017	0.008
AB-02	Bidol	Saraswisti/Tholo Khola	3.60	0.050	0.037	0.030	0.028	0.026	0.178	0.377	0.675	0.375	0.240	0.166	0.078
AB-04	Dhunge Dhara	Ghatte Khola	6.90	0.052	0.026	0.011	0.006	0.005	0.311	0.717	1.286	0.714	0.438	0.288	0.108
AB-10	Katunje	Budhi Ganga/Ghatte Khola	2.40	0.026	0.017	0.011	0.013	0.009	0.059	0.204	0.363	0.186	0.123	0.091	0.040
AB-12	Kutudhal	Hanumante/Ghatte Khola	7.30	0.069	0.024	0.015	0.009	0.009	0.200	0.761	1.363	0.707	0.425	0.286	0.091
AB-14	Mahadev Khola	Mahadev Khola	4.40	0.057	0.041	0.031	0.030	0.027	0.169	0.442	0.775	0.428	0.276	0.196	0.089
AL-08	Khokana	Nakhu Khola	49.00	0.537	0.326	0.202	0.332	0.096	0.710	5.417	7.907	5.865	2.532	1.248	0.737
AL-10	Kotkhu	Karmanasia/Kotkhu Khola	16.00	0.178	0.135	0.110	0.129	0.142	0.403	1.449	2.094	1.615	0.712	0.368	0.245
AL-13	Lubhu	Sineri(Lubhu) Khola	5.20	0.070	0.052	0.041	0.038	0.036	0.242	0.530	0.925	0.526	0.337	0.234	0.108
AL-19	Thika Bhairaw-I	Lele & Nakhu Khola	39.00	0.508	0.385	0.330	0.349	0.406	1.313	4.345	6.300	4.916	2.147	1.068	0.705
AL-20	Thika Bhairaw-II	Nakhu Khola	47.00	0.546	0.355	0.250	0.350	0.195	0.916	5.247	7.646	5.748	2.485	1.229	0.748

(2) 80% Reliable Discharge

Scheme Code No.	Name of Scheme	River & Tributary	Catchment Area (km2)	Available Water at Intake Point (80% Reliable Discharge, Unit : m3/sec)											
				Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
AK-04	Biswambhara	Manohara River*	5.84	0.086	0.062	0.048	0.041	0.034	0.079	0.443	0.773	0.471	0.247	0.148	0.093
AK-05	Boshan	Boshan Khola	6.80	0.102	0.075	0.058	0.048	0.040	0.094	0.525	0.918	0.556	0.294	0.173	0.114
AK-07	Dakshinkali	Kharpa & Hundu Khola	10.00	0.169	0.123	0.087	0.077	0.031	0.106	0.914	1.597	0.946	0.494	0.294	0.189
AK-14	Indrayani	Ghatte/Manamatta Khola	5.20	0.085	0.062	0.046	0.039	0.028	0.068	0.448	0.783	0.470	0.247	0.146	0.095
AK-25	Sali Nadi	Sali Nadi Khola	12.00	0.205	0.150	0.114	0.096	0.078	0.174	1.060	1.852	1.116	0.589	0.348	0.227
AK-27	Tokha	Tokha Khola	0.30	0.004	0.003	0.003	0.002	0.002	0.004	0.023	0.040	0.024	0.013	0.008	0.005
AB-02	Bidol	Saraswisti/Tholo Khola	3.60	0.043	0.032	0.024	0.020	0.017	0.040	0.221	0.387	0.234	0.124	0.073	0.048
AB-04	Dhunge Dhara	Ghatte Khola	6.90	0.037	0.014	0.005	0.004	0.004	0.031	0.400	0.737	0.427	0.202	0.098	0.047
AB-10	Katunje	Budhi Ganga/Ghatte Khola	2.40	0.025	0.010	0.008	0.007	0.006	0.013	0.115	0.208	0.105	0.056	0.038	0.022
AB-12	Kutudhal	Hanumante/Ghatte Khola	7.30	0.006	0.003	0.002	0.002	0.003	0.005	0.424	0.773	0.389	0.159	0.076	0.015
AB-14	Mahadev Khola	Mahadev Khola	4.40	0.048	0.034	0.024	0.021	0.018	0.021	0.256	0.453	0.259	0.137	0.084	0.053
AL-08	Khokana	Nakhu Khola	49.00	0.317	0.156	0.030	0.122	0.038	0.065	3.377	5.137	4.405	1.972	0.918	0.507
AL-10	Kotkhu	Karmanasia/Kotkhu Khola	16.00	0.120	0.086	0.065	0.071	0.080	0.164	0.919	1.379	1.233	0.553	0.277	0.174
AL-13	Lubhu	Sineri(Lubhu) Khola	5.20	0.059	0.043	0.033	0.028	0.023	0.054	0.313	0.546	0.328	0.173	0.102	0.066
AL-19	Thika Bhairaw-I	Lele & Nakhu Khola	39.00	0.338	0.235	0.180	0.189	0.208	0.483	2.765	4.150	3.786	1.677	0.808	0.505
AL-20	Thika Bhairaw-II	Nakhu Khola	47.00	0.336	0.185	0.060	0.150	0.069	0.146	3.287	4.986	4.348	1.955	0.919	0.528

Note * : In interim report, Intake of Biswambhara was considered on the Godagare Khola which is a tributary of the Manohara River, with a catchment area of 1.7 km2.
Available water in this table will be reviewed in Phase-II Study for model schemes based on the monthly discharge to be estimated.

Table 5-4 Rehabilitation and Improvement Plan for 16 Schemes

(1) Kathmandu District (6 Schemes)

Name of Scheme	Weir	Apron	Gate	Canal
Biswambhara (AK-04) (A=125ha)	L=20 m Improvement (30% of construction cost)	Replacement by concrete and gravel work(100%) (Up/Downstream)	0.8 x 0.8 m. Replacement by steel gate.	L=3.5 km. Replacement by concrete canal (80%)
Boshan (AK-05) (A=210ha)	L=20 m. Replacement (100%)	Replacement by concret and gravel work(100%) (Up/Downstream)	0.8 x 0.9 m. Installation of steel gate.	L=2.0 km. Replacement by concrete canal (100%)
Dakshinkali (AK-07) (A=100ha)	L=6 m.(Temp.) Replacement (100%)	Upper Scheme Replacement by concrete and gravel work(100%) (Up/Downstream)	0.45 x 0.9 m. Replacement by steel gate.	No additional work.
	L=12 m No additional work.	Lower Scheme Replacement by concrete and gravel work(100%) (Up/Downstream)	No additional work.	L=2.4 km. Replacement by concrete canal (100%)
Indrayani (AK-14) (A=140ha)	L=16 m.(Temp.) Replacement (100%)	Replacement by concrete and work(100%) (Up/Downstream)	0.7 x 0.7 m. Replacement by steel gate	L=3.5km. Replacement by concrete canal (100%)
Shali Nadi (AK-25) (A=300ha)	L=15 m.(Temp.) Replacement (100%)	Replacement by concrete and gravel work(100%) (Up/Downstream)	0.6 x 0.7 m. Replacement by steel gate.	L=4.0km. Replacement by concrete canal (100%)
Tokha (AK-27) (A=90ha)*	L=3.4m. Replacement (100%)	Replacement by concrete and gravel work(100%) (Up/Downstream)	0.9 x 0.6 m. Replacement by steel gate.	L=2.2km. Replacement by concrete canal (100%)

Sub-total (965/ha)

Note * : Command area of Tokha (AK-27) is changed for 90ha (maximum irrigable area) by the reason of available water discharge, though ordinary requested 150ha.

(2) Bhaktapur District (5 Schemes)

Name of Scheme	Weir	Apron	Gate	Canal
Bidol (AB-02) (A=60ha)	L=3.5m Replacement (100%)	Provision of concrete and gravel apron (Up/Downstream)	0.45 x 0.70 m (2 Nos.) Replacement by steel gate	L=3.2km. Replacement by concrete canal (100%)
Dhunge Dhara (AB-04) (A=210ha)	L=20m. Replacement (100%)	Provision of concrete and gravel apron ((Up/Downstream)	0.4 x 0.4 m Replacement by steel gate	L=4.1km. Replacement by concrete canal (100%)
Katunje(AB-10) (A=90ha)	Construction of a weir(L'=5.0m)	Provision of concrete and gravel apron (Up/Downstream)	Provision of steel gate. (0.5 x 0.6 m)	L=2.0km. Replacement by concrete canal (100%)
Kutudhal (AB-12) (A=147ha)	L=12m Replacement (100%)	Provision of concrete and gravel apron (Up/Downstream)	Replacement of gate(0.4 x 0.4 m)	L=2.0km. Replacement by concrete canal (70%)
Mahadev Khola(AB-14) (A=450ha)	L=16m Improvement (50% of construction cost)	Provision of concrete and gravel apron (Up/downstream)	Replacement of gate(1.7 x 0.65 m)	L=6.5km. Replacement by concrete canal (100%)
Sub-total (957ha)				

(3) Lalitpur (5 Schemes)

Name of Scheme	Weir	Apron	Gate	Canal
Khokana (AL-08) (A=250ha)	L=80m.(Temp) Construction of a weir (L'=50m.)	Provision of concrete and gravel apron (Up/Downstream)	Installation of steel gate (0.6 x 0.8 m)	L=4.5km. Replacement by concrete canal (100%)
Kotkhu (AL-10) (A=445ha)	L =9m. Improvement (50% of construction cost)	Provision of concrete and gravel apron (Up/Downstream)	Replacement by steel gate (0.9 x 1.2 m)	L=7.0km. Replacement by concrete canal (100%)
Lubhu (AL-13) (A=165ha)	Construction of a weir (L'=10m.)	Provision of concrete and gravel apron (Up/Downstream)	Installation of steel gate (0.9 x 0.85 m.)	L=4.0km. Replacement by concrete canal (100%)
Thika Bhairaw (1) (AL-19) (A=600ha)	L=10.6m. Improvement (50% of construction cost)	Provision of concrete and gravel apron (Up/Downstream)	Replacement by steel gate (1.75 x 0.95 m.)	L=14.5km. Replacement by concrete canal (100%)
Thika Bhairaw (2) (AL-20) (A=400ha)	Construction of a weir (L'=25m.)	Provision of concrete and gravel apron (Up/Downstream)	Installation of steel gate (0.7 x 1.4 m)	L=7.4km. Replacement by concrete canal (100%)
Sub-total	(1,860ha)			
Total	(3,782ha)			

Table 5-5 Preliminary Cost Estimation for 16 Schemes

Unit : NRs.1,000

No.	Name of Schemes	Net Comm. Area (ha)	Construction Cost								Admini. Cost	Price Esc.	Eng. Fee	GRAND TOTAL	Unit Cost [/ha.]	
			Canal Works					Div. Work	Prep. work	Total						
			Main Canal	Seco--ndary	Tertiary	Other Structures	Total		15%		15%	15%	7.0%			(US$)
AK-04	Biswambhara	100	4,246	2,177	1,866	1,243	9,532	1,476	1,651	12,659	1,898	1,898	886	17,341	173.41	3,468
AK-05	Boshan	168	3,912	3,657	3,134	1,605	12,308	4,884	2,578	19,770	2,965	2,965	1,383	27,083	161.21	3,224
AK-07	Dakshinkali	80	4,541	1,741	1,492	1,166	8,940	3,621	1,884	14,445	2,166	2,166	1,011	19,788	247.35	4,947
AK-14	Indrayani	112	6,865	2,438	2,089	1,709	13,101	3,904	2,550	19,555	2,933	2,933	1,368	26,789	239.19	4,784
AK-25	Shali Nadi	240	11,010	5,224	4,478	3,107	23,819	3,712	4,129	31,660	4,749	4,749	2,216	43,374	180.73	3,615
AK-27	Tokha	72	2,920	1,743	1,494	923	7,080	840	1,188	9,108	1,366	1,366	637	12,477	173.29	3,466
	Sub-Total	772	33,494	16,980	14,553	9,753	74,780	18,437	13,980	107,197	16,077	16,077	7,501	146,852	190.22	3,804
AB-02	Bidol	48	4,248	1,044	895	928	7,115	864	1,196	9,175	1,376	1,376	642	12,569	261.85	5,237
AB-04	Dhunge Dhara	168	9,681	3,657	3,134	2,471	18,943	4,884	3,574	27,401	4,110	4,110	1,918	37,539	223.45	4,469
AB-10	Katunje	72	3,759	1,567	1,343	1,000	7,669	1,231	1,335	10,235	1,535	1,535	716	14,021	194.74	3,895
AB-12	Kutudhal	118	2,868	2,560	2,194	1,143	8,765	2,145	1,636	12,546	1,881	1,881	878	17,186	146.14	2,923
AB-14	Mahadev Khola	360	12,878	7,837	6,717	4,115	31,547	2,883	5,164	39,594	5,939	5,939	2,771	54,243	150.68	3,014
	Sub-Total	766	33,434	16,665	14,283	9,657	74,039	12,007	12,905	98,951	14,841	14,841	6,925	135,558	177.06	3,541
AL-08	Khokana	200	10,686	4,354	3,732	2,816	21,588	19,768	6,203	47,559	7,133	7,133	3,329	65,154	325.77	6,515
AL-10	Kotkhu	356	13,419	7,750	6,642	4,172	31,983	1,112	4,964	38,059	5,708	5,708	2,664	52,139	146.46	2,929
AL-13	Lubhu	132	5,938	2,873	2,463	1,691	12,965	2,451	2,312	17,728	2,659	2,659	1,240	24,286	183.98	3,680
AL-19	Thika Bhairaw (1)	480	26,467	10,449	8,956	6,881	52,753	1,292	8,106	62,151	9,322	9,322	4,350	85,145	177.39	3,548
AL-20	Thika Bhairaw (2)	320	15,062	6,966	5,971	4,200	32,199	6,153	5,752	44,104	6,615	6,615	3,087	60,421	188.82	3,776
	Sub-Total	1,488	71,572	32,392	27,764	19,760	151,488	30,776	27,337	209,601	31,437	31,437	14,670	287,145	192.97	3,859
	TOTAL	3,026	138,500	66,037	56,600	39,170	300,307	61,220	54,222	415,749	62,355	62,355	29,096	569,555	188.25	3,765

Table 5-6 (1/2) Economic Cost and Return under With/Without Project Condition (1.00 ha Farm)

Without Project Condition

Description		Dry Season Crop																						
Crop		Wheat (0.520)			Maize (0.015)			Millet (0.085)			Potato (0.045)			Mustard (0.020)			Legumes (0.015)			Vegetable (Radish) (0.030)			Total (0.730)
(ha)	Unit	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Value (NRs.)
A) Output																								
a) Production	kg	884	7.50	6,630	32	6.80	210	110	4.00	440	500	6.45	3,220	14	30.00	420	9	12.00	100	1,043	2.50	2,610	
b) By-product	Kg	834	0.25	210	33	0.20	10	159	0.30	50	0	0.00	0	4	0.50	0	4	0.20	0	0	0.00	0	
c) Gross Income	NRs			6,840			220			490			3,220			420			100			2,610	13,680
B) Input																								
a) Seed	Kg	59	12.10	720	0	14.80	10	2	11.05	20	46	11.05	500	0	45.00	10	0	100.00	20	0	100.00	20	
b) Fertilizer																								
Complex	Kg	33	10.20	330	1	10.20	10	2	10.20	20	9	10.20	90	4	10.20	40	0	10.20	0	17	10.20	170		
Urea	Kg	129	5.72	740	3	5.72	20	0	5.72	0	20	5.72	110	2	5.72	10	0	5.72	0	4	5.72	20		
Manure	Kg	3,383	0.25	850	75	0.25	20	69	0.25	20	481	0.25	120	120	0.25	30	0	0.25	0	56	0.25	10		
c) Pesticides	Kg																							
Sub-total (a to c)				2,640			60			60			820			90			20			220	3,850
d) Labour Requirement																								
Family Labour																								
-Male	M/D	11	75.00	860	1	75.00	40	2	75.00	140	2	75.00	170	0	75.00	30	0	75.00	20	2	75.00	110		
-Female	M/D	40	38.00	1,500	1	38.00	60	6	38.00	250	7	38.00	260	2	38.00	90	1	38.00	20	6	38.00	230		
Hired Labour																								
-Male	M/D	4	75.00	270	0	75.00	20	0	75.00	0	1	75.00	40	0	75.00	0	0	75.00	0	0	75.00	20		
-Female	M/D	9	38.00	340	0	38.00	10	0	38.00	0	2	38.00	60	0	38.00	0	0	38.00	0	1	38.00	20		
Sub-total (d)		63		2,970	2		130	8		390	11		530	3		120	1		40	8		380	4,430	
Total Cost (a to d)	NRs			5,610			190			450			1,350			210			60			600	8,280	
C) Return (A - B)	NRs			1,230			30			40			1,870			210			40			2,010	5,400

With Project Condition

Description		Dry Season Crop																						
Crop		Wheat (0.40)			Maize (0.10)						Potato (0.10)			Mustard (0.20)						Winter Veg. (Radish) (0.20)			Total (1.00)
(ha)																								
Description	Unit	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)				Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)				Qty	Price (NRs.)	Value (NRs.)	Value (NRs.)
A) Output																								
a) Production	kg	800	7.50	6,000	250	6.80	1,700				1,300	6.45	8,390	160	30.00	4,800				6,950	2.50	17,380		
b) By-product	Kg	755	0.25	190	260	0.20	50				0	0.00	0	40	0.50	20				0	0.00	0		
c) Gross Income	NRs			6,190			1,750						8,390			4,820						17,380	38,530	
B) Input																								
a) Seed	Kg	46	12.10	550	2	14.80	30				102	11.05	1,120	2	45.00	110				1	100.00	100		
b) Fertilizer																								
Complex	Kg	25	10.20	260	6	10.20	60				20	10.20	200	40	10.20	410				112	10.20	1,140		
Urea	Kg	100	5.72	570	21	5.72	120				44	5.72	250	20	5.72	110				27	5.72	160		
Manure	Kg	2,602	0.25	650	500	0.25	120				1,069	0.25	270	1,200	0.25	300				375	0.25	90		
c) Pesticides	Kg																							
Sub-total (a to c)				2,030			330						1,840			930						1,490	6,620	
d) Labour Requirement																								
Family Labour																								
-Male	M/D	9	75.00	660	3	75.00	260				5	75.00	380	4	75.00	300				10	75.00	770		
-Female	M/D	30	38.00	1,160	10	38.00	380				15	38.00	570	24	38.00	910				40	38.00	1,530		
Hired Labour																								
-Male	M/D	3	75.00	210	2	75.00	140				1	75.00	90	0	75.00	0				2	75.00	140		
-Female	M/D	7	38.00	260	2	38.00	60				4	38.00	140	0	38.00	0				4	38.00	140		
Sub-total (d)		49		2,290	17		840				25		1,180	28		1,210				56		2,580	8,100	
Total Cost (a to d)	NRs			4,320			1,170						3,020			2,140						4,070	14,720	
C) Return (A - B)	NRs			1,870			580						5,370			2,680						13,310	23,810	
Incremental Benefit				640			550			-40			3,500			2,470			-40			11,300	Dry season 18,410	

Table 5-6 (2/2) Economic Cost and Return under With/Without Project Condition (1.00 ha Farm)

Without Project Condition

Description		Dry season *	Rainy Season Crops																Annual	
Crop (ha)		Total (0.730)	Paddy (0.585)			Maize (0.360)			Potato (0.020)			Legumes (0.020)			Summer Veg. (Tomato) (0.015)			Total (1.000)	Total (1.730)	Remarks
Description	Unit	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)	Value (NRs.)	Value (NRs.)	
A) Output																				
a) Production	kg		2,750	6.25	17,180	756	6.80	5,140	222	6.45	1,430	11	12.00	140	240	8.50	2,040			
b) By-product	Kg		1,314	0.75	990	786	0.20	160	0	0.00	0	6	0.20	0	0	0.00	0			
c) Gross Income	NRs	13,680			18,170			5,300			1,430			140			2,040	27,080	40,760	
B) Input																				
a) Seed	Kg		31	16.80	520	8	14.80	120	20	11.05	220	0	100.00	30	0	70.00	0			
b) Fertilizer																				
Complex	Kg		59	10.20	600	20	10.20	200	4	10.20	40	0	10.20	0	4	10.20	40			
Urea	Kg		160	5.72	910	75	5.72	430	9	5.72	50	0	5.72	0	1	5.72	10			
Manure	Kg		3,784	0.25	950	1,799	0.25	450	214	0.25	50	0	0.25	0	105	0.25	30			
c) Pesticides	Kg																			
Sub-total (a to c)		3,850			2,980			1,200			360			30			80	4,650	8,500	
d) Labour Requirement																				
Family Labour																				
-Male	M/D		20	75.00	1,540	12	75.00	920	1	75.00	80	0	75.00	30	1	75.00	50			
-Female	M/D		80	38.00	3,050	36	38.00	1,350	3	38.00	110	1	38.00	30	4	38.00	140			
Hired Labour																				
-Male	M/D		13	75.00	1,010	6	75.00	490	0	75.00	20	0	75.00	0	0	75.00	10			
-Female	M/D		30	38.00	1,130	5	38.00	210	1	38.00	30	0	38.00	0	0	38.00	10			
Sub-total (d)		4,430	144		6,730	60		2,970	5		240	1		60	5		210	10,210	14,640	
Total Cost (a to d)	NRs	8,280			9,710			4,170			600			90			290	14,860	23,140	
C) Return (A - B)	NRs	5,400			8,460			1,130			830			50			1,750	12,220	17,620	

With Project Condition

Description		Dry season *	Rainy Season Crops																Annual	
Crop (ha)		Total (1.00)	Paddy (0.80)												Summer Veg. (Tomato) (0.20)			Total (1.00)	Total (2.00)	Remarks
Description	Unit	Value (NRs.)	Qty	Price (NRs.)	Value (NRs.)										Qty	Price (NRs.)	Value (NRs.)	Value (NRs.)	Value (NRs.)	
A) Output																				
a) Production	kg		4,000	6.25	25,000										3,200	8.50	27,200			
b) By-product	Kg		1,912	0.75	1,430										0	0.00	0			
c) Gross Income	NRs	38,530			26,430												27,200	53,630	92,160	
B) Input																				
a) Seed	Kg		42	16.80	710										1	70.00	40			
b) Fertilizer																				
Complex	Kg		81	10.20	820										50	10.20	510			
Urea	Kg		218	5.72	1,250										12	5.72	70			
Manure	Kg		5,175	0.25	1,290										1,400	0.25	350			
c) Pesticides	Kg																			
Sub-total (a to c)		6,620			4,070												970	5,040	11,660	
d) Labour Requirement																				
Family Labour																				
-Male	M/D		28	75.00	2,100										8	75.00	630			
-Female	M/D		110	38.00	4,160										47	38.00	1,800			
Hired Labour																				
-Male	M/D		18	75.00	1,380										1	75.00	90			
-Female	M/D		41	38.00	1,550										5	38.00	190			
Sub-total (d)		8,100	197		9,190										62		2,710	11,900	20,000	
Total Cost (a to d)	NRs	14,720			13,260												3,680	16,940	31,660	
C) Return (A - B)	NRs	23,810			13,170												23,520	36,690	60,500	
		Dry season *																Rainy season	Annual	
Incremental Benefit		18,410			4,710			-1,130			-830			-50			21,770	24,470	42,880	

Note * : See Table 5-6 (1/2)

Table 5-7 Summary of EIRR for Selected 16 Schemes

		Irrigation Area in ha		Construction Cost Initial Cost	NRs.1,000	Incremental Benefit	EIRR
		Gross	Net	Total	/ha(Net)	NRs.1,000/yr	
Kathmandu District							
AK-04	Biswambhara	125	100	17,341	173.41	3,498	16.1%
AK-05	Boshan	210	168	27,083	161.21	7,209	22.1%
AK-07	Dakshinkali	100	80	19,788	247.35	3,433	13.4%
AK-14	Indrayani	140	112	26,789	239.19	4,806	13.9%
AK-25	Shali Nadi	300	240	43,374	180.73	10,298	18.1%
AK-27	Tokha	90	72	12,477	173.29	1,946	11.6%
	Sub-total	965	772	146,852	190.22		
Bhaktapur District							
AB-02	Bidol	60	48	12,569	261.85	2,060	12.4%
AB-04	Dhunge Dhara	210	168	37,539	223.45	4,480	7.6%
AB-10	Katunje	90	72	14,021	194.74	2,463	13.6%
AB-12	Kutudhal	147	118	17,186	146.14	3,781	17.8%
AB-14	Mahadev Khola	450	360	54,243	150.68	12,737	17.9%
	Sub-total	957	766	135,558	177.06		
Lalitpur District							
AL-08	Khokana	250	200	65,154	325.77	8,582	9.0%
AL-10	Kotkhu	445	356	52,139	146.46	15,276	22.6%
AL-13	Lubhu	165	132	24,286	183.98	5,664	19.1%
AL-19	Thika Bhairaw (1)	600	480	85,145	177.39	20,597	18.5%
AL-20	Thika Bhairaw (2)	400	320	60,421	188.82	13,731	17.3%
	Sub-total	1,860	1,488	287,145	192.97		
	Total	3,782	3,026	569,555	188.25		

Table 5-8 Selection of Priority Schemes

Code No.	Scheme	Less Urbanization *1	Farmland Conditions *1	Availability of Irrigation Water *1	Accessibility *1	Economic Viability (EIRR) *1	Over-all Judgment *2	Selected Area (ha) as 1st priority Gross	Selected Area (ha) as 1st priority Net	Selected Area (ha) as 2nd priority Gross	Selected Area (ha) as 2nd priority Net	Selected Area (ha) for Further Study Gross	Selected Area (ha) for Further Study Net
Kathmandu District													
AK-04	Biswambhara	○	○	△	○	△	○			125	100	125	100
AK-05	Boshan	○	○	◎	△	○	◎	210	168			210	168
AK-07	Dakshinkali	○	△	◎	○	△	○			100	80	100	80
AK-14	Indrayani	○	○	◎	△	△	○			140	112	140	112
AK-25	Shali Nadi	○	○	◎	○	○	◎	300	240			300	240
AK-27	Tokha	○	△	X	○	△	X						
	Sub-total							510	408	365	292	875	700
Bhaktapur District													
AB-02	Bidol	○	△	◎	△	△	○			60	48	60	48
AB-04	Dhunge Dhara	○	○	X	△	X	X						
AB-10	Katunje	△	△	△	△	△	○			90	72	90	72
AB-12	Kutudhal	○	○	△	△	○	◎	147	118			147	118
AB-14	Mahadev Khola	△	◎	△	△	○	◎	450	360			450	360
	Sub-total							597	478	150	120	747	598
Lalitpur District													
AL-08	Khokana	○	○	○	△	X	X						
AL-10	Kotkhu	△	◎	○	○	○	◎	445	356			445	356
AL-13	Lubhu	△	○	○	△	○	◎	165	132			165	132
AL-19	Thika Bhairaw-I	△	◎	◎	○	○	◎	600	480			600	480
AL-20	Thika Bhairaw-II	△	◎	○	△	△	○			400	320	400	320
	Sub-total							1,210	968	400	320	1,610	1,288
	Total							2,317	1,854	915	732	3,232	2,586

Note *1 : Judged with the following criteria.

Urbanization :○ almost nil △ a little progressed in a part of the comand area **X** progressed or most of area located in the urban extend area.

Farmland Conditions :◎ over 300ha ○ 300-100 ha △ 100- 40 ha **X** less than 40 ha of net command area.

Availability of Water :◎ in dry season, 100% of area can be irrigated with 80% dependable discharge ○ also 100% of area is irrigable with average discharge

:△ about 40-50% of area can be irrigated in dry season **X** irrigable area in dry season is less than 20% for proposed cropping pattern.

Accessibility :○ relatively good △ poor **X** bad

Economic viability :○ over 18% △ between 10 - 18% **X** less than 10%

*2 : If there are any X in EIRR or Water Availability, scheme was judged as the lowest priority and first priority was given for scheme which has EIRR over 18%.

: selected schemes as model areas for feasibility study.

Figures

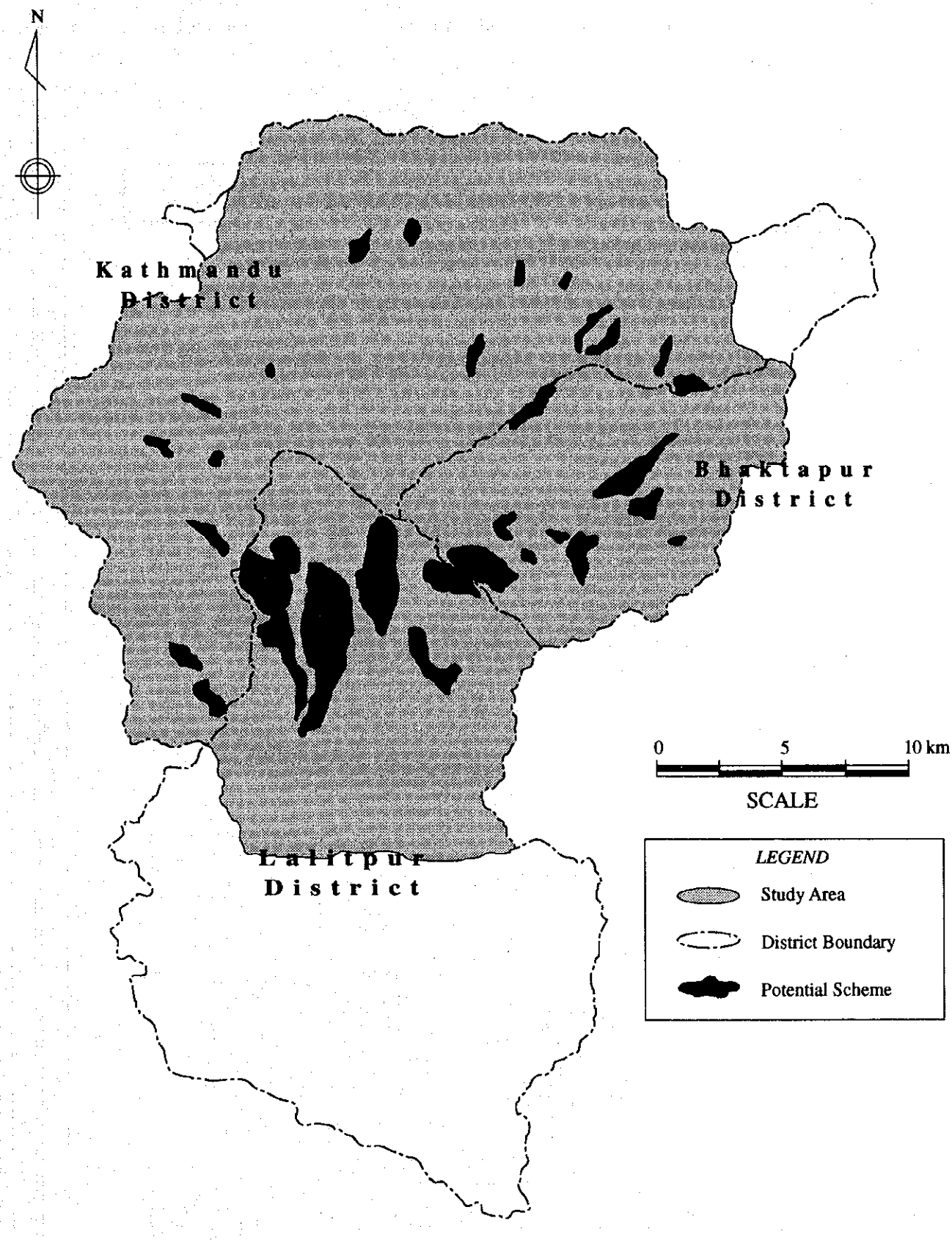


Figure 1-1 Study Area

Figure 1-2 Work Flow of the Study (1/2)

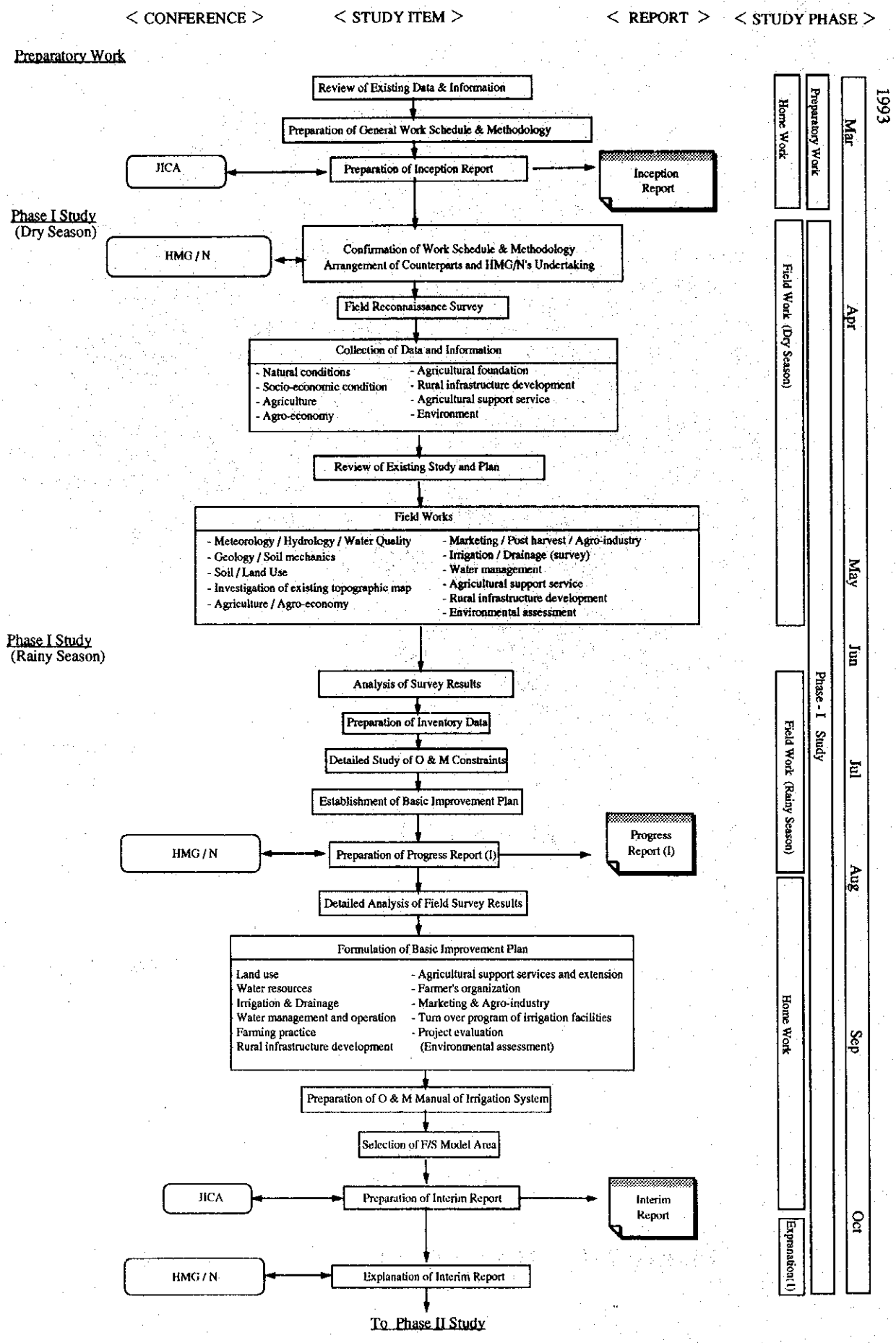


Figure 1-2 Work Flow of the Study (2/2)

< CONFERENCE > < STUDY ITEM > < REPORT > < STUDY PHASE >

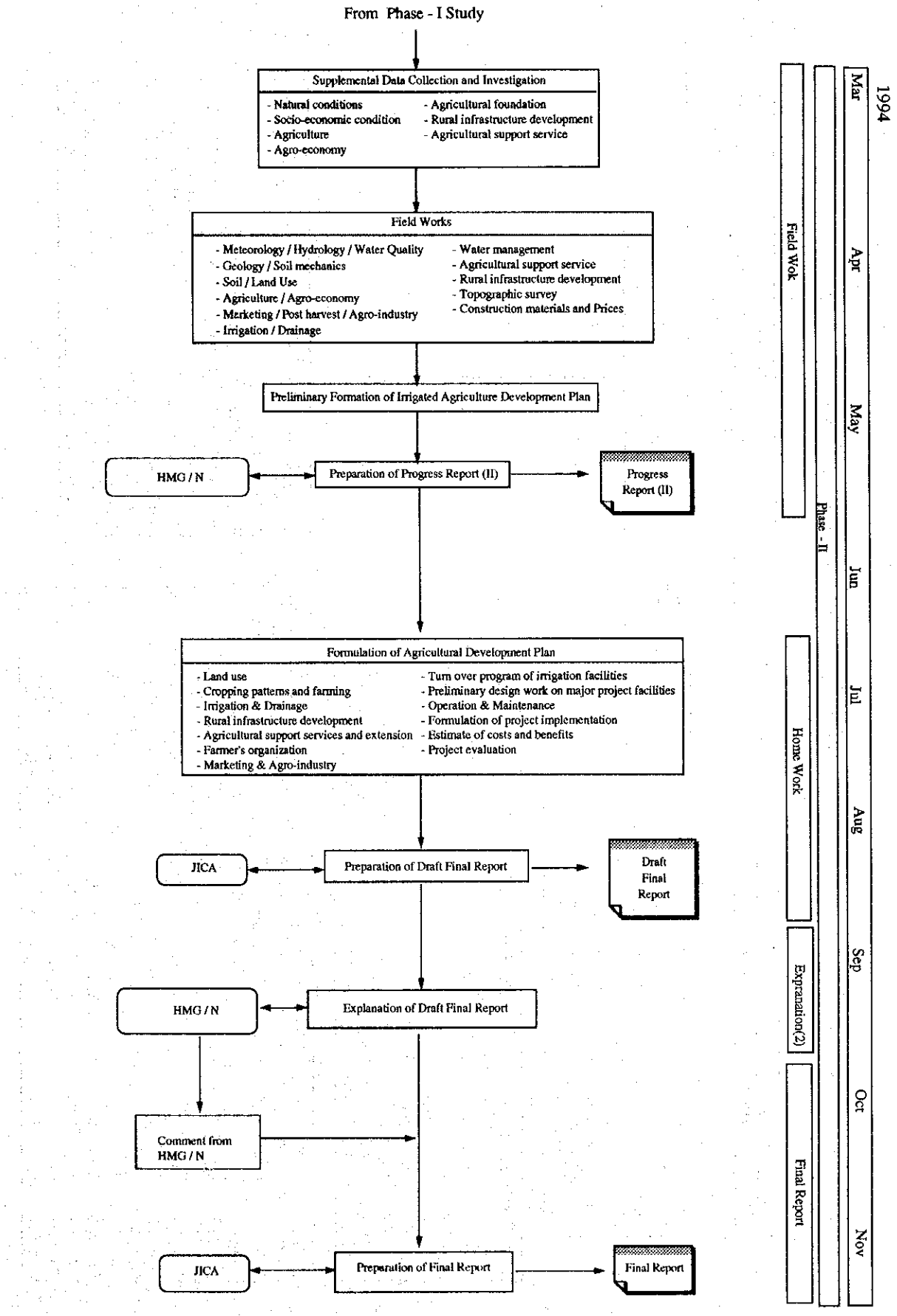


Figure 1-3 Organization of the Phase-I Study

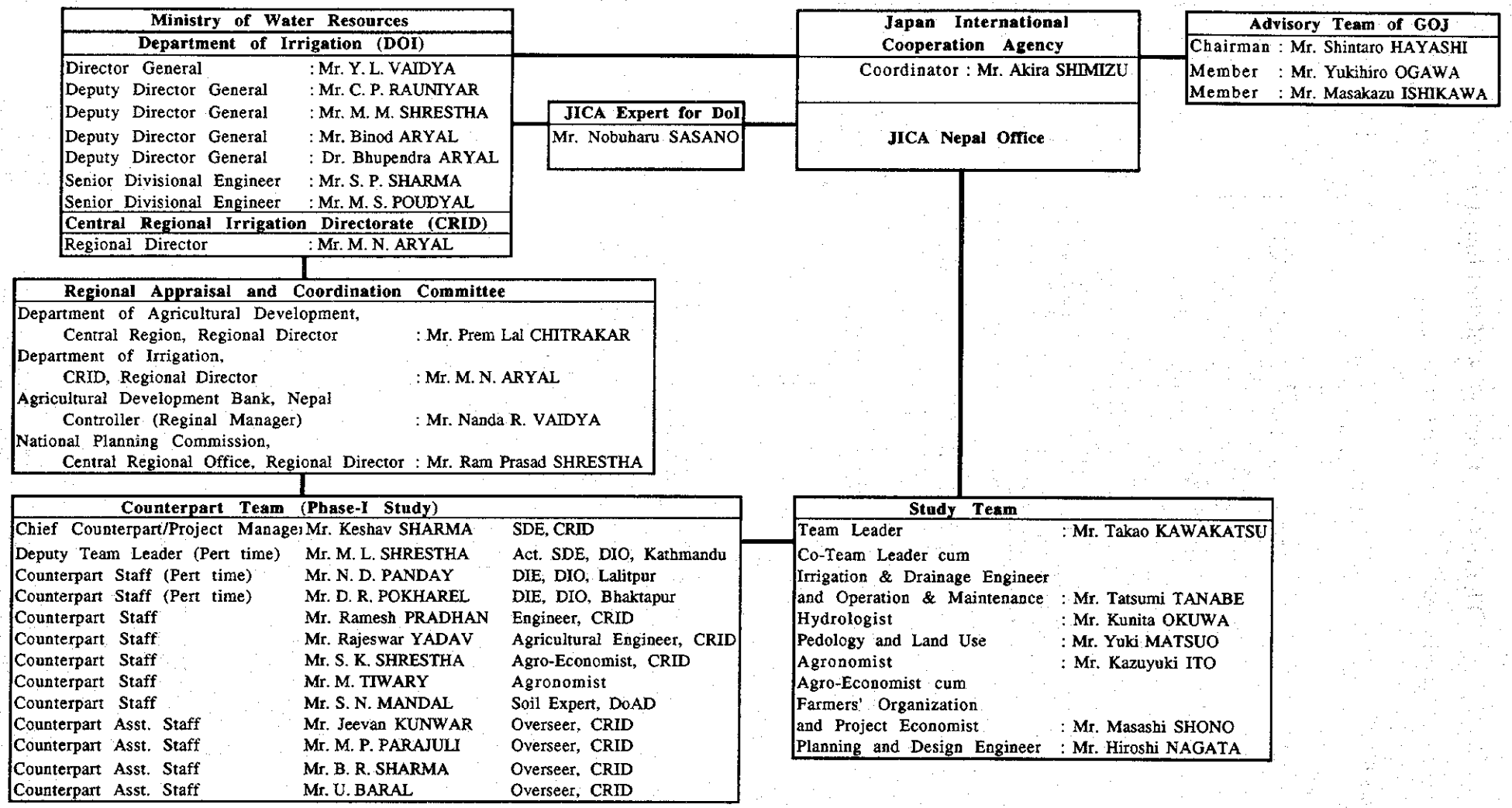


Figure 1-4 Assignment Schedule of the Study Team

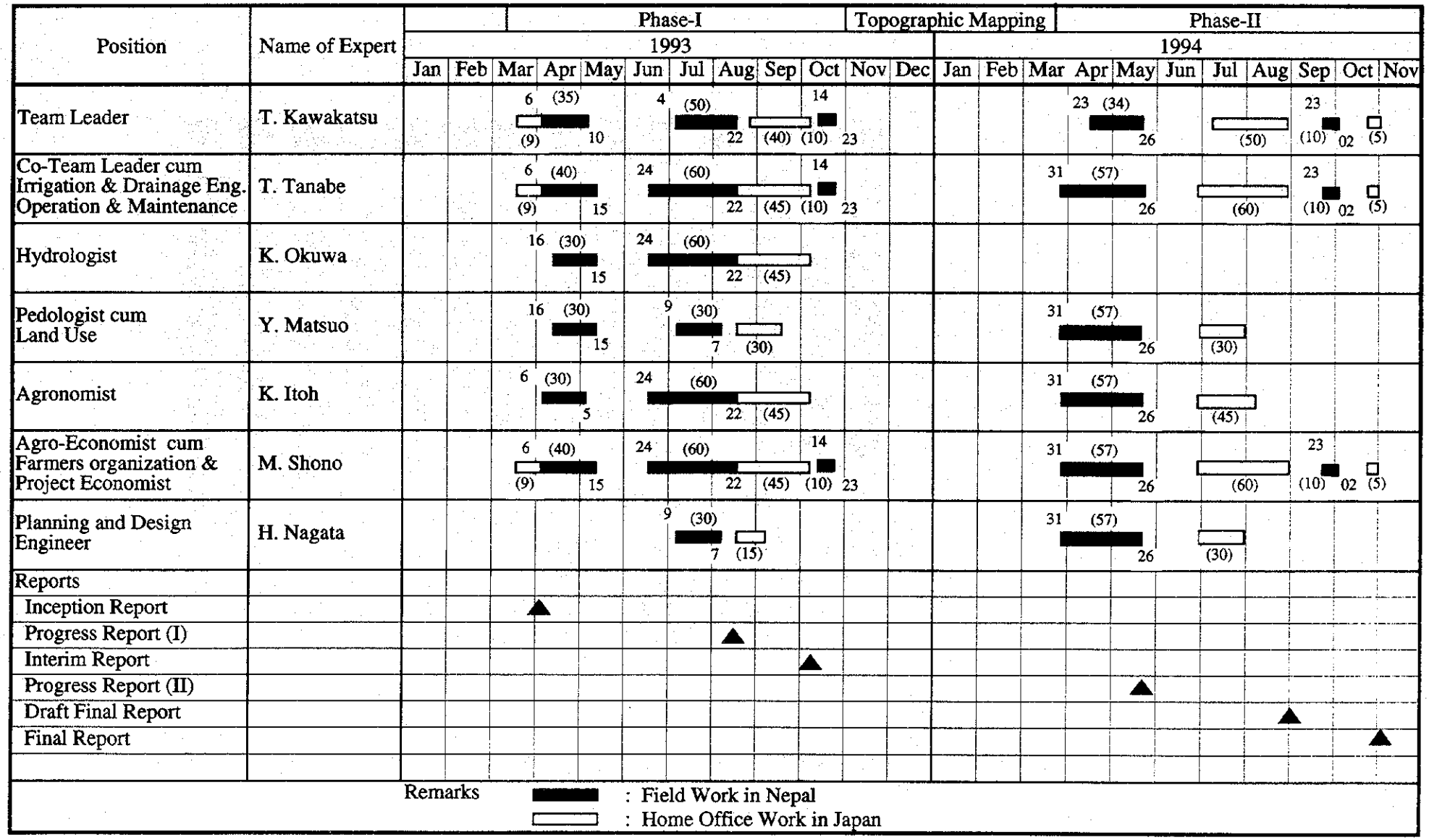
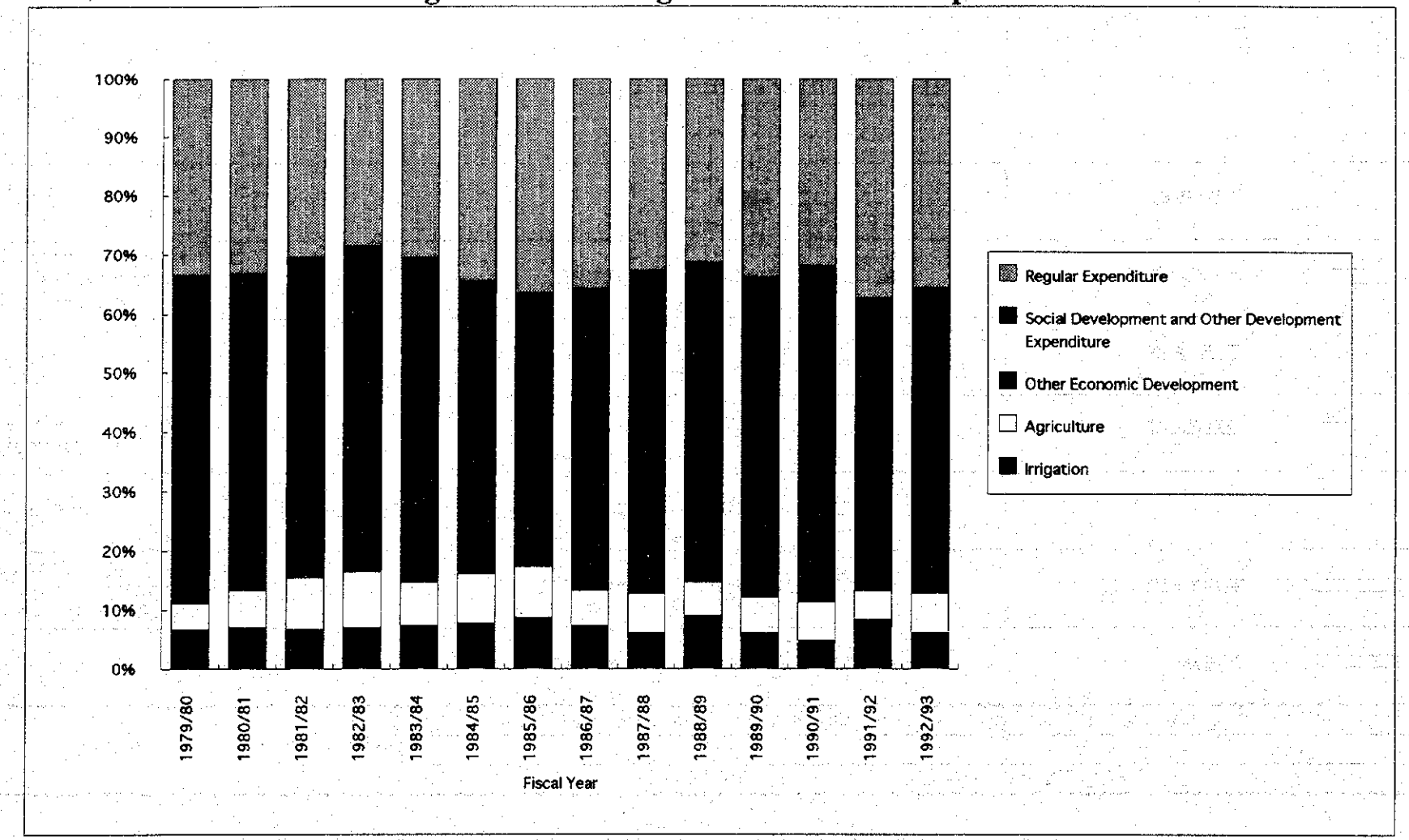
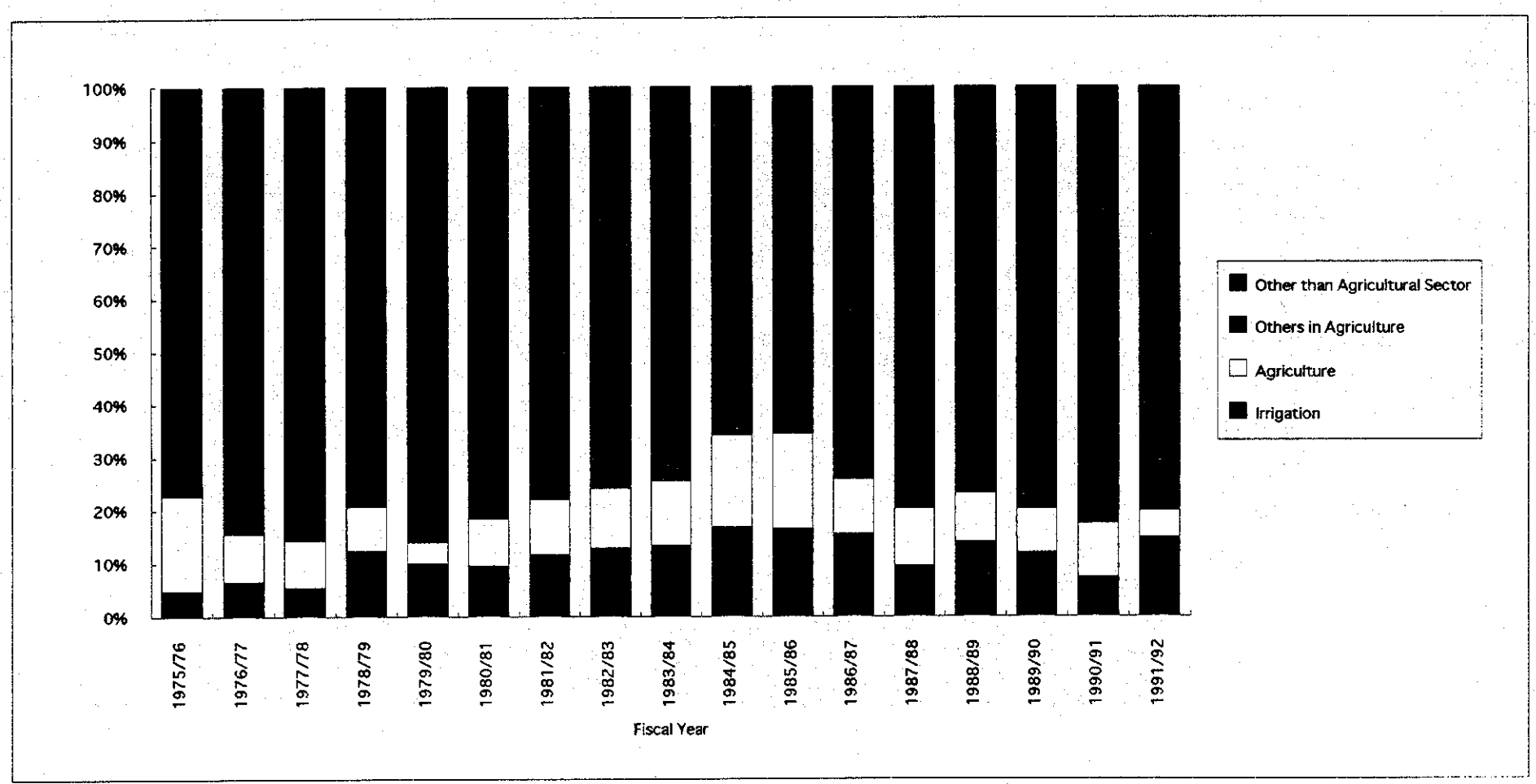


Figure 2-1 Annual Allocation of Government Budget for Irrigation and Agricultural Development



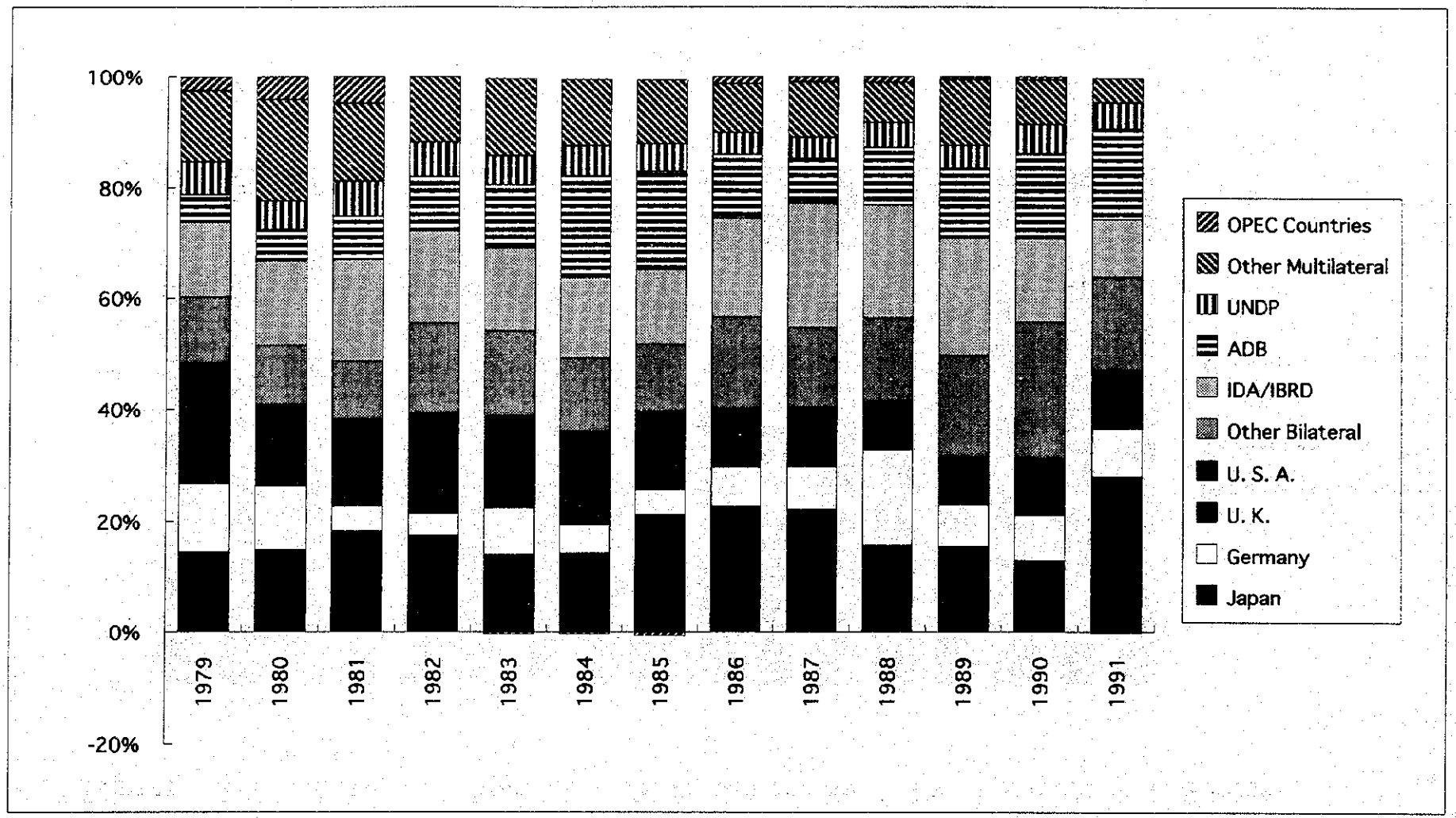
Source : Statistic Year Book of Nepal, 1989 for 1979/80, 1991 for 1980/81 & 1982/83, and 1993 for 1983/84 to 1990/91,
Economic Survey Fiscal Year 1992-93, Ministry of Finance, 1993 for 1991/92 and Annual Budget in FY2049/50B.S.(1992/93)

Figure 2-2 Share of Foreign Aid Disbursement by Agricultural Sector

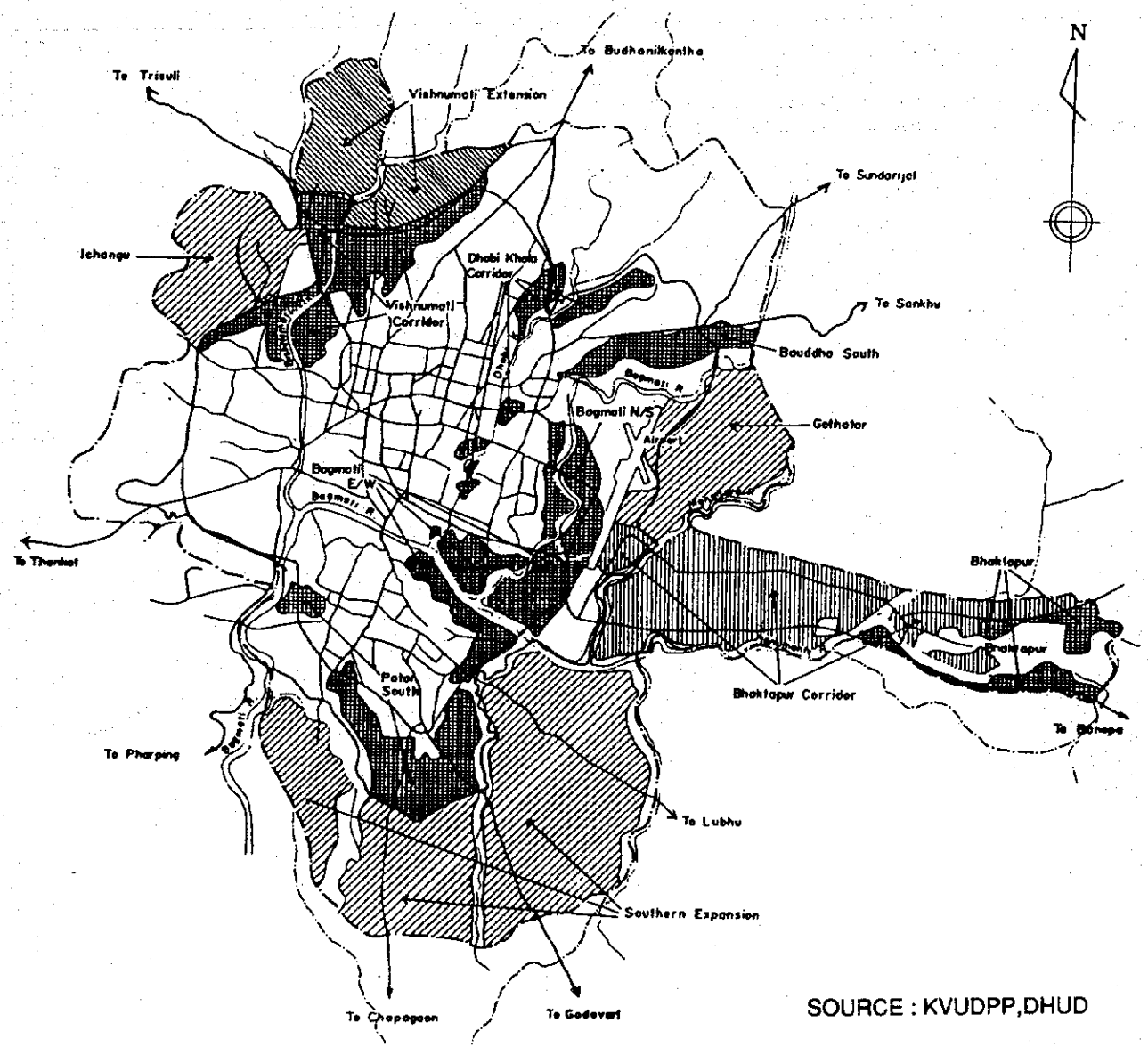


Source : Economic Survey, Fiscal Year 1992-93, Ministry of Finance, 1993.

Figure 2-3 Share of Foreign Aid Disbursement by Sources

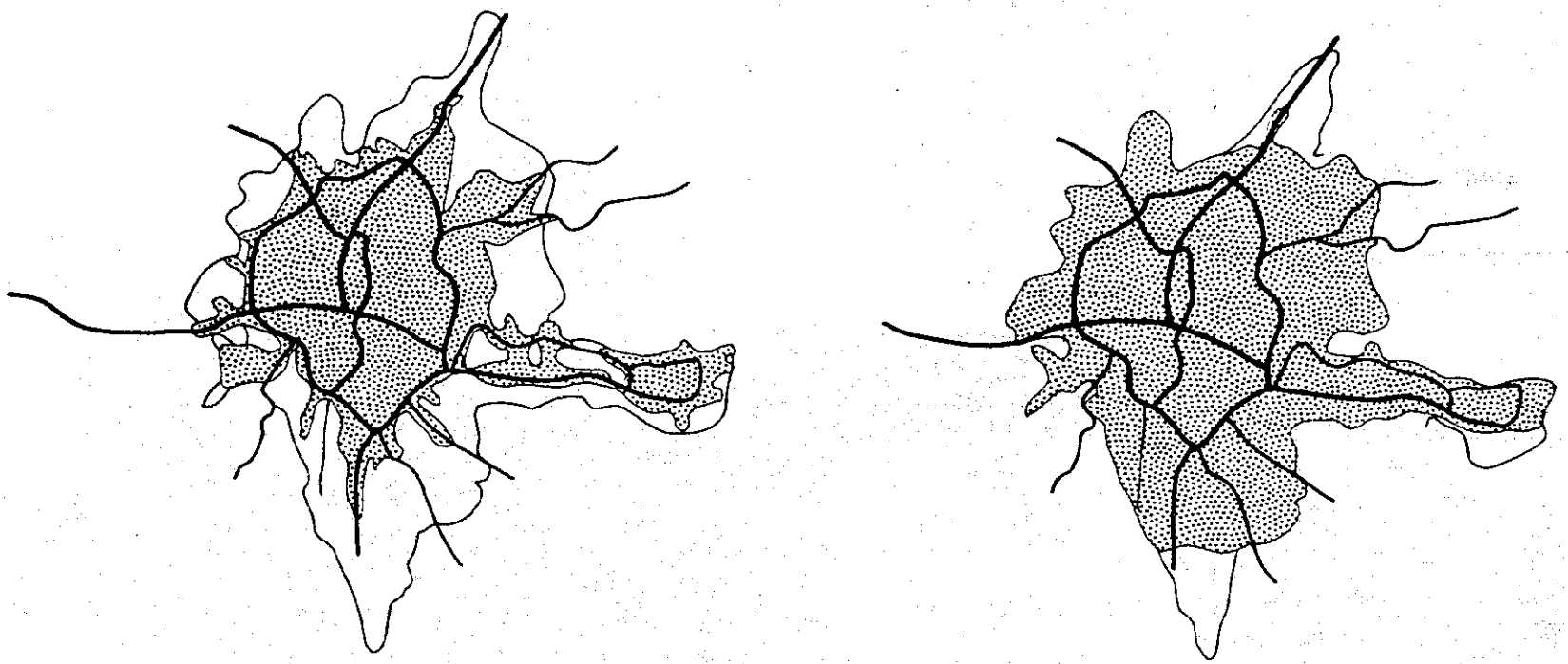


Sources : Geographical Distribution of Financial Flows to Developing Countries, OECD Paris, 1984,1987,1990 & 1993



SOURCE : KVUDPP,DHUD

Fig. 3 - 1 Urban Extension Area Proposed by KVUDPP, DHUD



1997

2015

Fig. 3 - 2 Extension of Urban Area

Source : Final Report on the Master Plan Study on Kathmandu Valley Urban Road Development
JICA, Depaertment of Road, HMGN; March, 1993

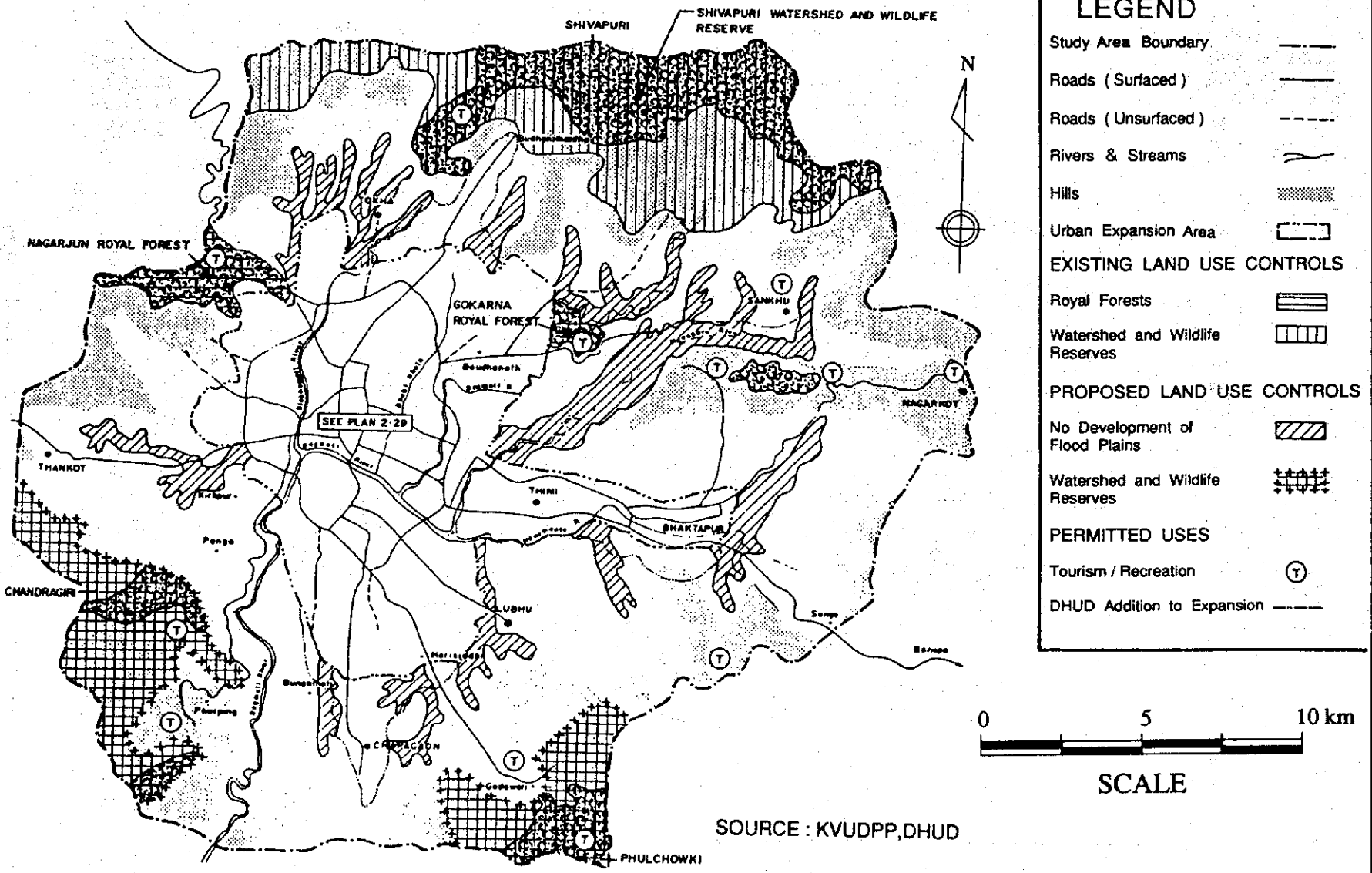


Fig. 3 - 3 Land Use Plan for Rural Development

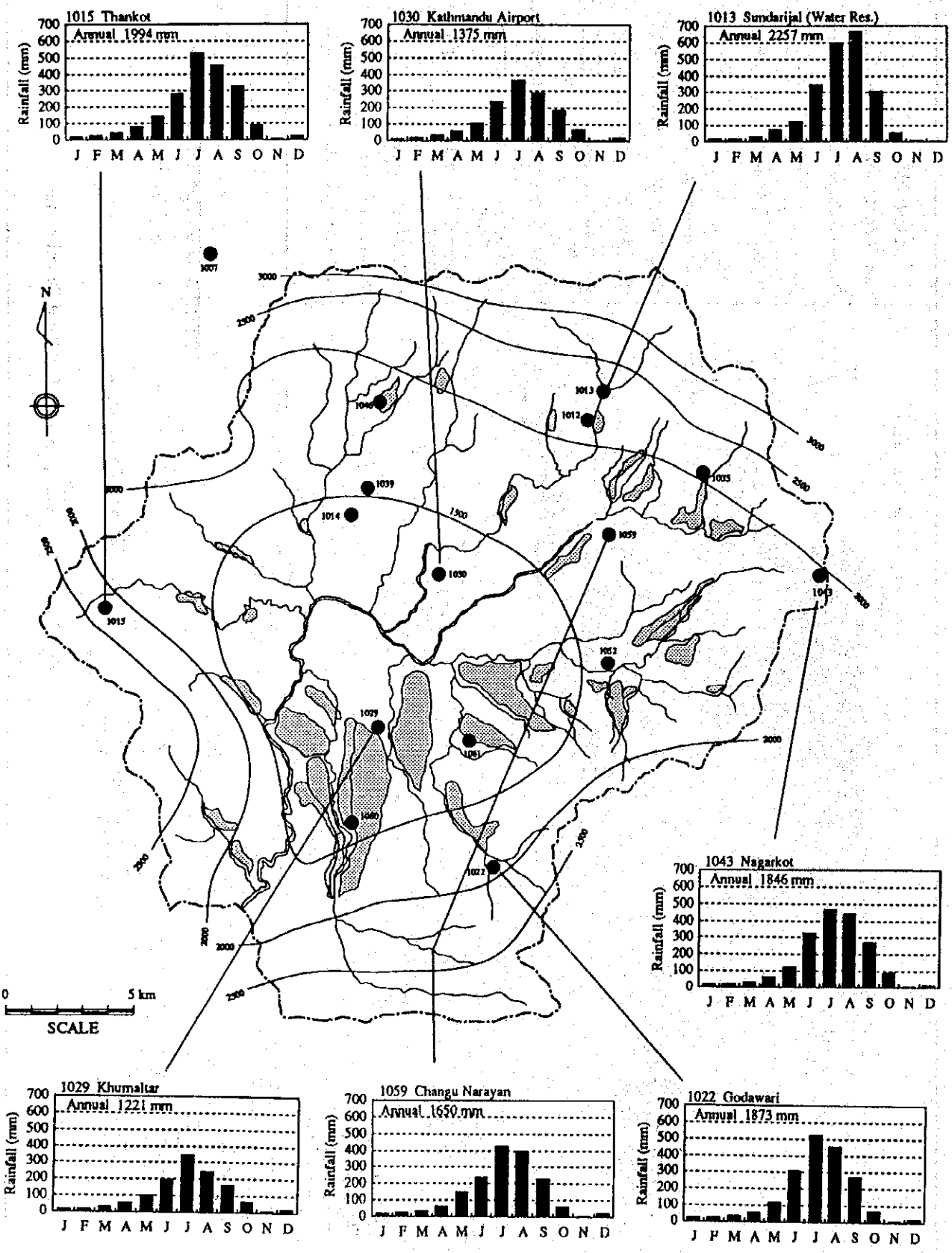
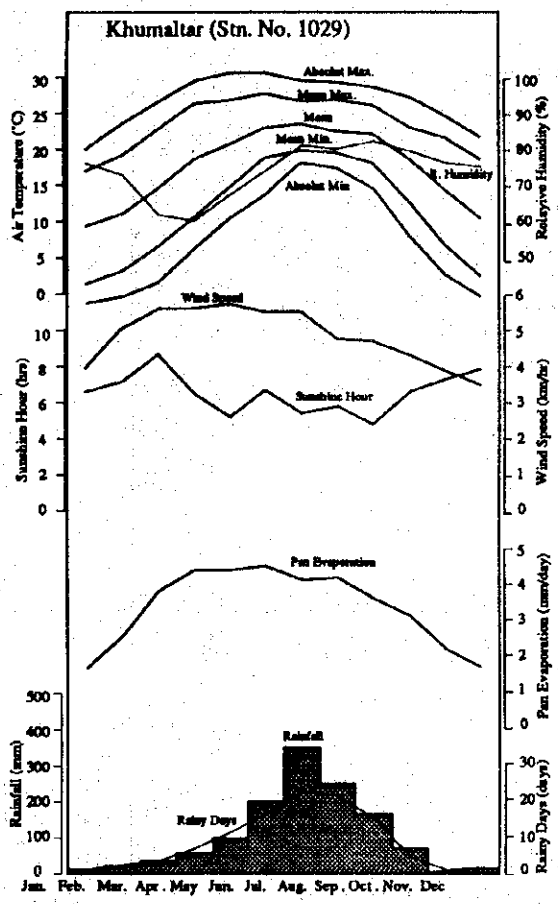
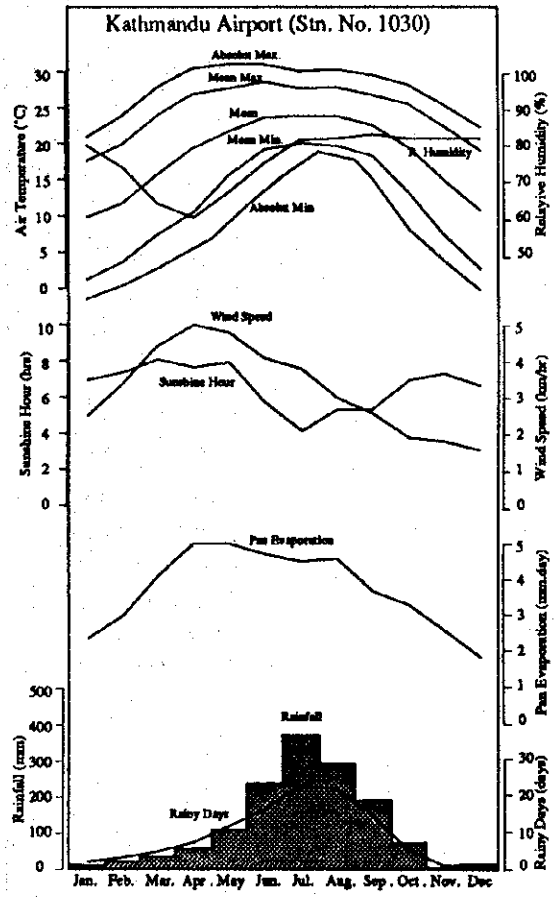


Fig. 3 - 4 Monthly Rainfall and Annual Isohyet





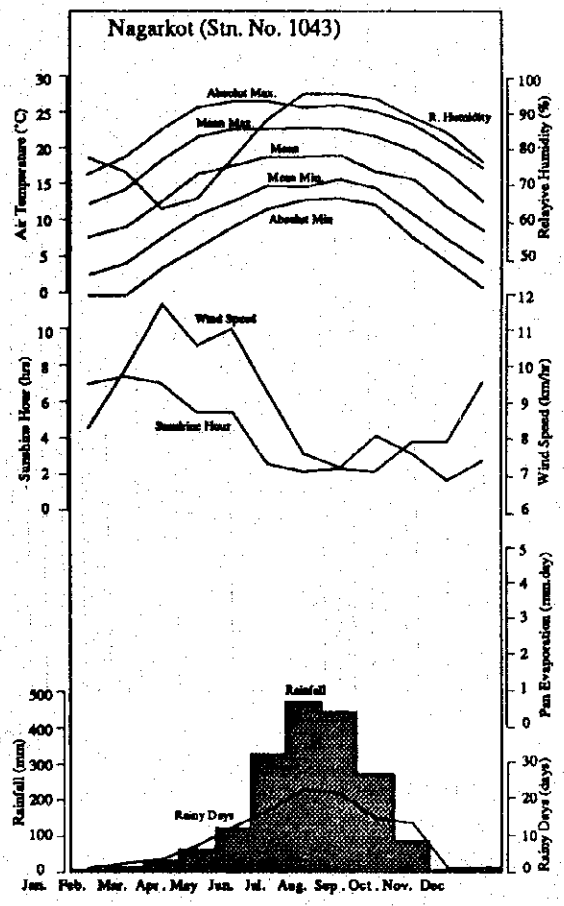


Fig. 3 - 5

Meteorological Pattern at Respective Stations

Peak Discharge of Annual Maximum Flood

Year	Stn. No. 505 Sundarijal (C.A = 17 km2)		Stn. No. 507 Mahankal (C.A = 13.7 km2)		Stn. No. 510 Shyamdado (C.A = 3.34 km2)		Stn. No. 530 Gauri Ghat (C.A = 67.8 km2)		Stn. No. 550 Cobhar (C.A = 585 km2)	
	Discharge (m3/sec)	Date	Discharge (m3/sec)	Date	Discharge (m3/sec)	Date	Discharge (m3/sec)	Date	Discharge (m3/sec)	Date
1962									287	Aug. 8
1963	17.30	Aug. 31	16.3	Aug. 18	4.19	Aug. 31			206	Sep. 1
1964	7.86	Aug. 30	9.5	Aug. 15	4.19	Jul. 29			251	Sep. 3
1965	16.00	Jul. 26	17.5	Jul. 26	9.97	Jul. 26	119.0	Aug. 19	395	Jul. 9
1966	33.10	Sep. 4	52.0	Aug. 24	10.80	Sep. 4	214.0	Aug. 24	634	Aug. 24
1967	31.10	Jul. 10	19.2	Jul. 10	19.50	Jul. 10	236.0	Jul. 10	680	Jul. 10
1968	26.00	Jun. 27	25.8	Jun. 27	6.73	Aug. 16	73.8	Aug. 15	497	Oct. 4
1969	6.00	Jul. 27	10.0	Jul. 22	3.73	Aug. 3	51.3	Aug. 11	431	Aug. 19
1970	41.00	Jul. 19	19.6	Jul. 28	13.20	Jun. 1	125.0	Jul. 20	582	Jul. 16
1971	9.52	Jul. 14	10.0	Jun. 10	7.54	Aug. 15	90.4	Jun. 12	617	Jun. 12
1972	7.28	Jul. 28							876	Jul. 28
1973	-	-							335	Jul. 25
1974	3.76	Sep. 2							350	Aug. 30
1975	18.20	Sep. 2							591	Aug. 3
1976	31.20	Jun. 8							245	Jun. 30
1977	16.20	Jul. 9							299	Jun. 20
1978	53.20	Aug. 25							407	Jul. 16
1979	3.26	Aug. 23							416	Aug. 21
1980	11.00	Aug. 22							254	Jul. 31
1981	16.20	Sep. 2								
1982	6.16	Aug. 28								
1983	20.80	Aug. 1								
1984	4.76	Aug. 26								
1985	7.00	Jun. 26								
1986										
Max.	53.20		52.0		19.50		236.0		876	
Probable Flood										
10 year	38.54		43.5		18.10		261.2		729	
50 year	58.62		65.6		26.75		383.4		1005	

Sources: DoHM and Ref.9

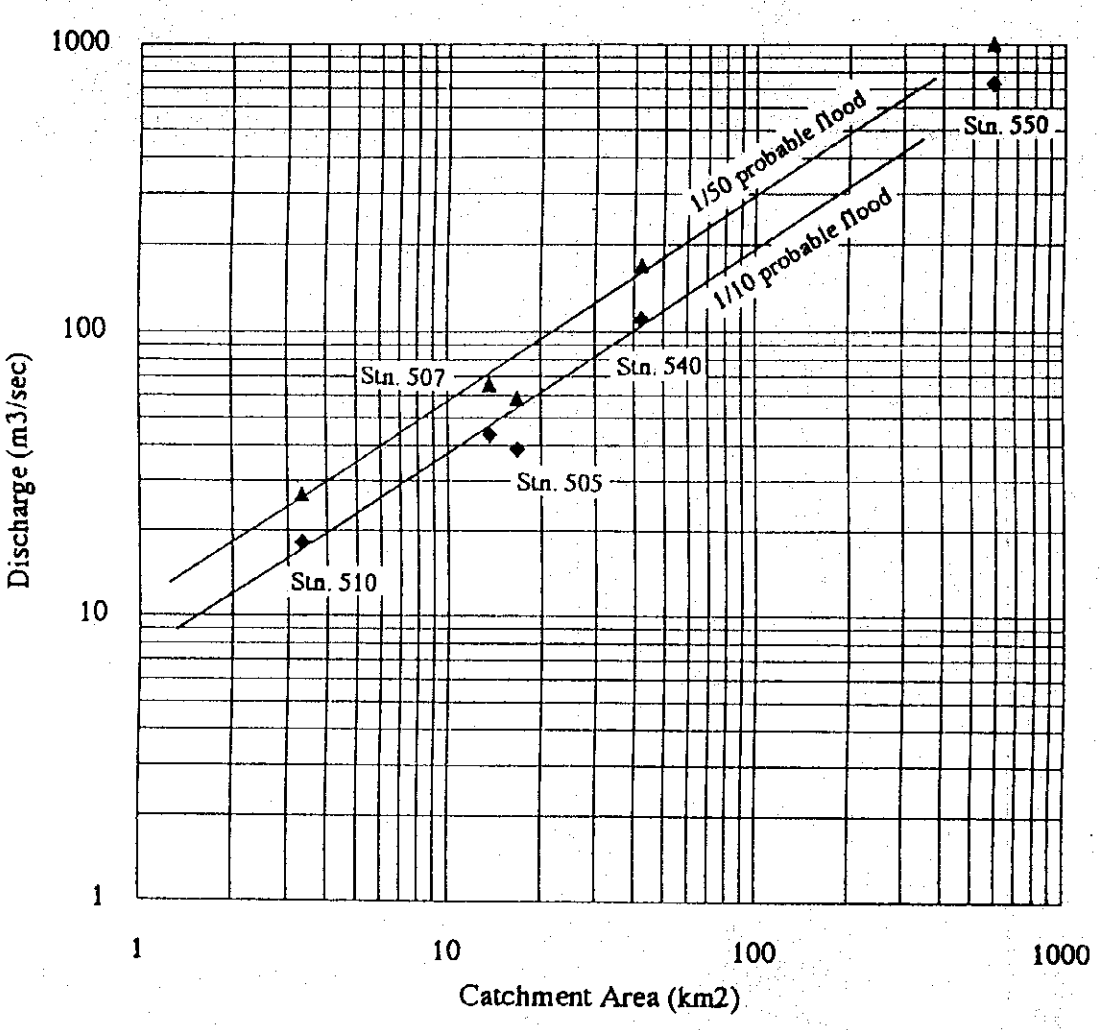


Fig. 3 - 6 Annual Maximum Flood and Probable Flood

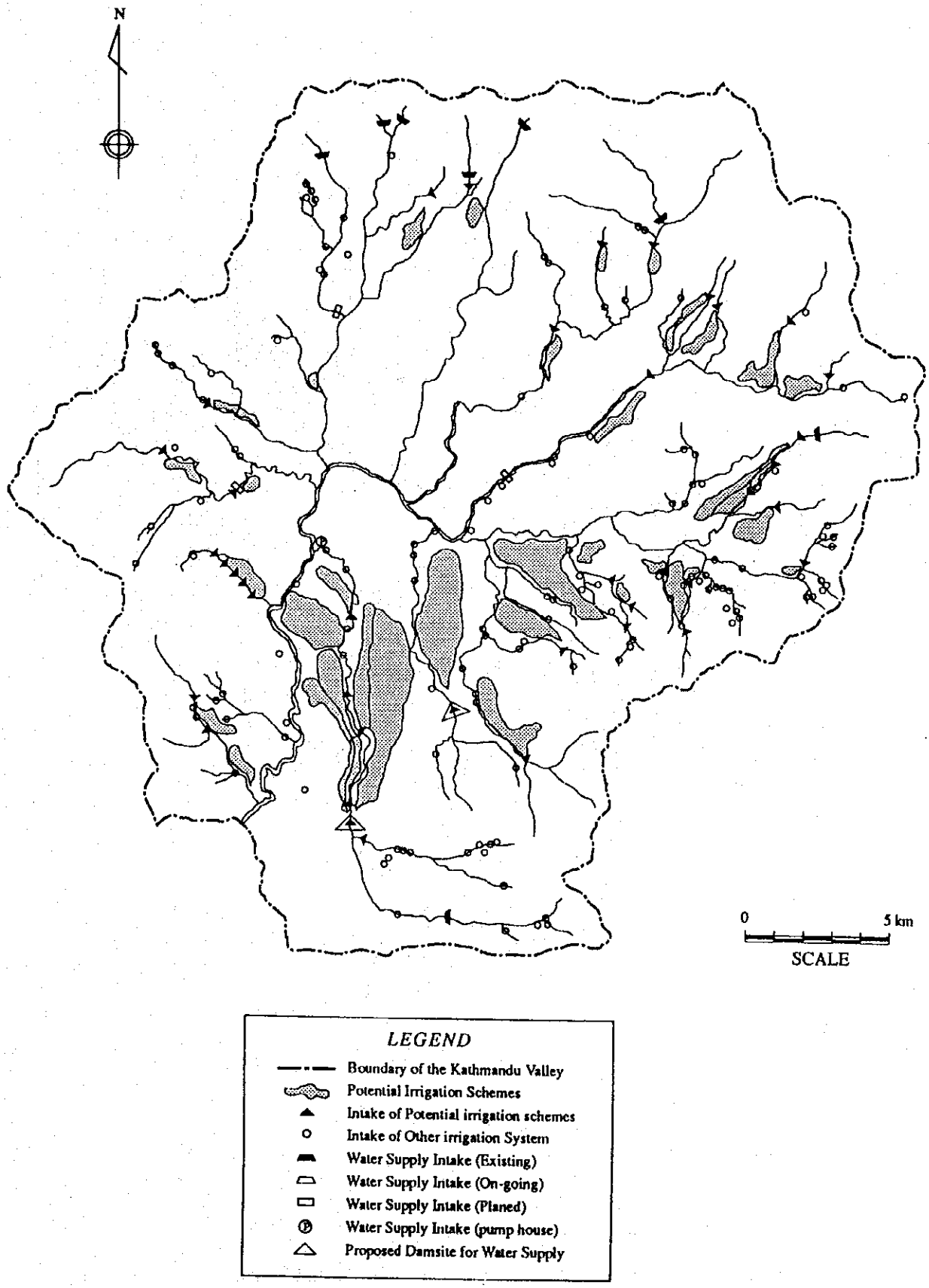


Fig. 3 - 7 Water Use in the Kathmandu Valley

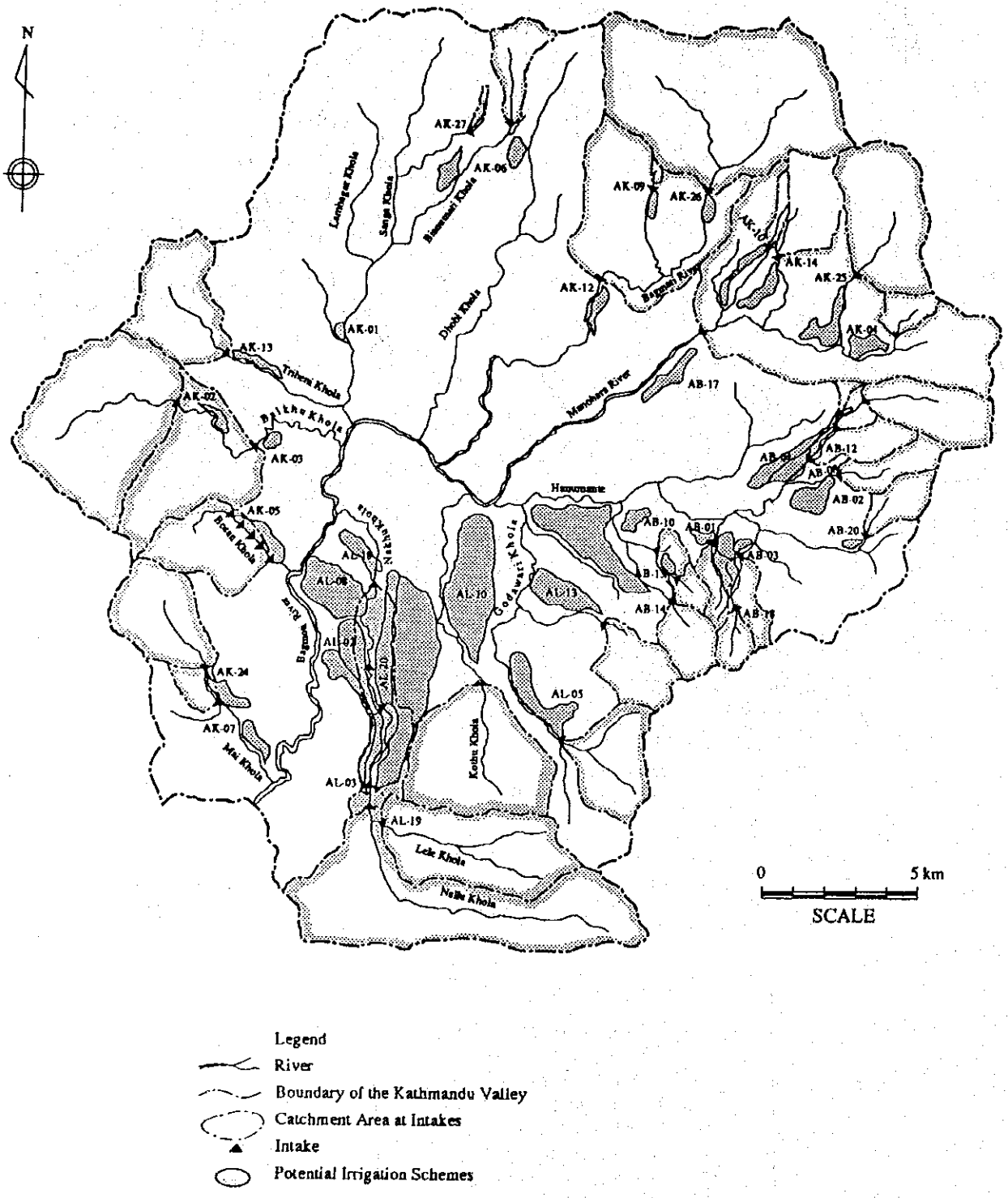


Fig. 3 - 8 Catchment Areas at Intakes of Potential Schemes

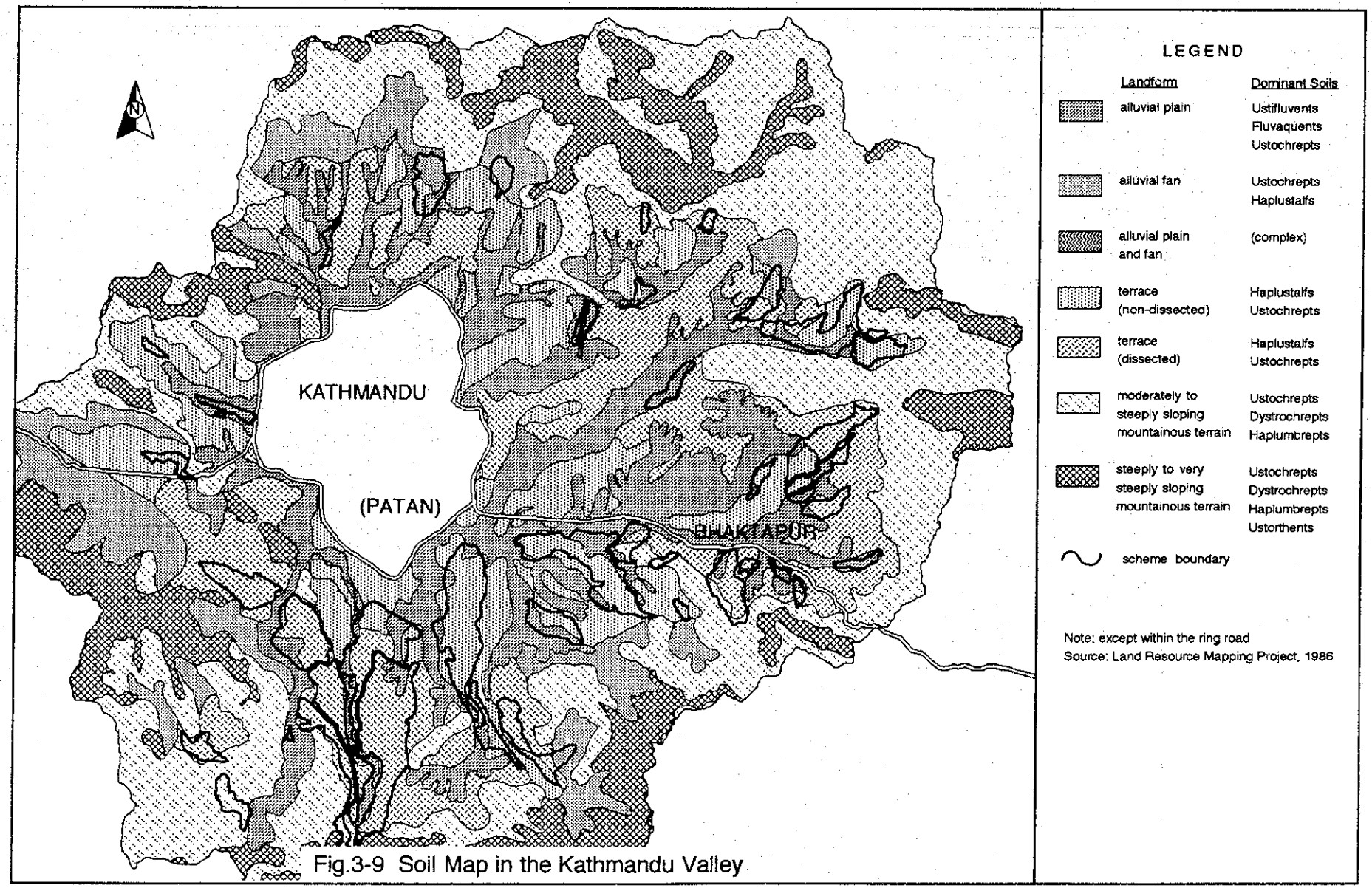


Fig.3-9 Soil Map in the Kathmandu Valley

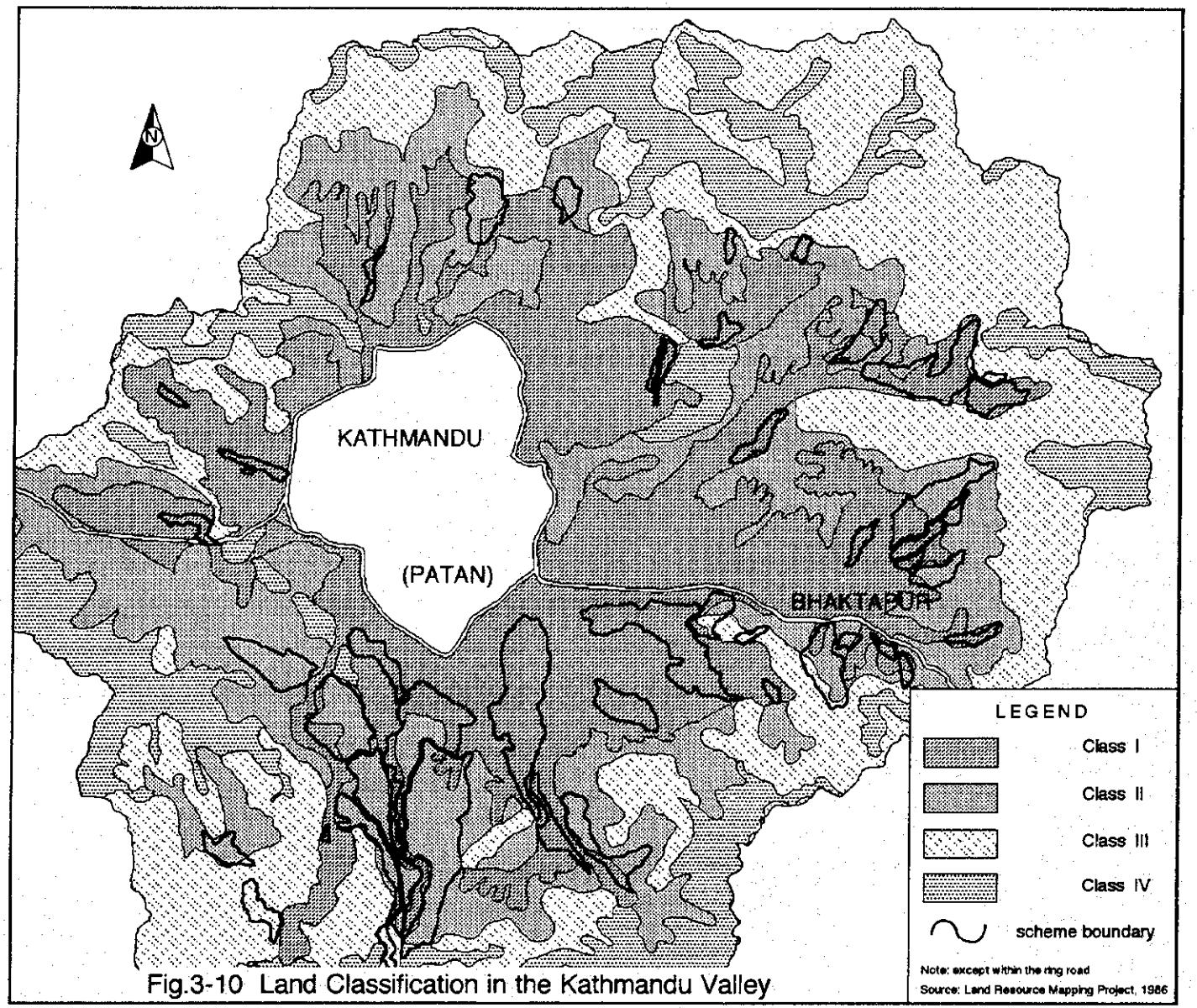


Fig.3-10 Land Classification in the Kathmandu Valley

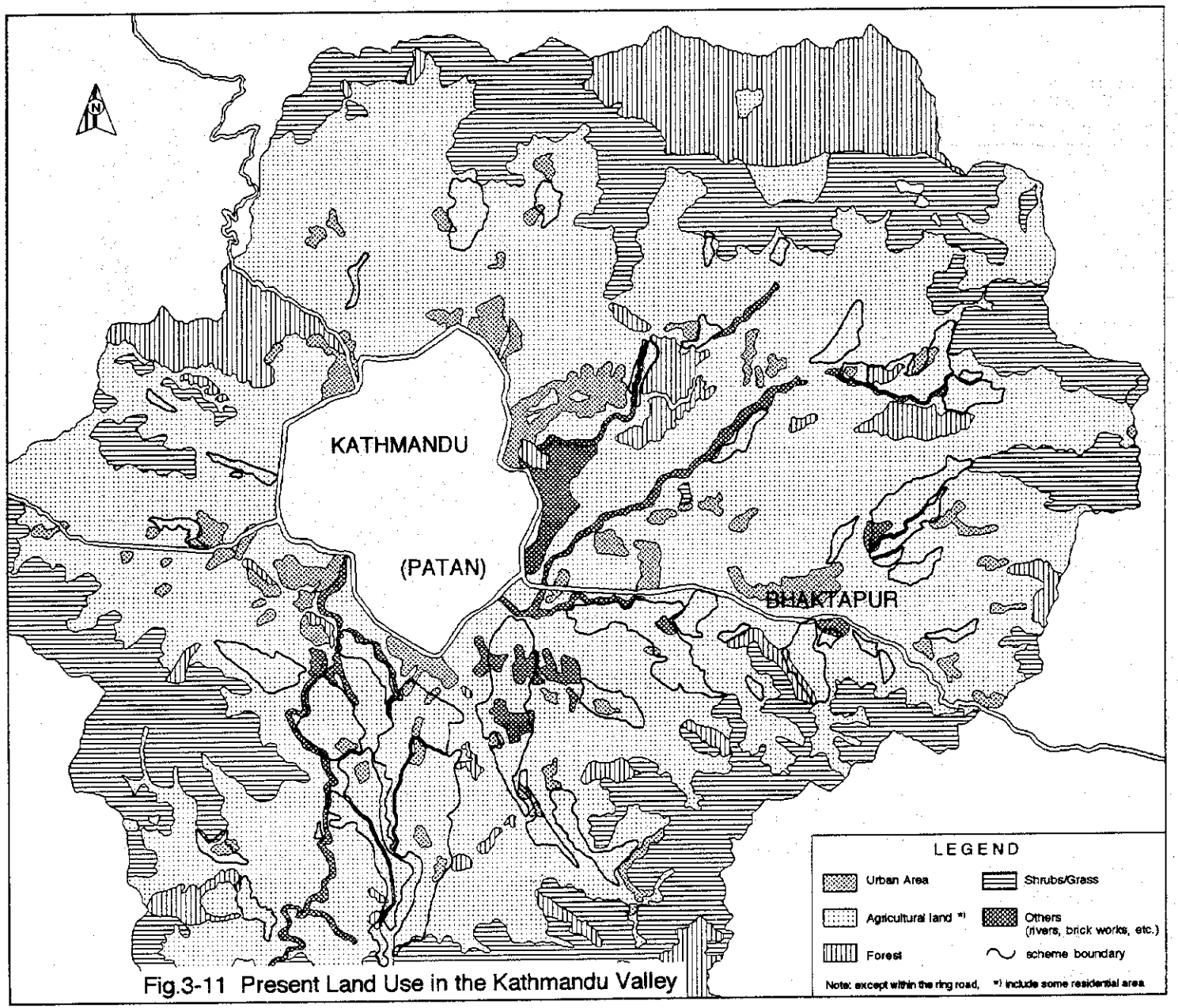


Fig.3-11 Present Land Use in the Kathmandu Valley

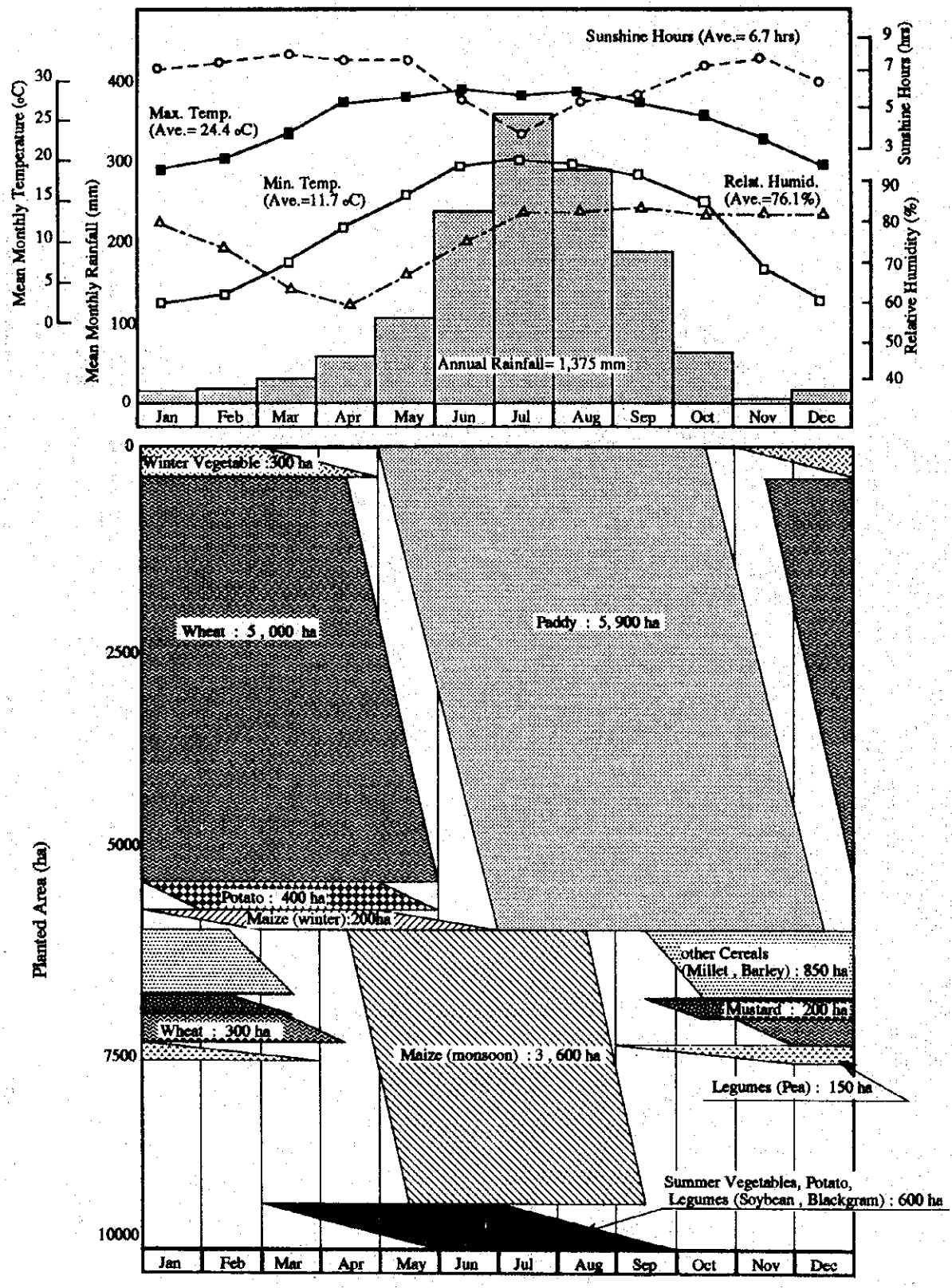


Fig. 3 - 12 Present Cropping Pattern in the Study Area

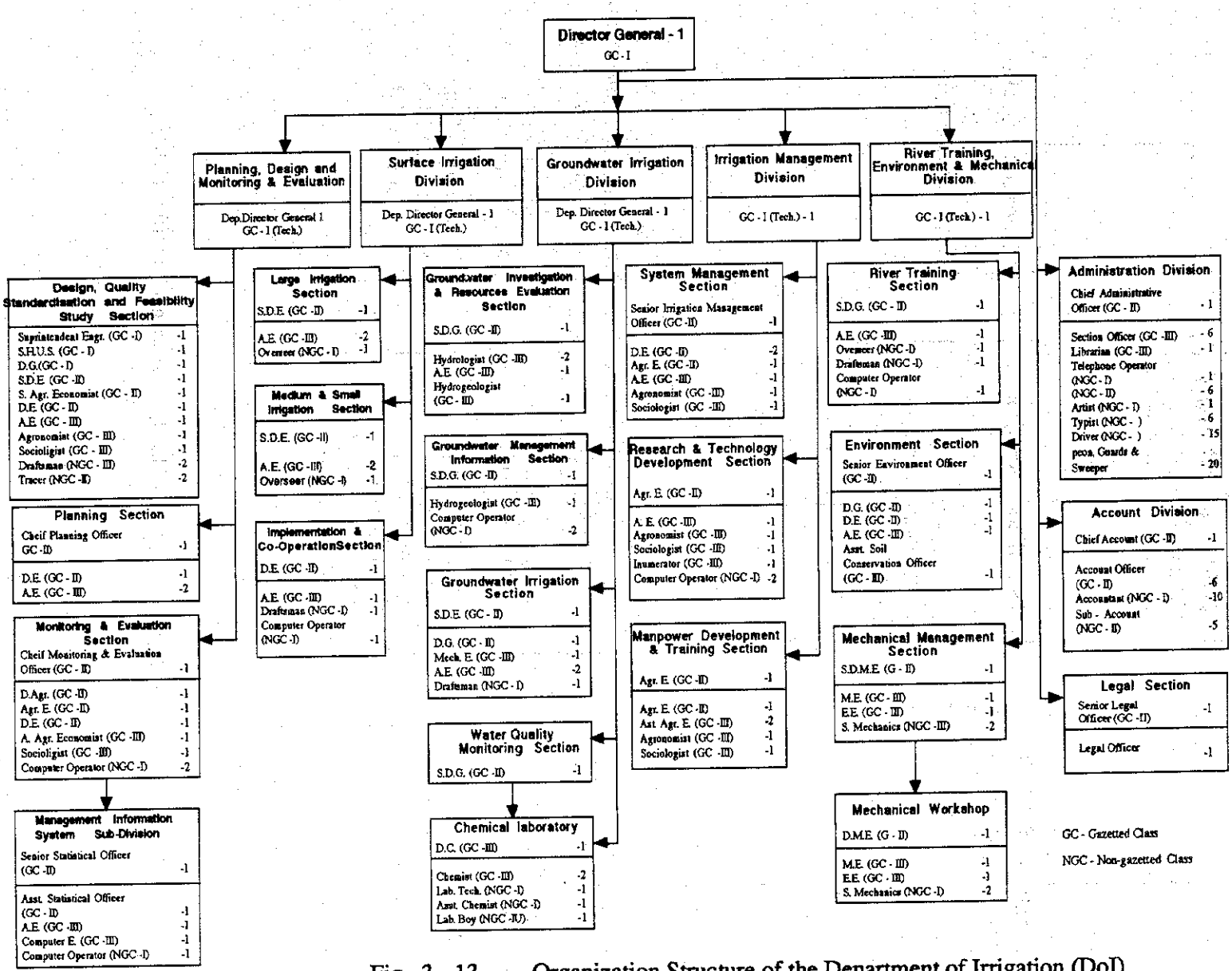


Fig. 3 - 13 Organization Structure of the Department of Irrigation (DoI)

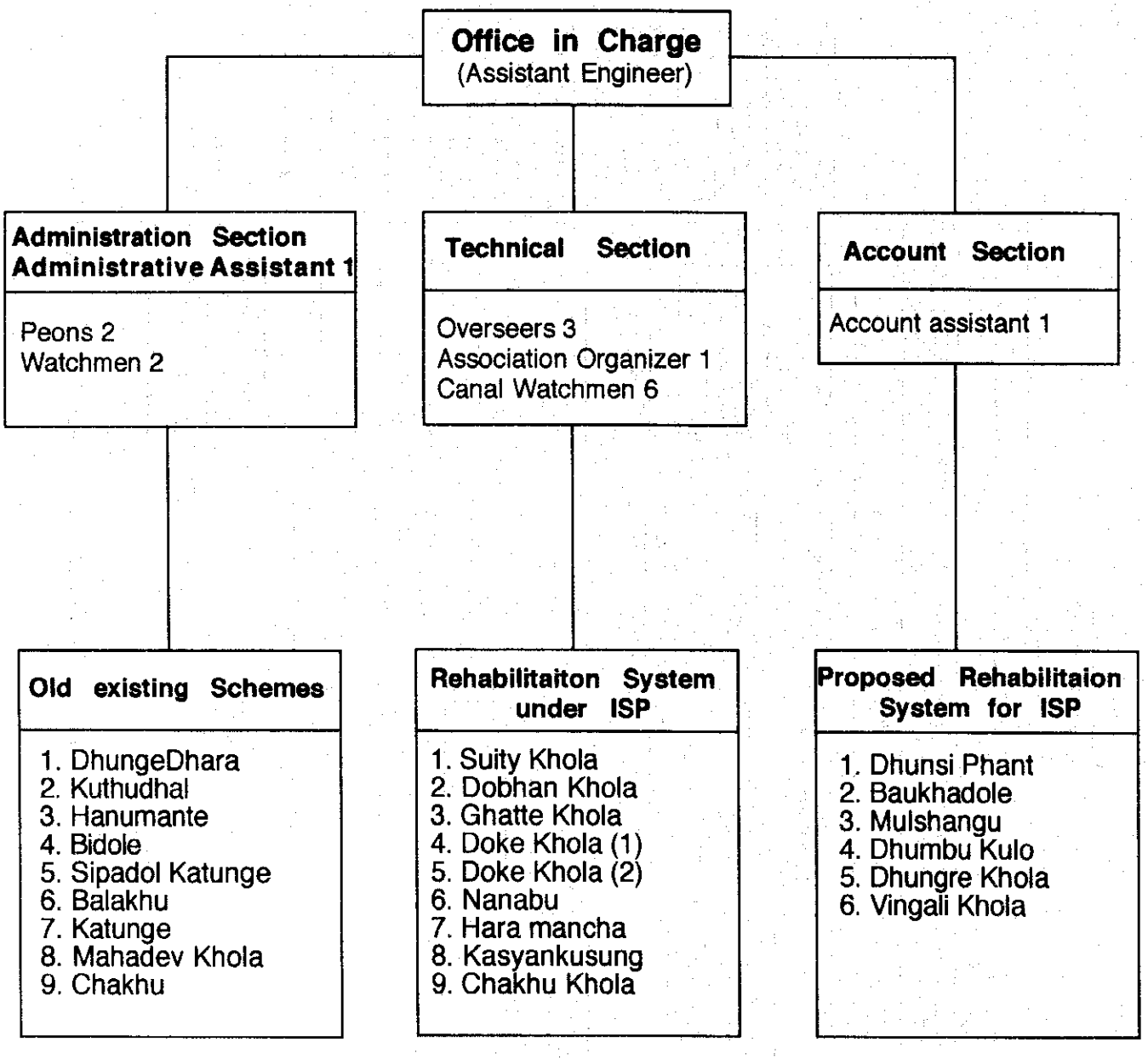


Fig. 3 - 14 Organization Structure of the District Irrigation Office (DIO)

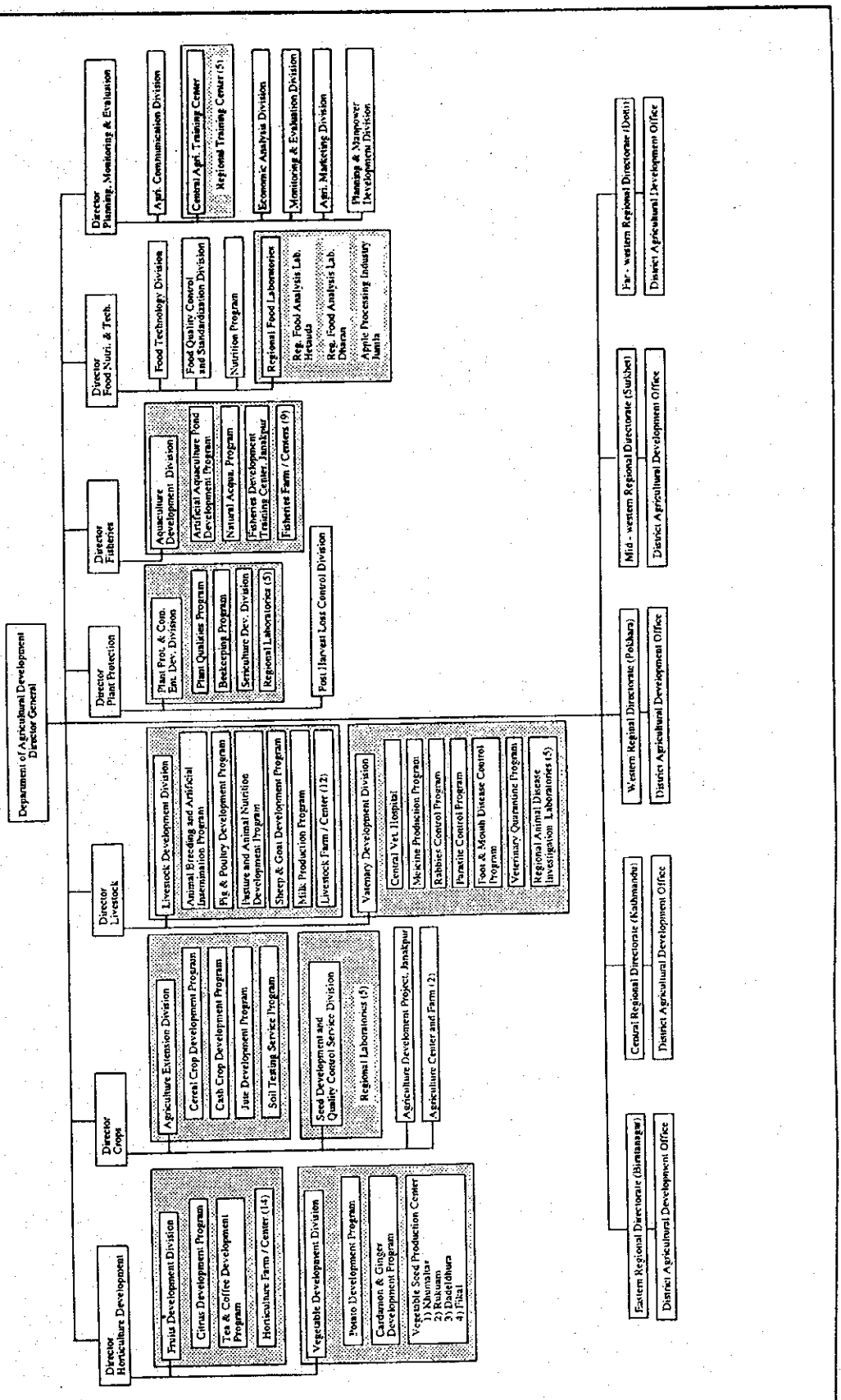


Figure 3 - 15
Organization Structure of the Department of Agricultural Development (DoAD)

HIS MAJESTY'S GOVERNMENT OF NEPAL

THE STUDY ON
THE REHABILITATION OF GOVERNMENT DEVELOPED IRRIGATION SCHEMES IN THE KATHMANDU VALLEY

JAPAN INTERNAIONAL COOPERATION AGENCY

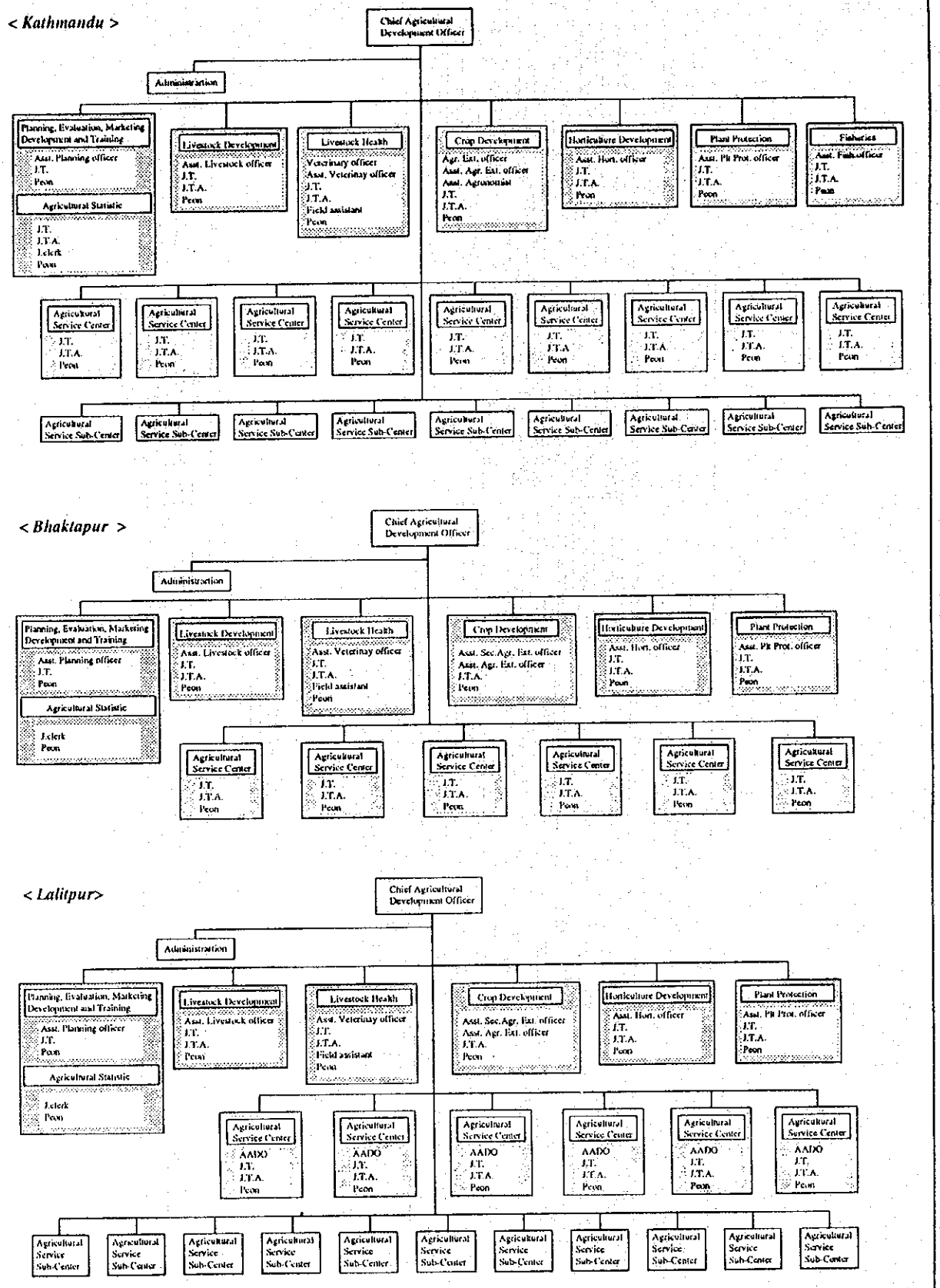
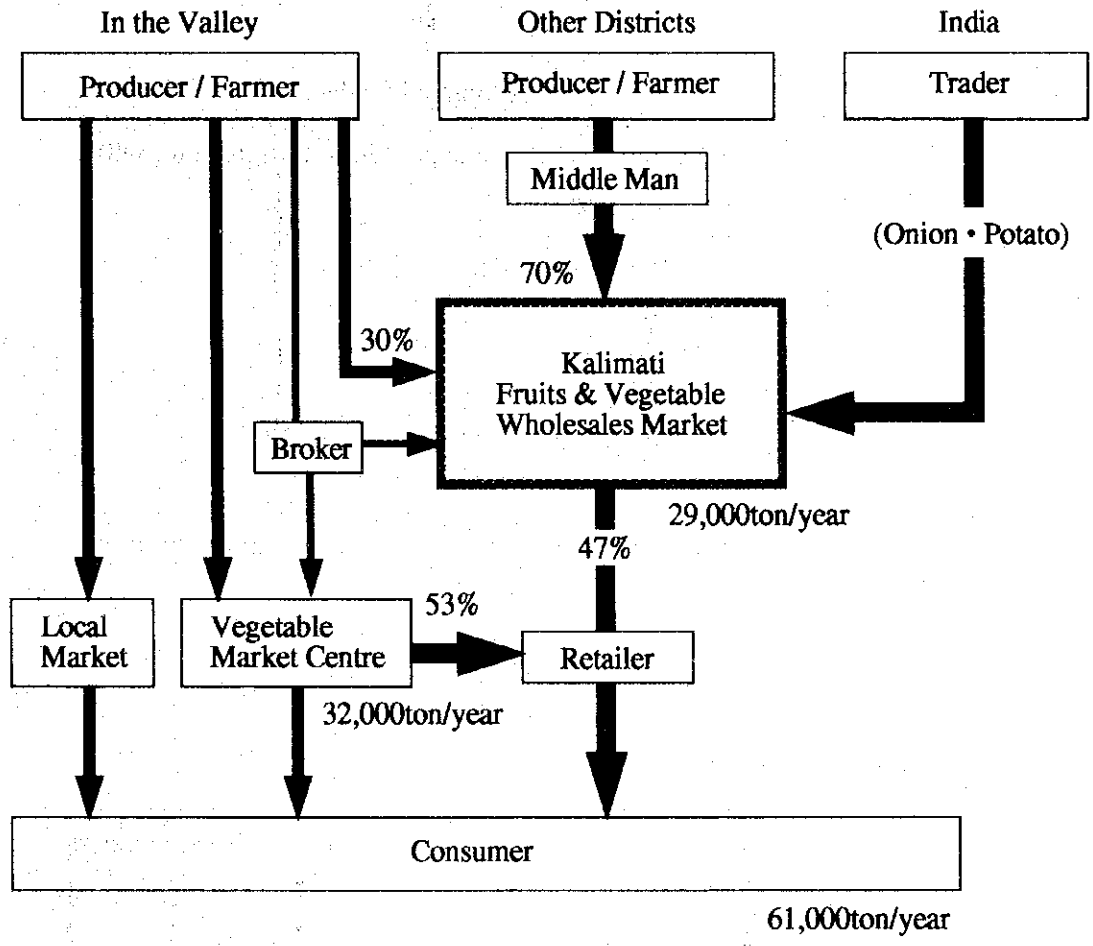


Figure 3 - 16
Organization Structure of the District Agricultural Development Office (DADO)
(Kathmandu , Lalitpur , Bhaktapur District)

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

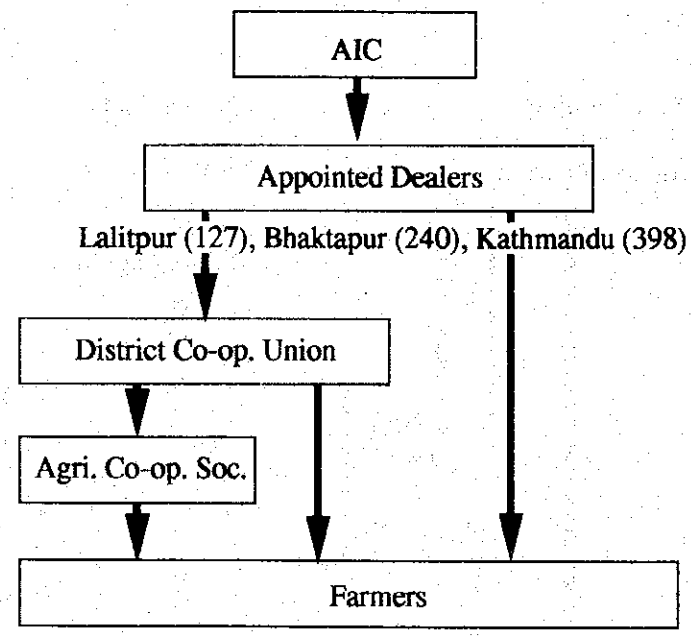
Fig. 3 - 17 Marketing Channels for Vegetables



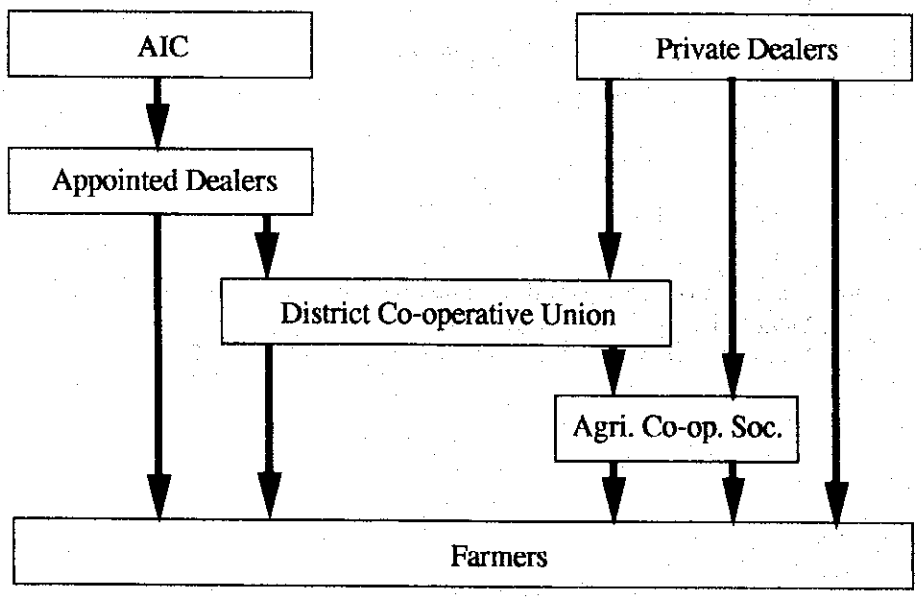
Note: other Districts are Dhading, Nuwakot, Makwanpur, and Kavre Districts in hilly region, Dhanukha, Sarlahi and Bara Districts in Terai region.
India is mainly Motihari, Ranchi, Sitamadi and Siligudi Districts.

Fig. 3 - 18 Major Supply Channels for Agricultural Input

A : For Chemical Fertilizer, Seed and Agricultural Tools



B : For Agro Chemicals



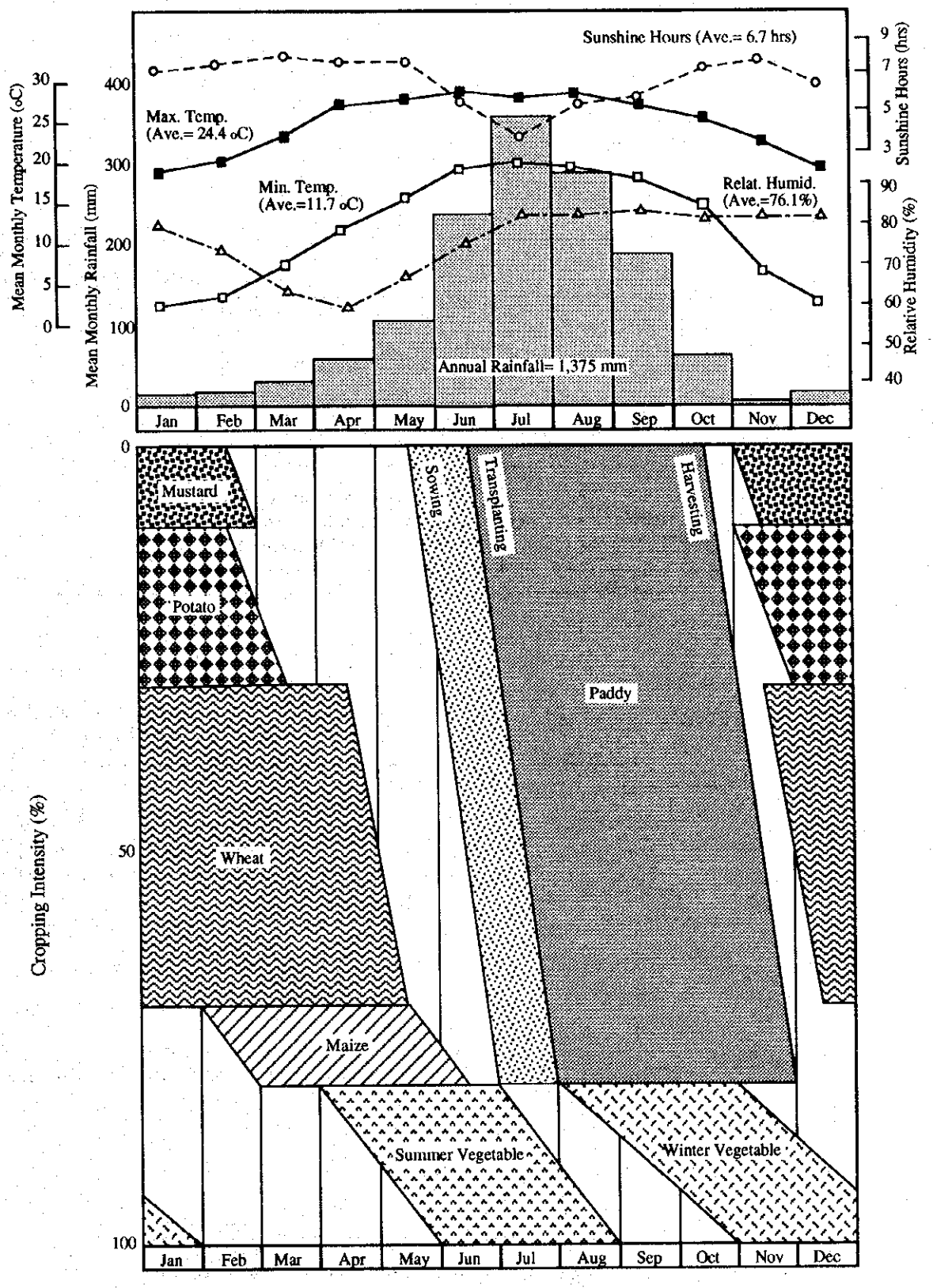


Fig. 5 - 1 Proposed Cropping Pattern

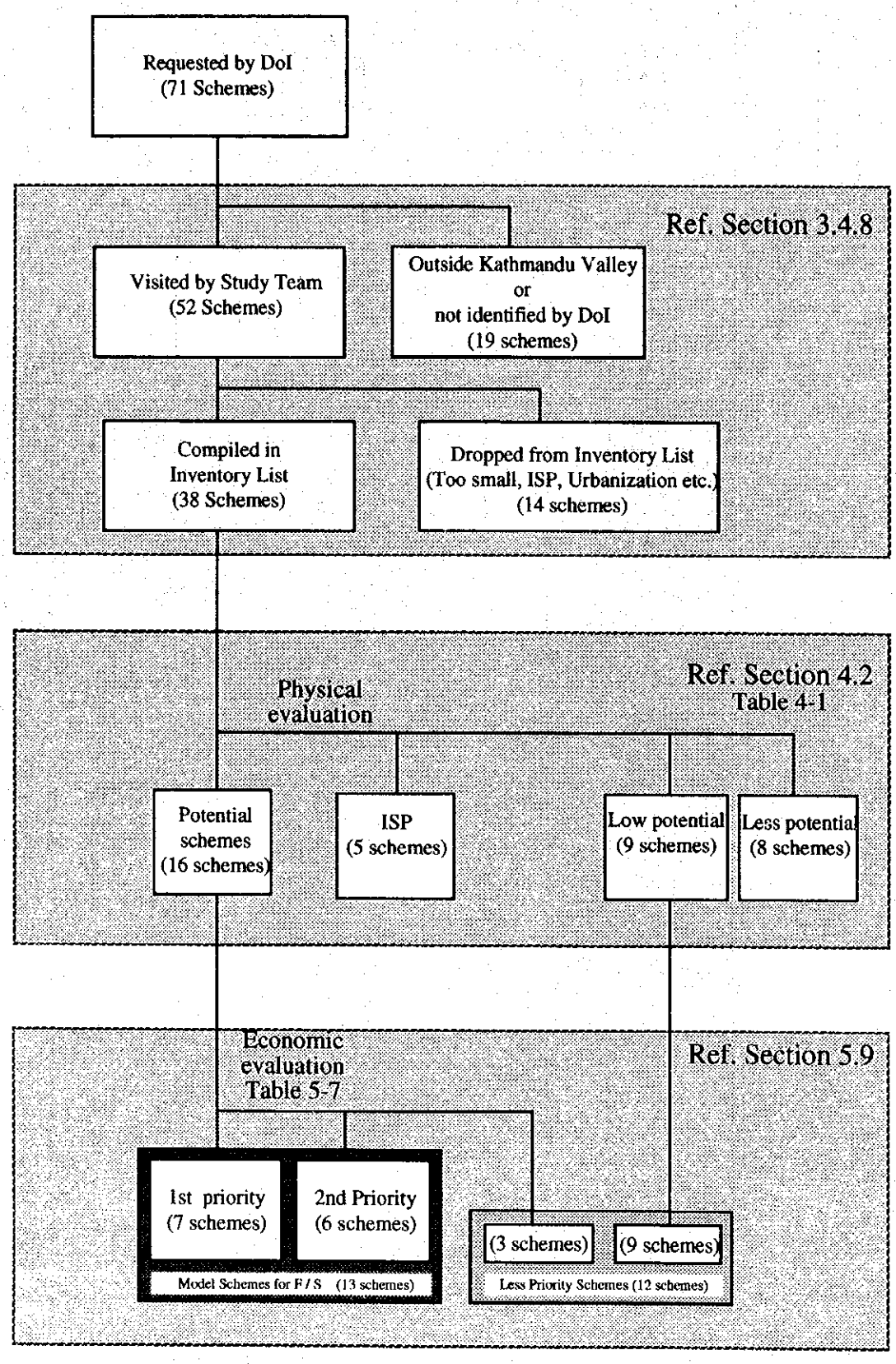


Fig. 5 - 2 Selection Procedure for Priority Projects