

## **ANNEXES**

- ANNEX 1 Organization Charts of IMD, GWID and IDD
- ANNEX 2 Organization Chart of DOA
- ANNEX 3 Summary Tables of Questionnaire Answers (JMIS)
- ANNEX 4 Summary Tables of Questionnaire Answers (IDD/IDSD)
- ANNEX 5 Summary Tables of Questionnaire Answers (GWID)
- ANNEX 6 Training Materials of IMD
- ANNEX 7 List of IWRMP Irrigation Sub-projects
- ANNEX 8 IWRMP Irrigation Sub-projects' Salient Features
- ANNEX 9 List of CMIASP Irrigation Sub-projects
- ANNEX 10 Salient Features of CMIASP-AF (Batch I) Irrigation Sub-projects in Terai Region
- ANNEX 11 Questionnaire Answers (JMIS) (Digital file)
- ANNEX 12 Questionnaire Answers (IDD/IDSD) (Digital file)
- ANNEX 13 Questionnaire Answers (GWID) (Digital file)

**ANNEX 1 Organization Charts of IMD, GWID and IDD**



## **Organization Charts of Various Governmental Organizations related to Irrigation in Nepal**

**1. Organization Charts of Irrigation Management Directorate (IMD)**

**2. Organization Charts of Ground Water Irrigation Directorate (GWID)**

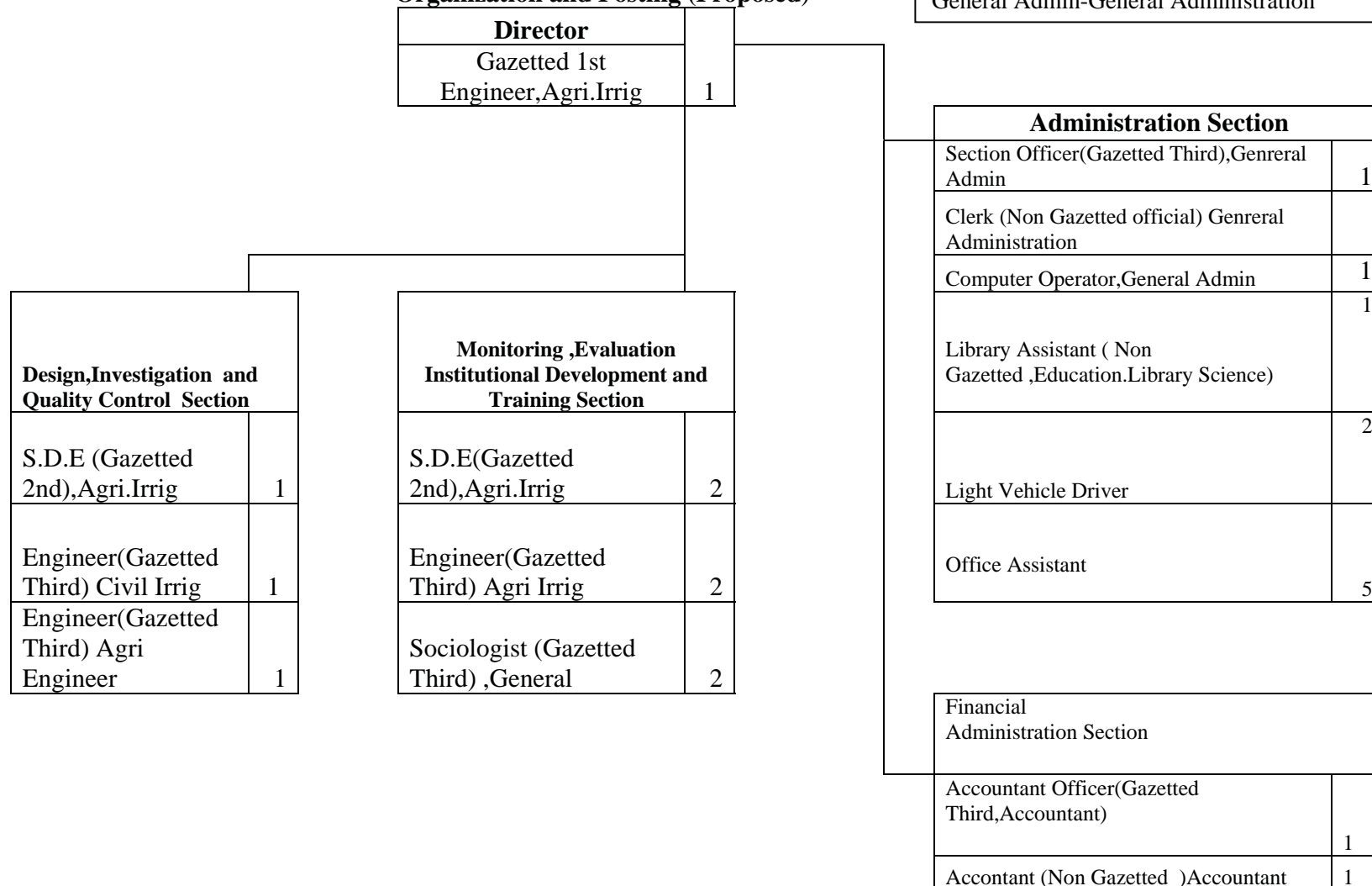
**3. Organization Charts of Irrigation Development Division (IDD)**

## **1. Organization Charts of Irrigation Management Directorate (IMD)**

- 1) Chitwan**
- 2) Kankai Irrigation Management Division, Jhapa  
Banganaga Sichai Management Division, Kapilbastu  
Praganna Badkapath Irrigation Management Division, Dang**
- 3) Sunsari - Morang, Chanda Mohana Irrigation Management  
Division, Morang**
- 4) Koshi Pump, Chandra Nahar Irrigation Management Division,  
Saptari**
- 5) Kamala Hardinath Irrigation Management Division, Dhanusha**
- 6) Bagmati, Manushmara Jhanj Irrigation Management Division,  
Sarlah**
- 7) Narayani Irrigation Management Division, Birgunj, Parsa**
- 8) Narayani Lift, Khageri, Irrigation Management Division, Chitwan**
- 9) Gandak Irrigation Management Division, Nawalparasi**
- 10) Bhairawa Lumbini Groundwater Irrigation Management Division,  
Rupandehi**
- 11) Babai, Rajapur Irrigation Management Division, Bardiya**
- 12) Mahakali Patharaiya Mohana Irrigation Management Division,  
Kanchanpur**

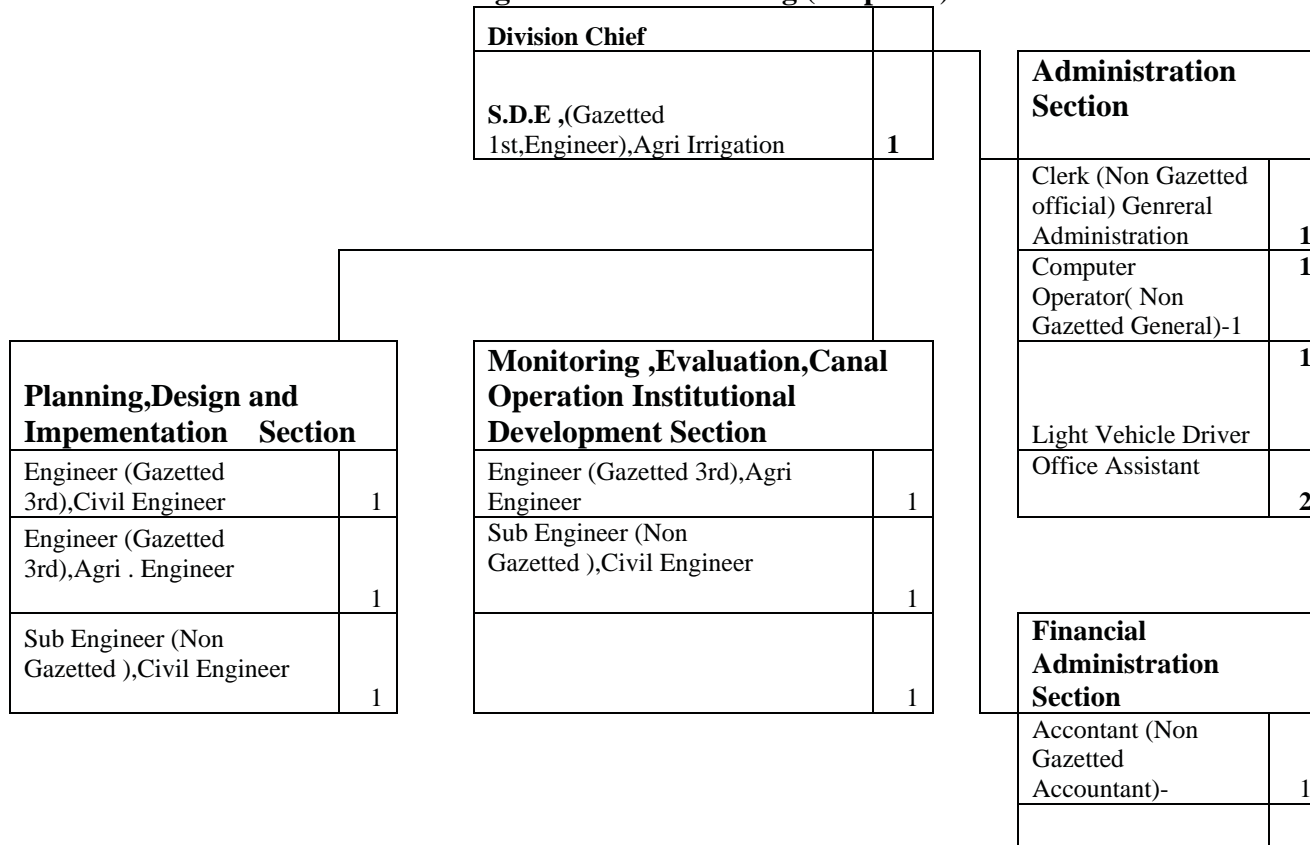
**Government of Nepal  
Minsirty of Irrigation  
Department of Irrigation  
Irrigation Management Directorate,Chitwan  
Organization and Posting (Proposed)**

Note: S.D.E - Senior Divisional Engineer  
Agri Irrig - Agricultural Engineering Irrigation Group  
Civil Irrig-Civil Engineering Irrigation Group  
General Admin-General Administration



Total Posting - 22

**Government of Nepal  
Minsirty of Irrigation  
Department of Irrigation  
Irrigation Management Directorate  
Kankai Irrigation Management Division,Jhapa  
Banganaga Sichai Management Division,Kapilbastu and  
Praganna Badkpathh Irrigation Management Division,Dang  
Organization and Posting (Proposed)**



Total Posting - 13  
Total of 3 division – 39

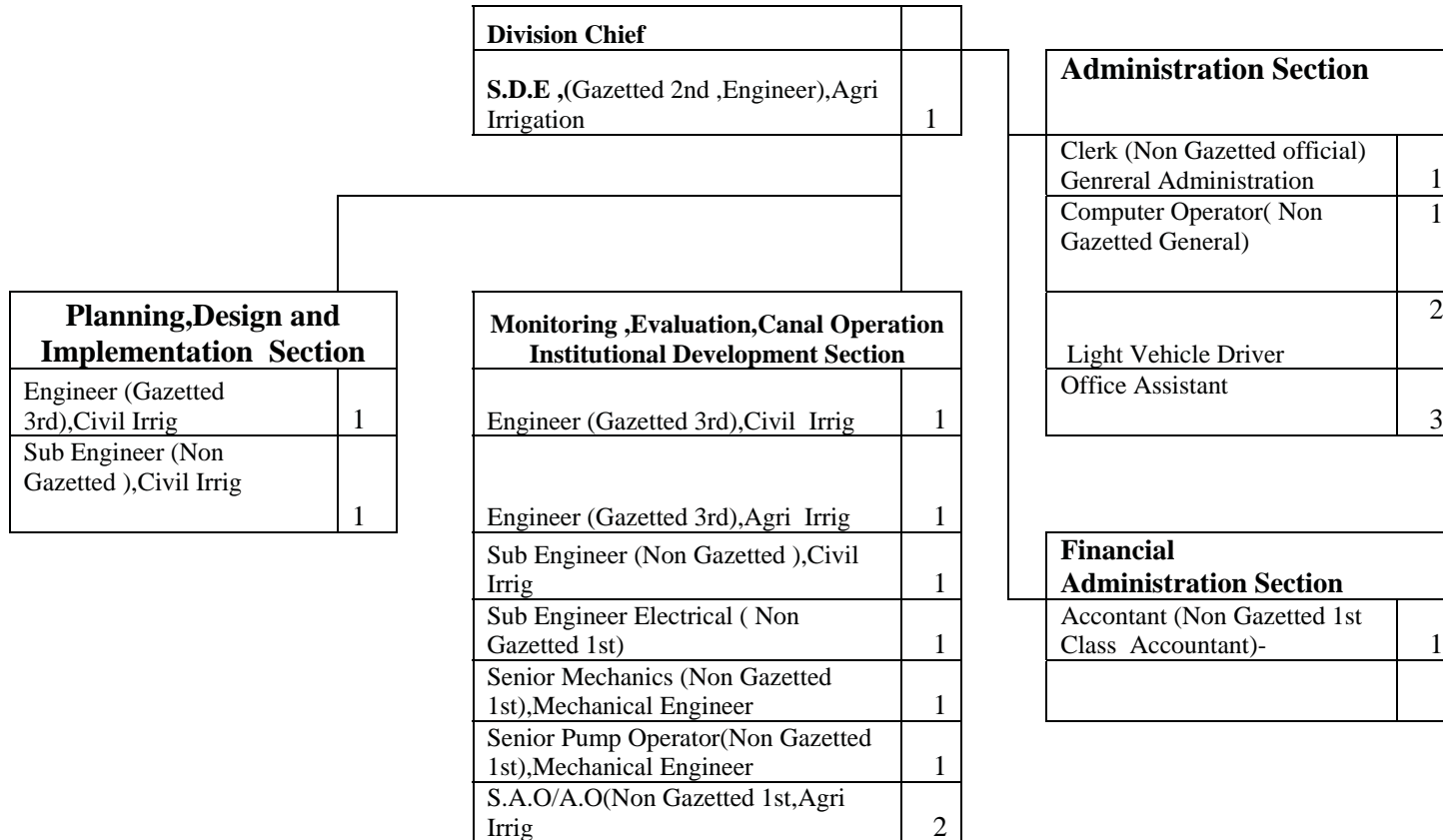
**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Sunsari - Morang,Chanda Mohana Irrigation Management Division,Morang**  
**Organization and Posting (Proposed)**

	<b>Division Chief</b>		
	S.D.E ,(Gazetted 2nd ,Engineer),Agri Irrigation	1	
			<b>Administration Section</b>
			Clerk (Non Gazetted official) Genrerel Administration
			1
			Computer Operator( Non Gazetted General)
			1
			4
			Light Vehicle Driver
			Office Assistant
			3
			<b>Financial Administration Section</b>
			Accountant (Non Gazetted Accountant)-
			1
<b>Planning,Design and implementation Section</b>			
Engineer (Gazetted 3rd),Civil Engineer	2		
Engineer (Gazetted 3rd),Agri . Engineer	1		
Sub Engineer (Non Gazetted ),Civil Engineer	4		
			<b>Monitoring ,Evaluation,Canal Operation Institutional Development Section</b>
	Engineer (Gazetted 3rd),Civil Engineer	1	
	Engineer (Gazetted 3rd),Agri Engineer	1	
	Electrical Engineer (Gazetted 3rd)	1	
	Sub Engineer Mechanical ( Non Gazetted 1st)	1	
	Heavy Equipment Operator (Non gazetted 1st)	1	
	Heavy Equipment Operator (Non gazetted 2nd)	1	
	Electrician (Non Gazetted 2nd),Enginner	1	
	Mechanics (Non Gazetted 2nd),Mechanical Engineer	1	
	Sub Engineer(Non Gazetted 1st),Civil Engineer	1	
	A.O(Non gazetted Second,Engineer,Agri Irr.	2	

Total Posting - 29



**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Koshi Pump,Chandra Nahar Irrigation Management Division,Saptari**  
**Organization and Posting (Proposed)**

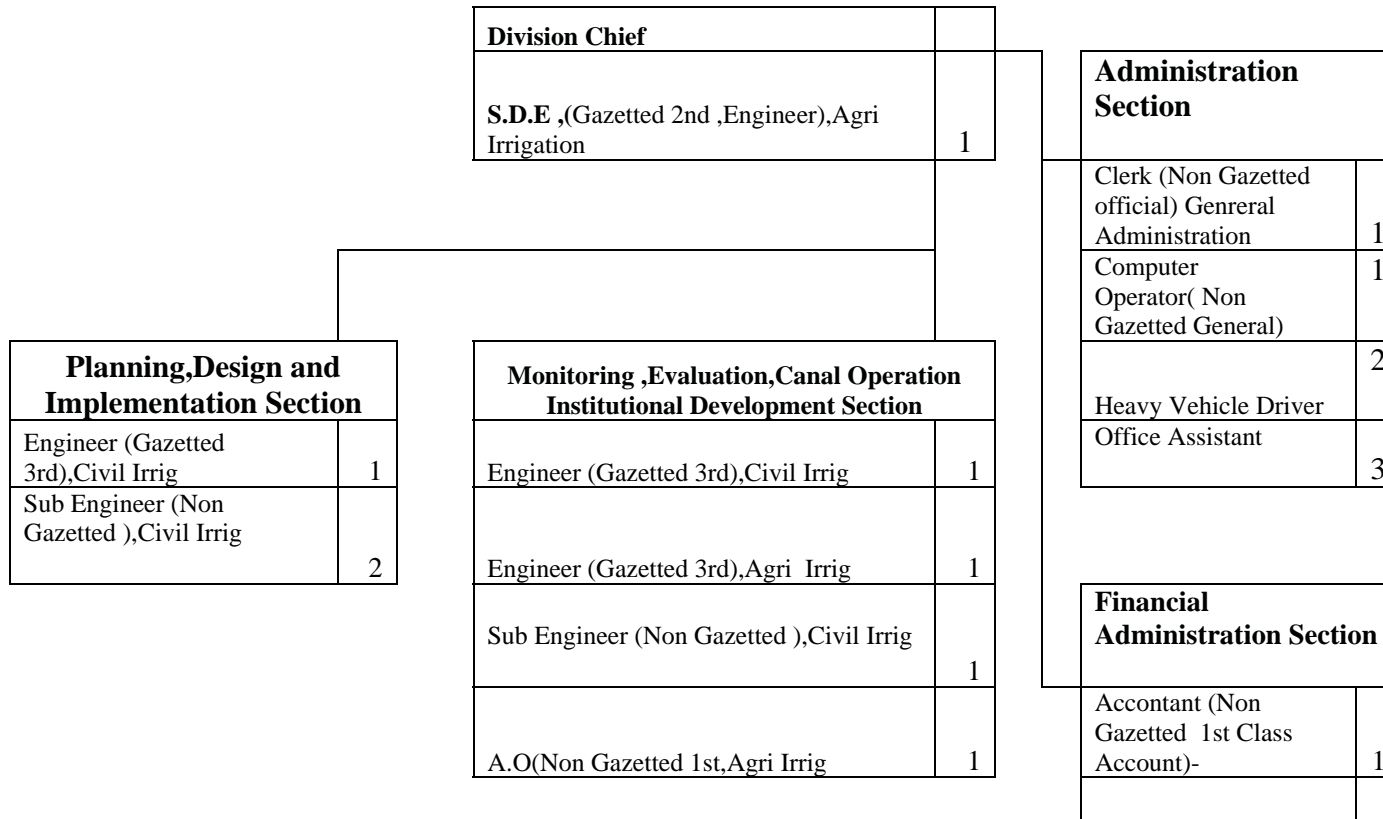


Total Posting - 19

Note: SAO-Senior Association Organization

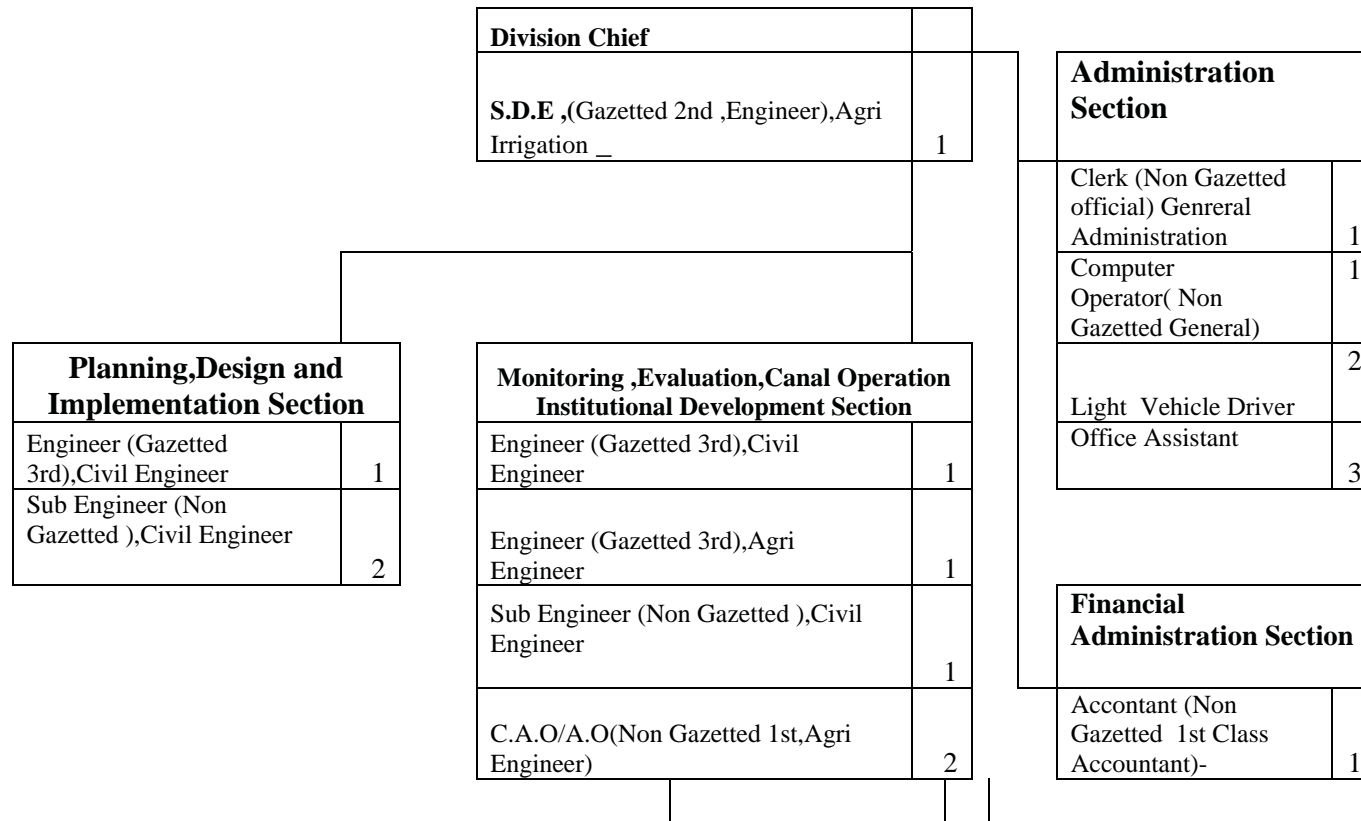
AO-Association Organization

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Kamala Hardinath Irrigation Management Division,Dhanusha**  
**Organization and Posting (Proposed)**



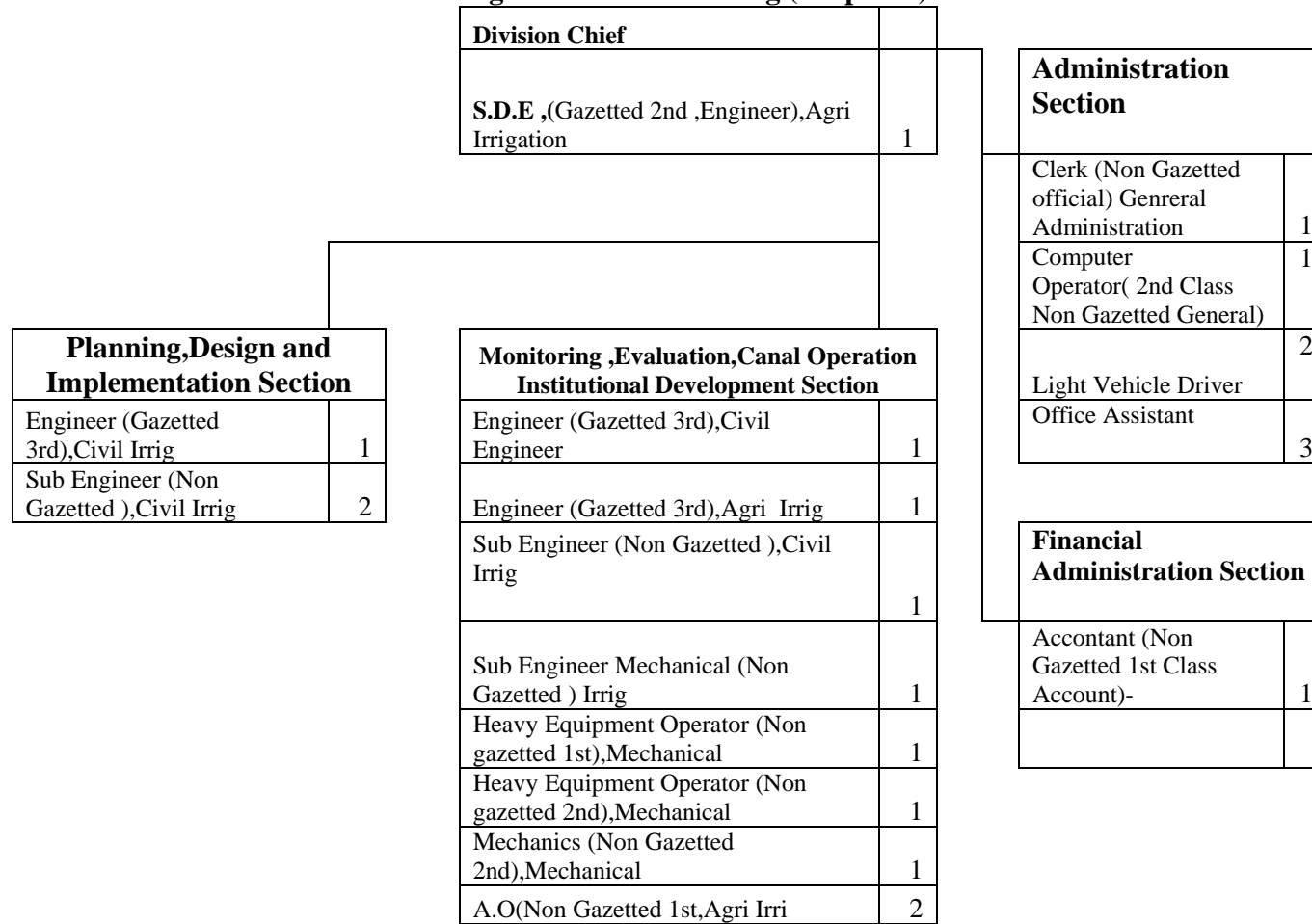
Total Posting - 16

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Bagmati,Manushmara Jhanj Irrigation Management Division,Sarlahi**  
**Organization and Posting (Proposed)**



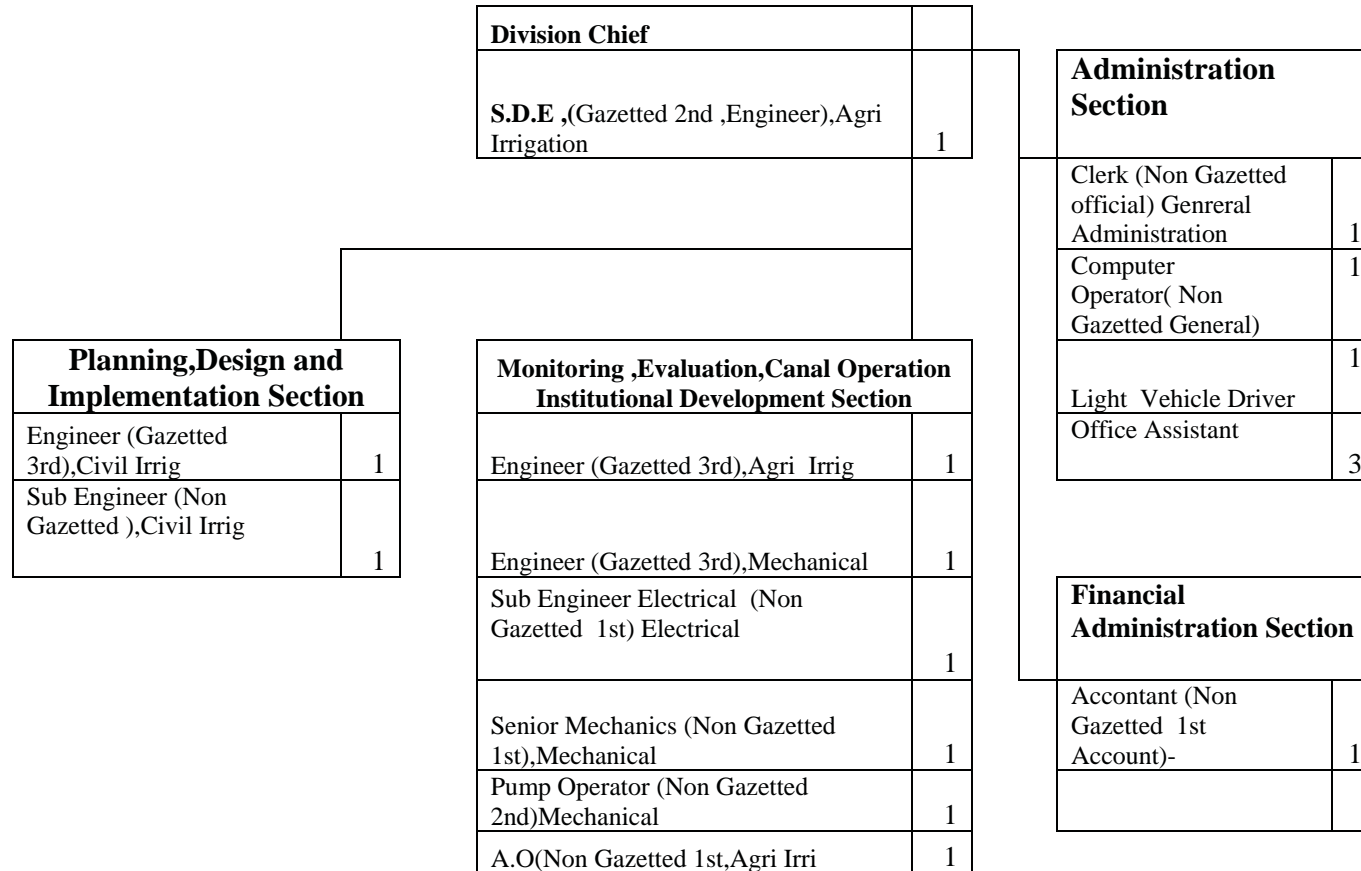
Total Posting - 17

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Narayani Irrigation Management Division,Birgunj,Parsa**  
**Organization and Posting (Proposed)**



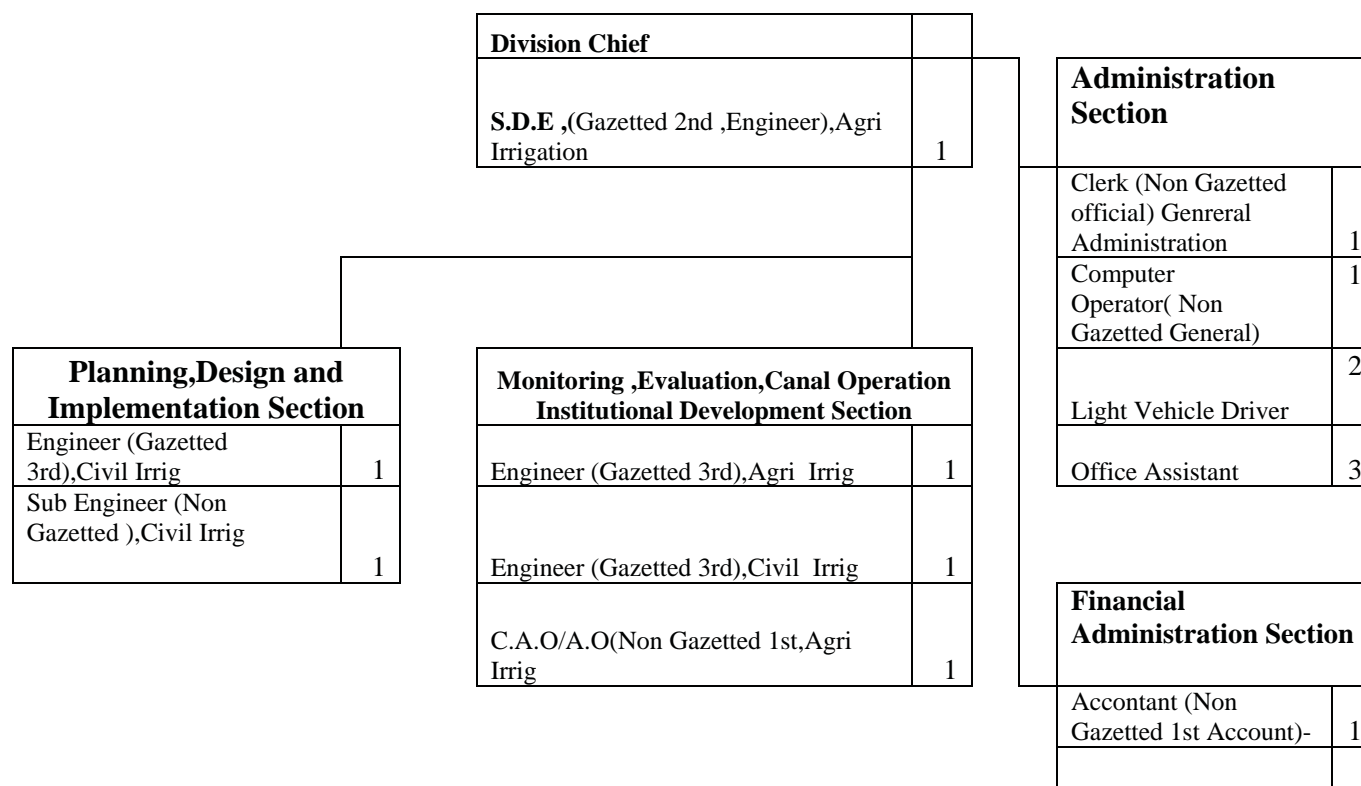
Total Posting - 21

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Narayani Lift,Khageri,Irrigation Management Division,Chitwan**  
**Organization and Posting (Proposed)**



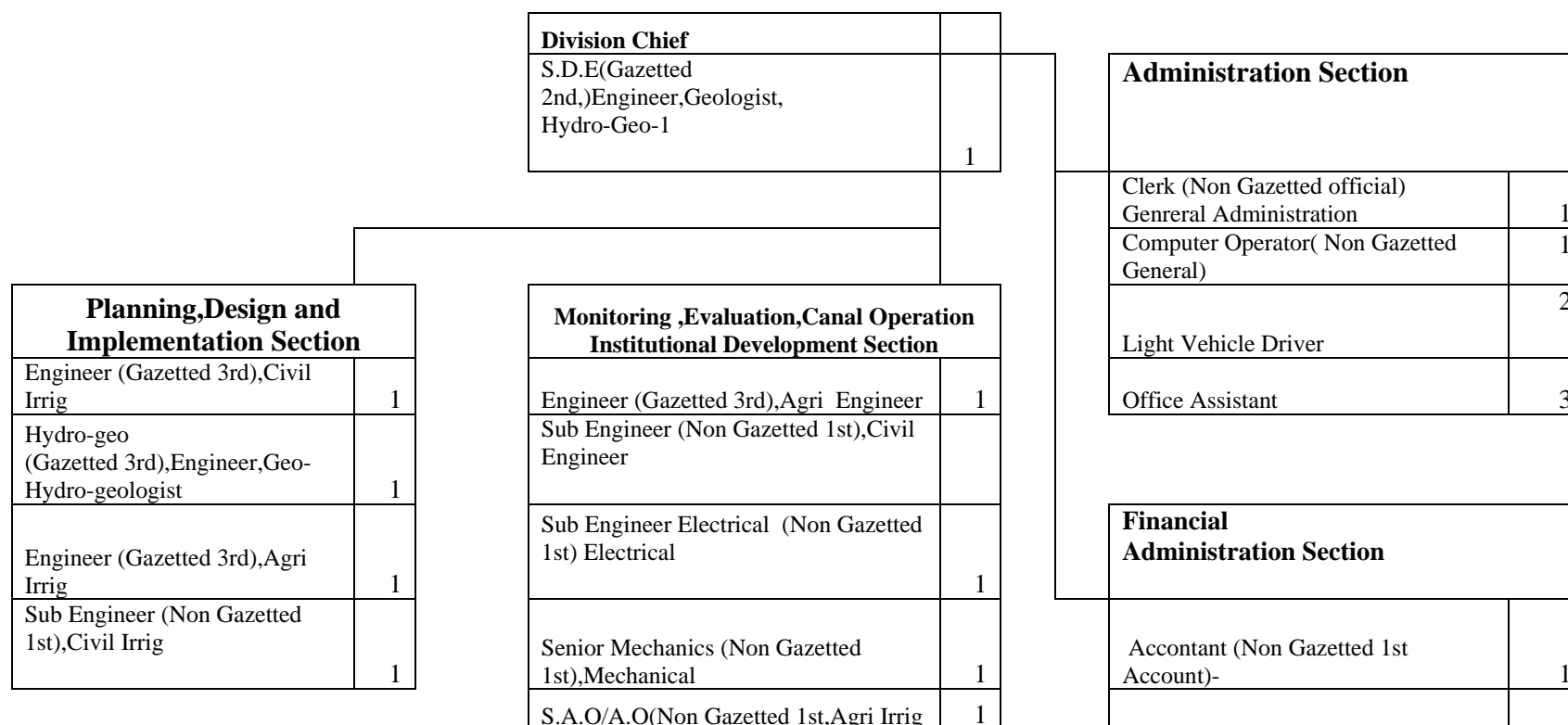
Total Posting - 16

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Gandak Irrigation Management Division,Nawalparasi**  
**Organization and Posting (Proposed)**



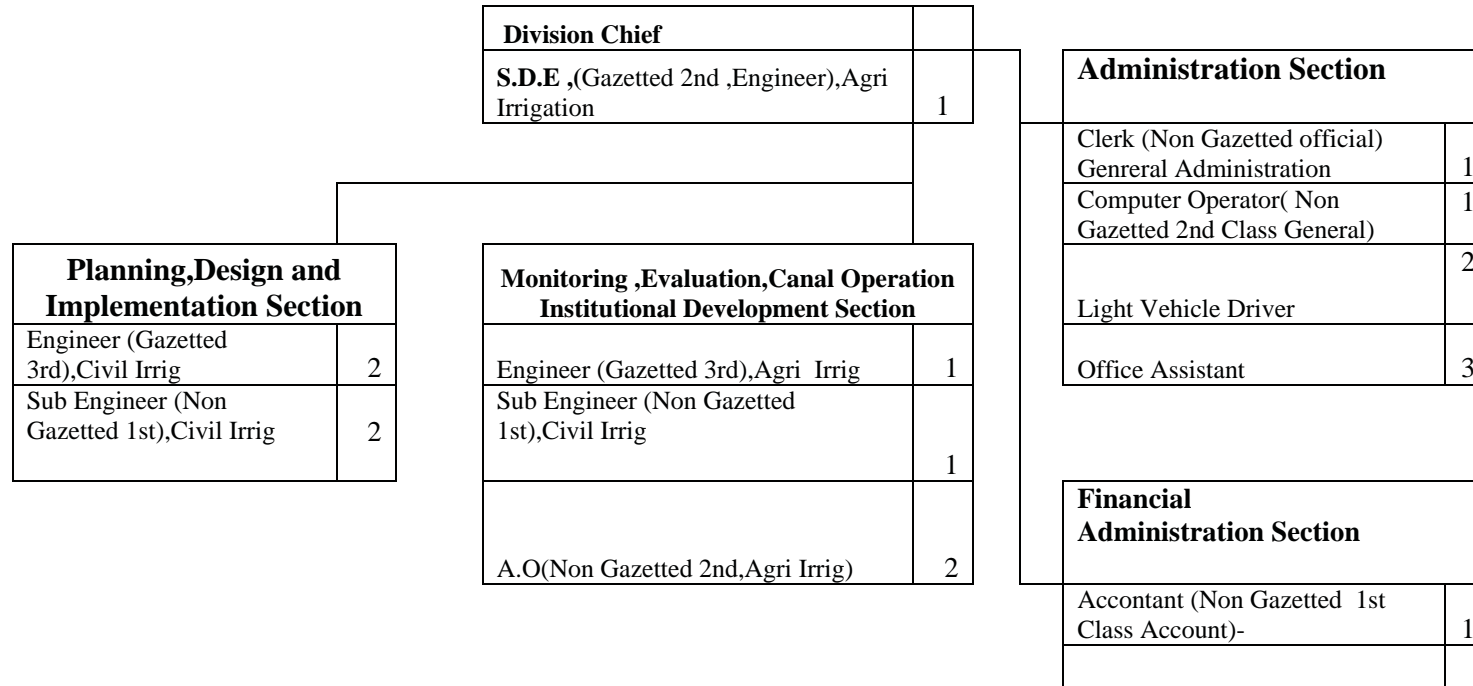
Total Posting - 14

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Irrigation Management Directorate**  
**Bhairawa Lumbini Groundwater Irrigation Management Division,Rupandehi**  
**Organization and Posting (Proposed)**



Total Posting - 18

**Government of Nepal  
Minsirty of Irrigation  
Department of Irrigation  
Irrigation Management Directorate  
Babai ,Rajapur Irrigation Management Division ,Bardiya  
Organization and Posting (Proposed)**



Total Posting - 17



**Government of Nepal  
Minsirty of Irrigation  
Department of Irrigation  
Irrigation Management Directorate  
Mahakali Patharaiya Mohana Irrigation Management Division,Kanchanpur  
Organization and Posting (Proposed)**

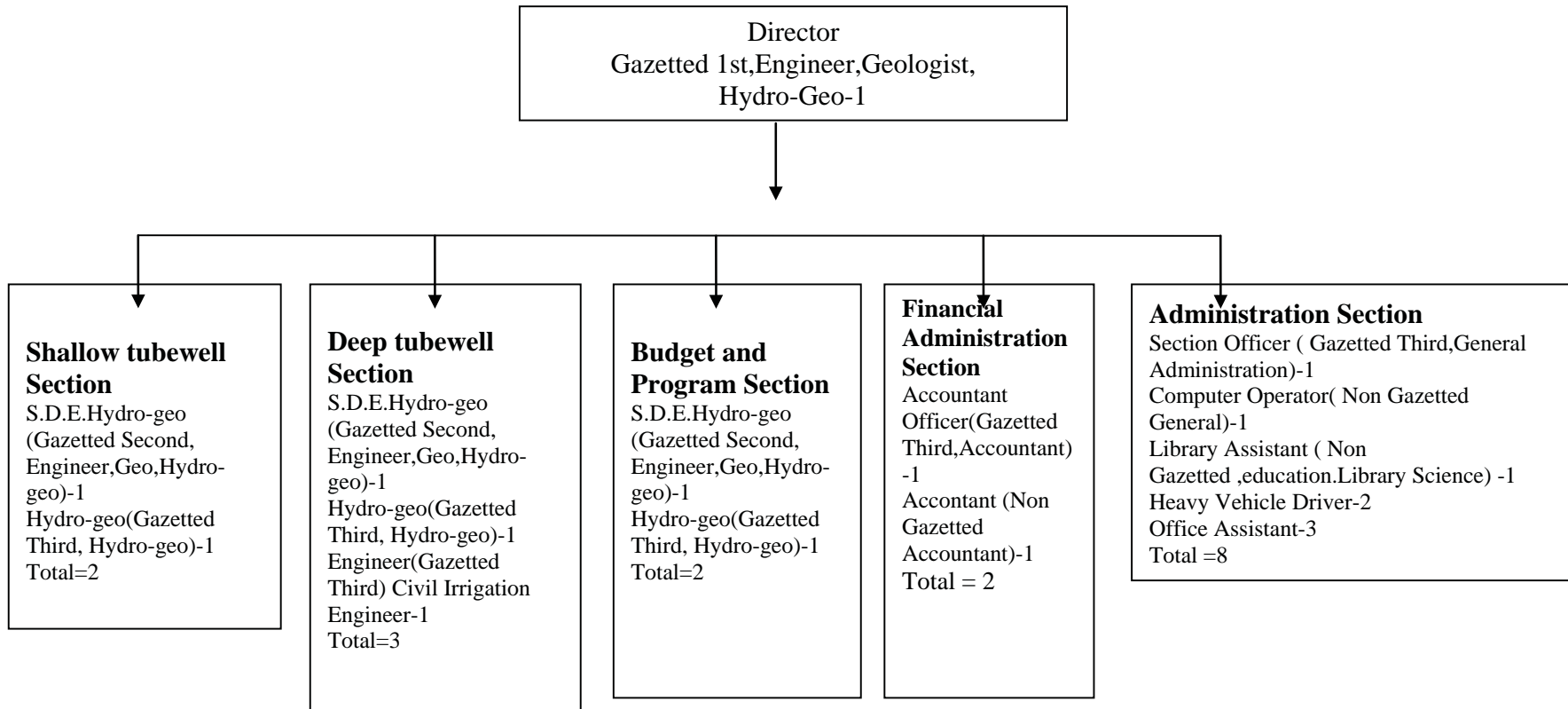
	<b>Division Chief</b>			
	S.D.E ,(Gazetted 2nd ,Engineer),Agri Irrigation	1		
<b>Planning,Design and Implementation Section</b>				
Engineer (Gazetted 3rd),Civil Irrig		1		
Engineer (Gazetted 3rd),Agri Irrig		1		
Sub Engineer (Non Gazetted 1st),Civil Irrig		2		
	<b>Monitoring ,Evaluation,Canal Operation Institutional Development Section</b>			
Engineer (Gazetted 3rd),Agri Irrig		1		
Sub Engineer (Non Gazetted 1st),Civil Irrig		1		
A.O(Non Gazetted 2nd,Agri Irrig )		2		
			<b>Administration Section</b>	
			Clerk (Non Gazetted official) Genrerel Administration	1
			Computer Operator( Non Gazetted General)	1
			Light Vehicle Driver	2
			Office Assistant	3
			<b>Financial Administration Section</b>	
			Accountant (Non Gazetted Accountant)-	1

Total Posting - 17

## **2. Organization Charts of Ground Water Irrigation Directorate (GWID)**

- 1) Chitwan**
- 2) Dhulikhel (For Valley and Hilly areas)**
- 3) Biratnagar, Lahan, Mahottari, Sarlahi, Birgunj, Chitwan, Butwal, Dang, Nepalgunj, Dhangadi)**

**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Ground Water Irrigation Directorate,Chitwan**  
**Organization and Posting (Proposed)**

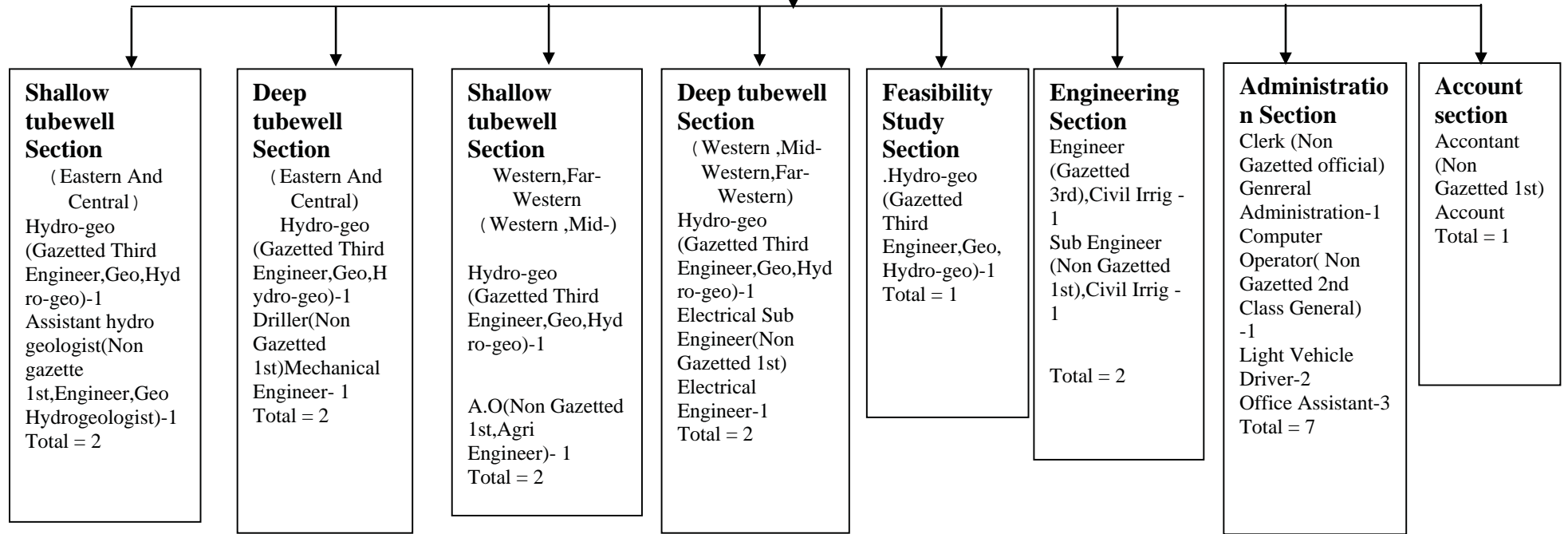


Total Posting - 18

Note: Engineer Geo Hydro -  
Engineering Geology,Hydrology

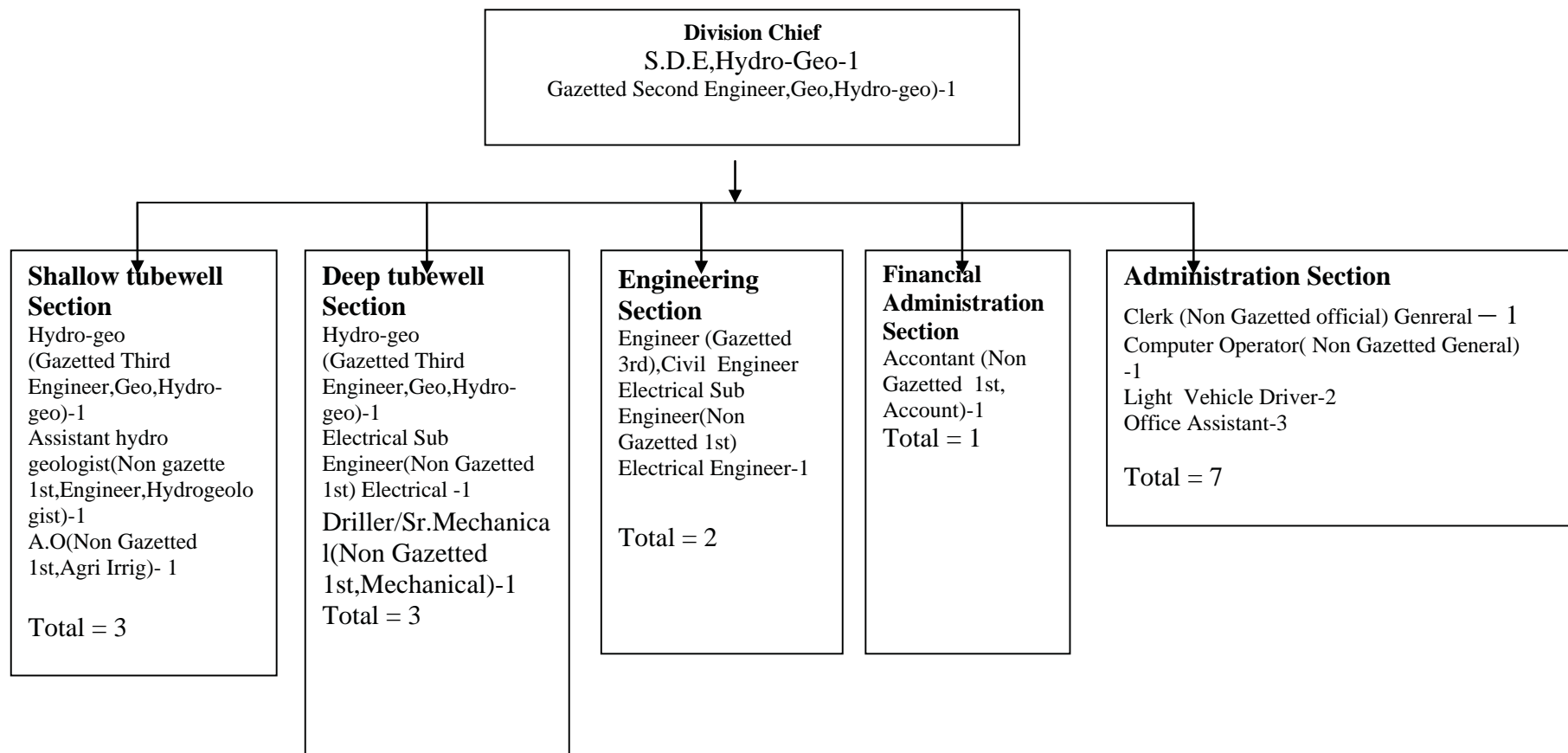
**Government of Nepal**  
**Minsirty of Irrigation**  
**Department of Irrigation**  
**Groundwater Irrigation Directorate**  
**Groundwater Irrigation Development Division ,Dhulikhel**  
**(For Valley and Hilly areas)**  
**Organization and Posting (Proposed)**

**Division Chief**  
**Sr.Divisional Hydrologist**  
**(Gazetted 2nd Class,Engineer Geo Hydrologist)**



Total Posting - 20

**Minsirty of Irrigation  
 Department of Irrigation  
 Groundwater Irrigation Directorate  
 Groundwater Irrigation Development Divison  
 Biratnagar,Lahan,Mahottari,Sarlahi,Birgunj,Chitwan,Butwal,Dang,Nepalgunj,Dhangadi)  
 Organization and Posting (Proposed)**

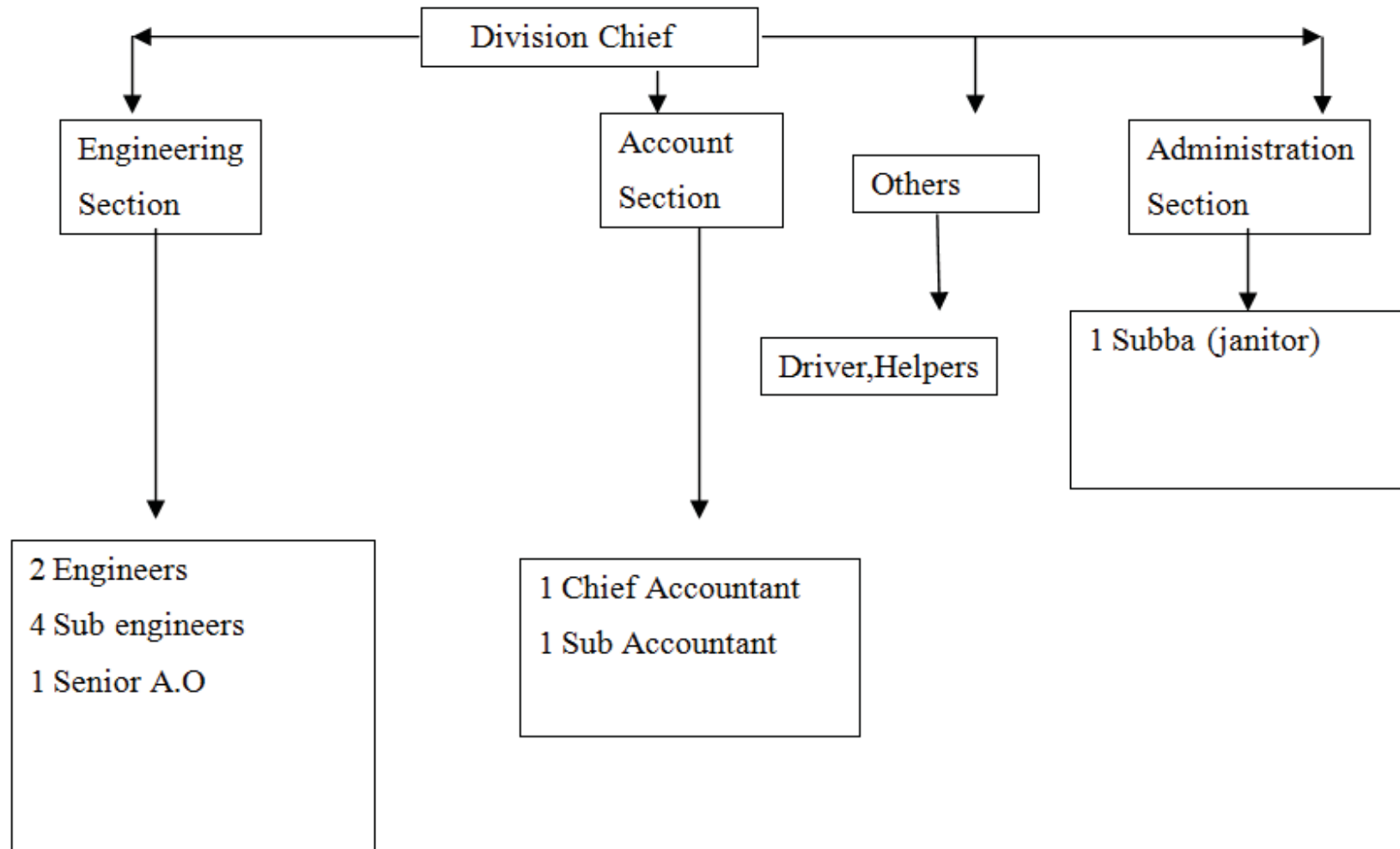


Each Division Posting - 17  
 Posting of 10 Division - 170

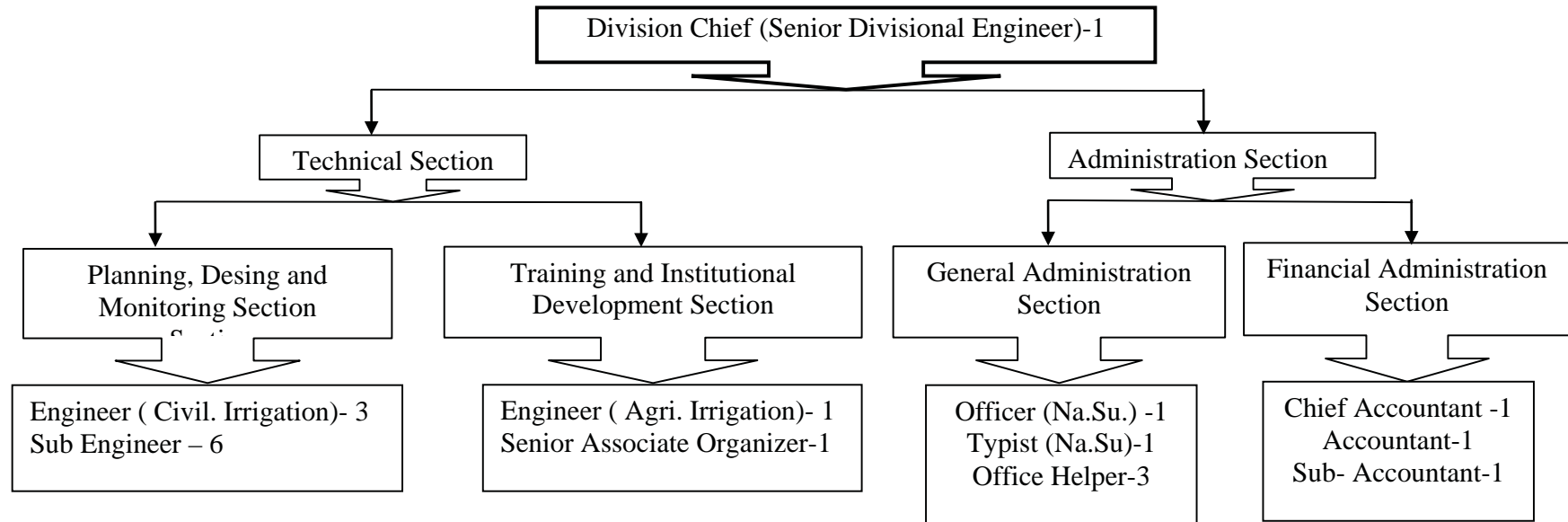
### **3. Organization Charts of Irrigation Development Division (IDD)**

- 1) Nawalparasi**
- 2) Jhapa**
- 3) Morang**
- 4) Sunsari**
- 5) Parsa**
- 6) Rauthat**
- 7) Kapilvastu (in Nepalese)**

# 1) Nawalparasi

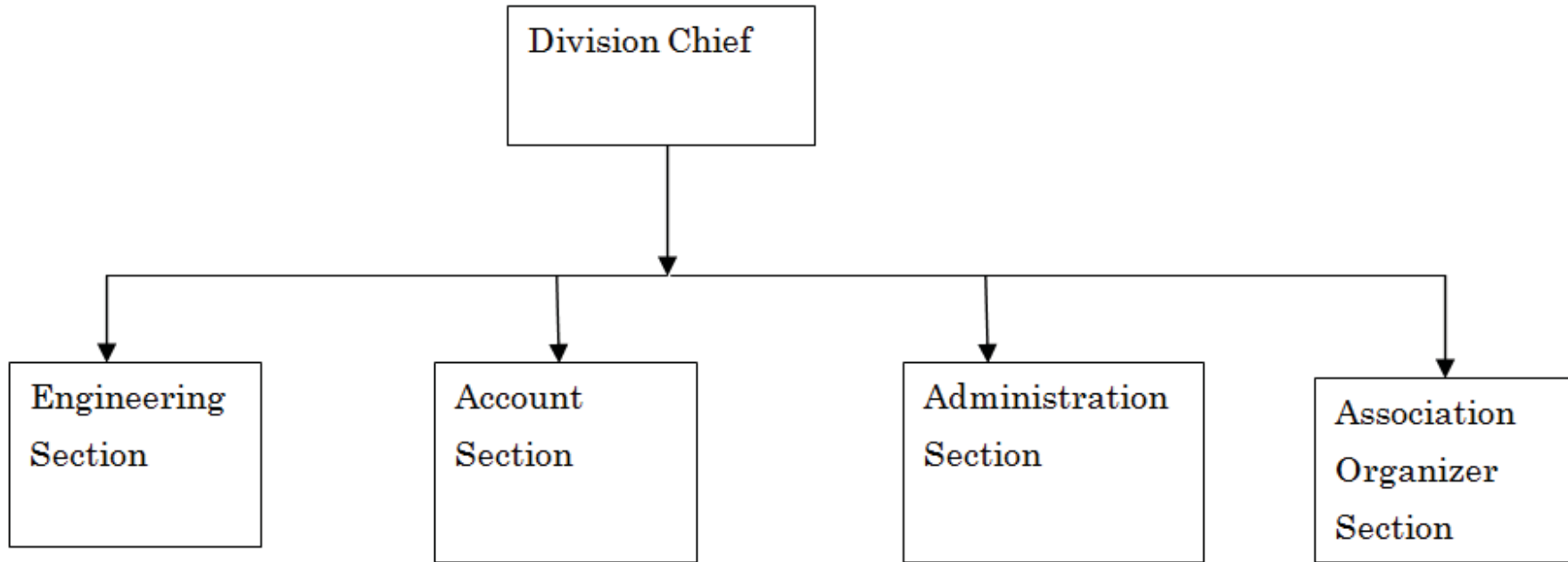


## 2) Jhapa

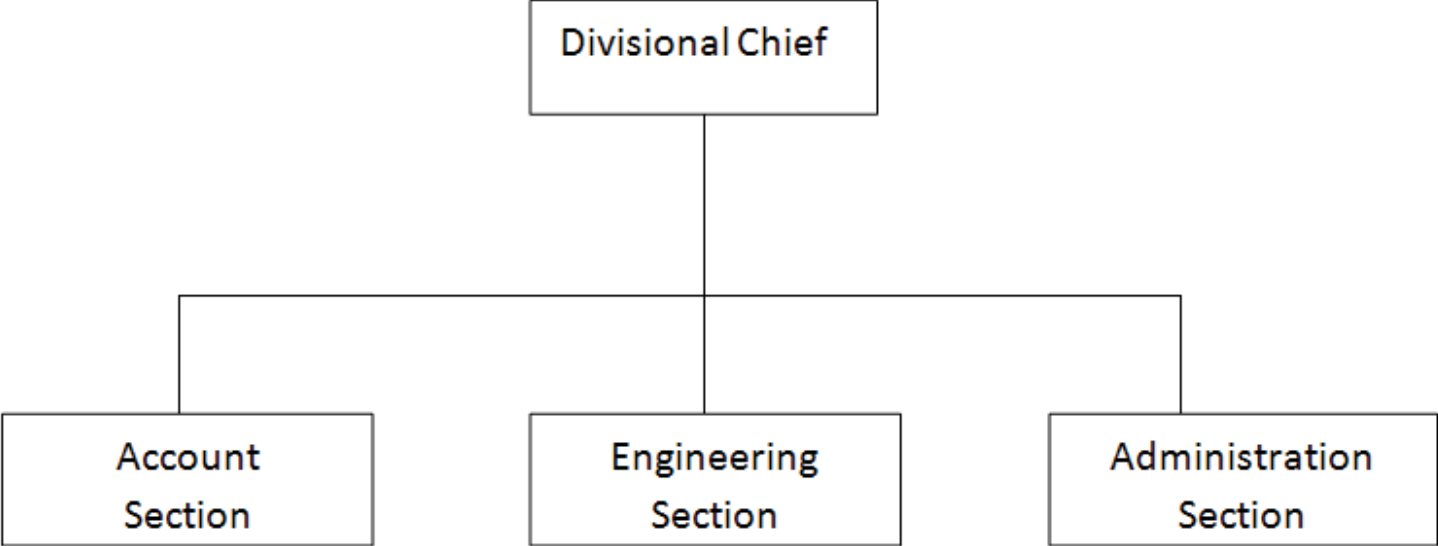




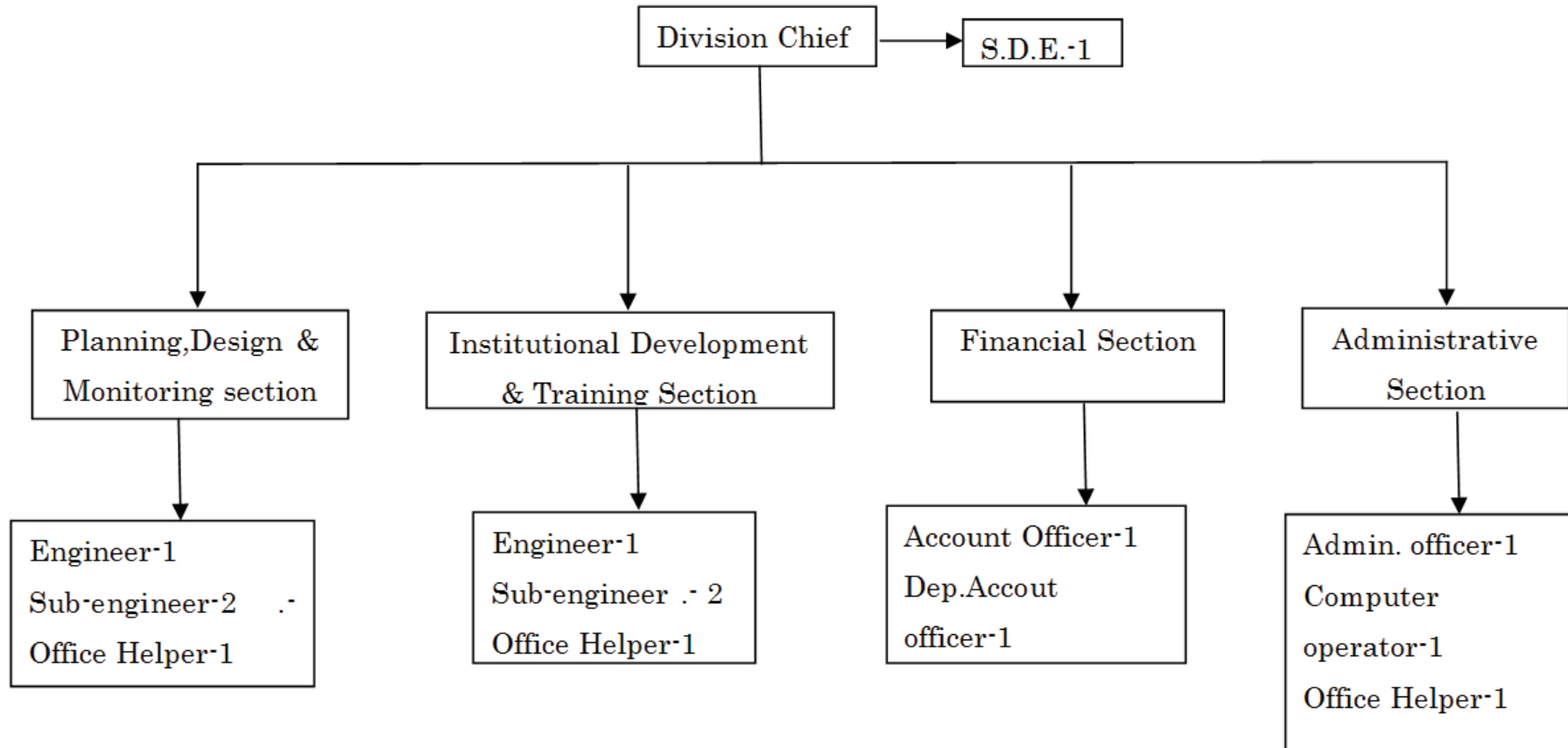
### 3) Morang



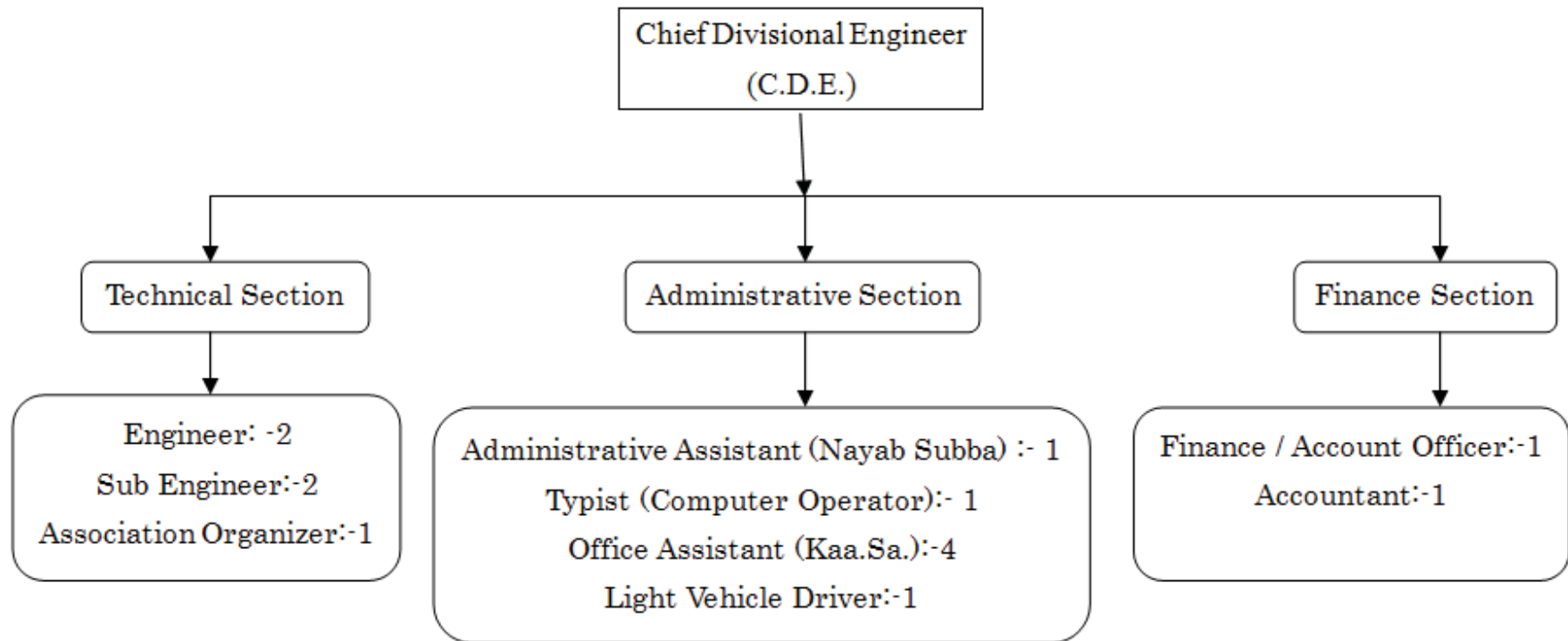
**4) Sunsari**



## 5) Parsa



## 6) Rauthat

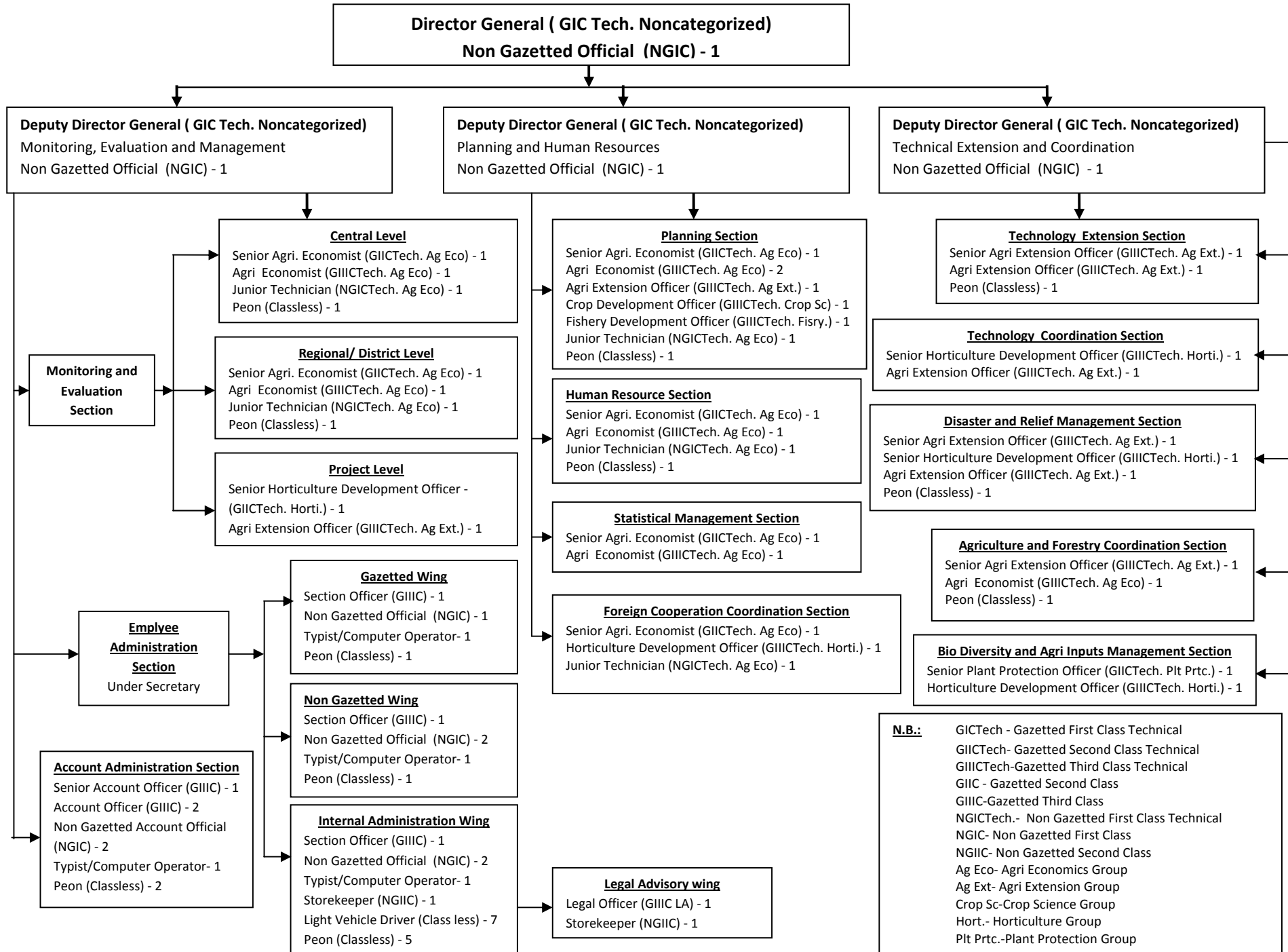


## 7) Kapilvastu (in Nepalese)



## **ANNEX 2 Organization Chart of DOA**

# Internal Organization Chart of Department of Agriculture



**ANNEX 3 Summary Tables of Questionnaire Answers (JMIS)**







Question No.

**B. WUA**

Irrigation System	13 Joint Management Type	16 Number of Member	29 Irrigation Service Fee				30 Sharing of ISF (%)		34 WUA's Participation to Rehab.			35 Participation to Cleaning of Main Canal			36 Participation to Cleaning of 2ndary Canal			37 Participation to Cleaning of Tertiary Canal		
			Fee	When to collect	Collectio Rate	Penalty	National Treasury	WUA	Plan	Design	Constru ction	In- Charge	Frequen cy	Record	In- Charge	Frequen cy	Record	In- Charge	Frequen cy	Record
(1) Kankai	A	1,236	Rs.300/Season	June/July	60 to 75%	No Participatio n	10	90	Yes	No	Yes	Government	Once per year	Yes	Government	Once per year	Yes	WUA	1-2 year	Yes
(2) Sunsari Morang	B	-	Rs.1,500,000 /Year	Jan to June	300/ha	-	20	80	Yes	No	Yes	jointly	once per 2years	Yes	jointly	Once per year	Yes	WUA	Once per year	Yes
(4) Chandra Nahar	B	-	-	-	-	No penalty	10	90	Yes	No	Yes	Government	Once per year	Yes	Government	Once per year	Yes	WUA	-	No
(5) Koshi West Canal (Distribution System)	B	-	-	-	-	No penalty	-	-	Yes	No	Yes	-	-	-	Mainly Gov, partly WUA	Once per year	Yes	WUA	Once per year	No
(6) Koshi Pump Canal	B	-	Rs.40/ Bigha/Crop	-	-	No penalty	20	80	Yes	No	Yes	Government	Whenever required	Yes	Mainly Gov, partly WUA	as per required	Yes	WUA	as per required	No
(7) Kamala	B	1,004	Rs.300/Year	December to June	60%	double amount	20	80	-	-	Yes	Government	Once per year	Yes	Government	Once per year	Yes	WUA	Twice a year	Yes
(8) Hardinath	A	280	Rs.300/Year	December to June	65%	double amount	20	80	-	-	Yes	Government	Once per year	Yes	Government	Once per year	Yes	WUA	Twice a year	-
(10) Bagmati	B	-	Rs.10/Haet	-	-	-	30	70	Yes	No	Yes	Government	-	Yes	Government	-	Yes	WUA	-	Yes
(14) Narayani Lift	A	65	-	Bhadra to Aswin	225per ha	No penalty	16.67	83.33	Yes	Yes	Yes	Government	Once per year	Yes	WUA	Once per year	Yes	Government	Once per year	Yes
(15) Khageri	A	19	-	Bhdra to Magh	Nrs.300/ha	10 to 25%	5	95	Yes	Yes	Yes	WUA and Office	Once per year	Yes	WUA	Once per year	Yes	WUA	Once per year	Yes
(16) Nepal Gandak Western Canal	A	1,124	Rs.20/kattha/year	-	Rs.400/ Bigha	There is but not implemented	10	90	Yes	No	Yes	Government	Seasonal	Yes	Government and WUA	Seasonal	Yes	WUA	Whenever required	No
(18) Banganga	A	2	Rs.50(season)/338sqm for 2season	Just after winter ans summer crop harvesting time	6-8% yearly	Not be participated in election	10	90	Yes	No	No	Government	-	Yes	Government	-	Yes	WUA	Twice per year	Yes
(19) Praganna Kulo	A	4	Rs.20/kattha /year	At the end of crop season	-	-	0	100	Yes	No	Yes	Government and WUA	Twice per year	No	WUA	Twice per year	No	WUA	-	No
(20) Babai	-	3	-	-	-	-	-	-	Yes	Yes	-	Government and WUA	Basically annual	-	Government and WUA	Whenever required	-	WUA	Once per year	No
(21) Rajapur	-	-	-	-	-	-	-	-	Yes	Yes	Yes	-	-	-	-	-	-	-	-	-
(22) Pathraiya	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(23) Mohana	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(24) Mahakali	A	1,425	-	-	-	-	10	90	-	-	-	Government	Once per many years	Yes	WUA	Not Regularly	No	WUA	Once per year	Yes
(25) Marchwar	-	-	-	-	-	Rs.500/Bigra	0	100	Yes	Yes	Yes	WUA	1	No	WUA	1	Yes	WUA	1	-

- A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.
- B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.
- C. Other (specify )

**ANNEX 4 Summary Tables of Questionnaire Answers (IDD/IDSD)**



**3 (4) List of All Irrigation Systems (IS) under administration of IDDO or IDSDO Please add rows if there are more than 10.**

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
<b>1. Jhapa</b>												
1	MawaKhola Dhunge Paini ISP, Damak-5 Jhapa	1	g	f	200	200	137	91	3	1	MIP	253
2	Sadhutar Nete Sisne ISP, Khudunabari-1,2, Jhapa	1	G	F	355	355	245	160	3	1	MIP	500
3	Hadiya Dama Rajpaina ISP, Budhabare 1,6	1	G	F	220	220	143	100	3	1	CMIASP-AF	250
4	Bhuteni Khola ISP, Goldhap 4,5,7,8	1	G	F	629	629	470	300	3	1	CMIASP-AF	750
5	Manspur ISP, Ghailadubba	1	G	F	205	205	135	80	1	3	MIP	
6	Gauria ISP, Juropani	1	G	F	190	190	100	70	1	3	MIP	297
7	Kaptan Janasamuha Paini, Shantinagar	1	G	F	220	220	168	85	1	3	MIP	
8	Kapilmuni Paini ISP, Sanischare	1	G	F	245	245	183	110	1	3	MIP	
9	Siddhikhola ISP, Bahundangi	1	G	F	1700	1700	1275	800	1	3	MIP	1515
10	Janjagriti ISP, Shantinagar	1	G	F	415	415	307	174	1	3	MIP	
11	Kishne Khola Bandh ISP, Gauradaha, 3,5,8,9	1	G	F	948	948	730	370	3	1	MIP	970
12	Parikalpana Non Conventional Irrigation Technology Project (NITP), Shantinagar-6	1,3	G	F	28				1	3	NITP	
13	Paurakhi NITP, Shantinagar	1,3	G	F	20				1	3	NITP	
14	Sunmai NITP, Shantinagar	1,3	G	F	20				1	3	NITP	
15	Sirjansil NITP, Shantinagar	1,3	G	F	20				1	3	NITP	40
16	Dipeni NITP, Damak	1,3	G	F	10				1	3	NITP	17
17	Tamakot NITP, Shantinagar	1,3	G	F	30				1	3	NITP	26
18	Aashirbad NITP, Shantinagar	1,3	G	F	24				1	3	NITP	25
19	Tallo Kishne ISP, Gauriganj, Jhapa	1	G	F	1500	1500	975	600	3	1	MIP	700

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households		
						Monsoon	Winter	Spring						
<b>2. Morang</b>														
1	Bhibare Paini ISP, Pathari Sanischare 9, 15	Pathari River	P	FM	300	300	180	120	3	2	FMIS	250		
2	Bansbari ISP, Keroun	Kalikoshi	P	FM					3	2				
3	Sana Sichain Janabikash Paini ISP, Letang -3	Sichang River	P	FM					3	2				
4	Budgi khola Sirkulo ISP, Yangshila -8	Budhikhola	P	FM					3	2				
5	Trinath ISP, Bahuni-1	Dhaiti River	P	FM	215	215	129	86	3	2			155	
6	Kali koshi ISP, Keraun	Kalikoshi	P	FM	135	135	81	54	3	2				
7	Keshliya Majhigaoun IAP, Dangihat	Keshliya River	P	AM	288	288	173	115	5	1	CMIASP-AF	266	Under Construction	
8	Bhaluwa ISP, Bayarban	Bhaluwa River	P	AM	312	312	187	125	5	1			345	Under Construction
9	Nunsari Rachana Kalidaha ISP, Tandi (80 ha)	Nunsari River	P	AM	80	80	48	32	5	1	MIP		Under Construction	
10	Keshliya Bandh ISP, Kaseni (248 ha)	Keshliya River	P	AM	248	248	149	99	5	1				Under Construction
11	Singhdevi ISP, Jate-3 (120 ha)	Teli River	P	AM	120	120	72	48	5	1				Under Construction
12	Pachpaina ISP, Darwesa-6 (322 ha)	Geuriya River	P	AM	322	322	193	129	5	1				Under Construction
<b>3. Sunsari</b>														
1	Tengra Khola (Karnel Bandh) I.P.	Perennial	Gravity	Farmer Managed	400	300	200	100	Maintenance and repair are done and	Under Operation				
2	Dumraha I.P.	Perennial	Gravity	Farmer Managed	440	300	210	110	partly malfunctioning	Under WUA Strenghteni				
3	Kajara I.P.	Perennial	Gravity	Farmer Managed	250	127	102	67	Warning sign are found but functioning	Under WUA Strenghteni				
4	Galfariya I.P.	Perennial	Gravity	Farmer Managed	180	120	90	45	partly malfunctioning	Damaged				
5	Kharsala I.P	Perennial	Gravity	Farmer Managed	200	160	100	50	Warning sign are found but functioning	Under WUA Strenghteni				
6	Budhi Paterawa I.P	Perennial	Gravity	Farmer Managed	310	210	120	60	Warning sign are found but functioning	Under WUA Strenghteni				

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
7	Bauka I.P.	Perennial	Gravity	Farmer Managed	125	85	60	35	Maintenance and repair are done and	Under WUA Strengthening		
8	Madhuban I.P.	Perennial	Gravity	Farmer Managed	200	160	100	40	Maintenance and repair are done and	Under WUA Strengthening		
9	Tengra Tengri Bhab I.P.	Perennial	Gravity	Farmer Managed	110	80	60	40	Warning sign are found but function	Under WUA Strengthening		
10	Paschim Kushaha I.P.	Perennial	Gravity	Farmer Managed	475	300	200	100	Maintenance and repair are done and	Under WUA Strengthening		
11	Sera I.P.	Perennial	Gravity	Farmer Managed	400	220	110	55	Maintenance and repair are done and	Under WUA Strengthening		
12	Geruwa Khola I.P.	Perennial	Gravity	Farmer Managed	421	220	110	55	Partly disabled	Partly disabled	Damaged	
13	Tengra Khola (Shere Bandh) I.P.	Perennial	Gravity	Farmer Managed	266	190	139	70	Maintenance and repair are done and	Maintenance and repair are done	Under WUA Strengthening	
14	Sunsari Khola I.P.	Perennial	Gravity	Farmer Managed	300	220	150	75	Partly disabled	Partly disabled	Damaged	
15	Birendra Hakraha I.P.	Perennial	Gravity	Farmer Managed	200	150	100	50	partly malfunctioning	partly malfunctioning	Under WUA Strengthening	
16	Sukumari I.P.	Perennial	Gravity	Farmer Managed	170	120	69	40	Maintenance and repair are done and	Maintenance and repair are done	Under WUA Strengthening	
17	Khetikhola I.P.	Perennial	Gravity	Farmer Managed	475	300	150	120	Partly disabled	Partly disabled	Damaged	
18	Sehara-Seuti Khola I.P.	Perennial	Gravity	Farmer Managed	400	220	180	90	Warning sign are found but function	Warning sign are found but	Under WUA Strengthening	
19	Dattakichcha I.P.	Perennial	Gravity	Farmer Managed	200	150	100	50	Partly disabled	Damaged		
20	Bharaul I.P.	Perennial	Gravity	Farmer Managed	400	300	150	78	Warning sign are found but function	Under Rehab	MIP	
21	Panbari I.P.	Perennial	Gravity	Farmer Managed	300	200	100	50	Warning sign are found but function	Under Rehab	MIP	
22	Tengra I.P.	Perennial	Gravity	Farmer Managed	235	130	76	36	Warning sign are found but function	Under Rehab	MIP	



S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
23	Haripur, I.P	Perennial	Gravity	Farmer Managed	600	480	260	120	Warning sign are found but function	Under Rehab	MIP	
24	Bishnupadaka IP	Seasonal	Gravity	Farmer Managed	20	15	8	4	Warning sign are found but function	Under Rehab	NITP	
25	Turke IP	Perennial	Gravity	Farmer Managed	18	12	6	3	Warning sign are found but function	Under Rehab	NITP	
26	Saune Khola Ip	Perennial	Gravity	Farmer Managed	14	10	5	4	Warning sign are found but function	Under Rehab	NITP	
27	Gahane Pokhari IP	Seasonal	Gravity	Farmer Managed	12	8	5	4	Warning sign are found but function	Under Rehab	NITP	

#### 4. Mahottari

1	Marha IP	1	g	f	400				4	Defunt	ISP	500
2	Bighi IP	1	g	f	2000				3	3	ISP	6000
3	Ladakwa IP	1	g	f	300				4	Defunt	ISP	975
4	Kutumeshwori IP	1	g	f	200				2	3	ISP	222
5	Rupani IP	1	g	f	195				4	Defunt	ISP	500
6	Jhijha Gulariya IP	1	g	f	210				4	Defunt	ISP	3000
7	Shirkhola IP	1	g	f	105				3	3	SISP	435
8	Pasijawa IP	1	g	f	500				2	3	SISP	716
9	Kantawa ISP	1	g	f	750				2	3	CMIASP	3083
10	Geruka ISP	1	g	f	380				1	3	CMIASP	1800
11	Akusi khola IP	1	g	f	550				1	3	CMIASP	700
12	Dudhmati ISP	1	g	f	200				On Going	1	CMIASP-AF	940
13	Bhurhi ISP	1	g	f	310				On Going	1	CMIASP-AF	600
14	Pachain IP	1	g	f	500				4	Defunt	MIP	688
15	Bighi IP	1	g	f	2000				On Going	1	MIP	5000
16	Rato IP	1	g	f	200				On Going	1	MIP	1200
17	Auksi IP, Hatisarwa	1	g	f	1500				On Going	1	MIP	450
18	Rupani IP	1	g	f	530				On Going	1	MIP	300

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
19	Anarban IP	1	g	f	200				On Going	1	MIP	510
20	Banke IP	1	g	f	410				On Going	1	MIP	1200
<b>5. Sarlahi</b>												
1	Sudama Irrigation Project	Perennial river	Gravity	Farmer managed	1631	1100	800	500	Partly malfunctioning	Under rehabilitation	ISP	2320
2	Haripurwa Irrigation Project	Perennial river	Gravity	Farmer managed	595	595	350	100	Partly malfunctioning	Under Operation	ISP	450
3	Pharadhwa Irrigation Project	Perennial river	Gravity	Farmer managed	300	300	200	50	Partly malfunctioning	Under Operation	ISP	350
4	Bhaktipur Irrigation Project	Perennial river	Gravity	Farmer managed	200	200	100	50	Partly malfunctioning	Under Operation	ISP	159
5	Kisanpur Irrigation Project	Perennial river	Gravity	Farmer managed	330	330	200	70	Partly malfunctioning	Under Operation	ISP	316
6	Jingadwa Irrigation Project	Perennial river	Gravity	Farmer managed	376	376	100	0	Partly disabled	Under Operation	ISP	224
7	Parsa Irrigation Project	Perennial river	Gravity	Farmer managed	685	685	500	300	Warning signs (flaws) are found but functioning	Under Operation	SISP	750
8	Patharkot Irrigation Project	Perennial river	Gravity	Farmer managed	521	400	200	50	Partly disabled	Under Operation	SISP	536
9	Bagdah Irrigation Project	Perennial river	Gravity	Farmer managed	250	0	0	0	Partly disabled	Under Operation	SISP	530
10	Laukhat Irrigation Project	Perennial river	Gravity	Farmer managed	375	375	200	50	Warning signs (flaws) are found but functioning	Under Operation	SISP	600
11	Miyakhori Irrigation Project	Perennial river	Gravity	Farmer managed	100	100	70	30	Partly malfunctioning.	Under Operation	SISP	110
12	Laxmipur Irrigation Project	Perennial river	Gravity	Farmer managed	70	0	0	0	Dilapidated and malfunctioning in whole	Under Operation	SISP	70
13	Jhim Irrigation Project A	Perennial river	Gravity	Farmer managed	270	270	70	0	Partly malfunctioning.	Under rehabilitation	MIP	450
14	Pakka Badh Irrigation Project	Perennial river	Gravity	Farmer managed	526	526	300	150	Warning signs (flaws) are found but functioning	Under Operation	MIP	368
15	Geruka Irrigation Project	Perennial river	Gravity	Farmer managed	387	250	150	50	Maintenance and repair are done and functioning	Under rehabilitation	MIP	650
16	Khokana Irrigation Project	Perennial river	Gravity	Farmer managed	270	270	150	150	Maintenance and repair are done and functioning	Under rehabilitation	MIP	400
17	Soram Irrigation Project	Perennial river	Gravity	Farmer managed	270	200	135	100	Maintenance and repair are done and functioning	Under rehabilitation	MIP	750
18	Sapaha Irrigation Project	Perennial river	Gravity	Farmer managed	580	400	350	200	Maintenance and repair are done and functioning	Under rehabilitation	MIP	457

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
19	Ekadashi Irrigation Project	Perennial river	Gravity	Farmer managed	1300	900	650	400	Maintenance and repair are done and functioning	Under rehabilitation	MIP	2050
20	Maliniya Irrigation Project	Perennial river	Gravity	Farmer managed	390	250	190	90	Maintenance and repair are done and functioning	Under rehabilitation	MIP	839
21	Dumdumme Irrigation System	Seasonal river	Gravity	Farmer managed	125	125	100	25	Partly malfunctioning	Under rehabilitation	FMIS	54
22	Pakadi Irrigation System	Seasonal river	Gravity	Farmer managed	80	80	40	30	Partly malfunctioning	Under rehabilitation	FMIS	116
23	Gulariya Soti khola Irrigation System	Seasonal river	Gravity	Farmer managed	28	28	20	10	Partly malfunctioning	Under rehabilitation	FMIS	68
24	Katarwa Irrigation System	Seasonal river	Gravity	Farmer managed	100	100	50	25	Partly malfunctioning	Under rehabilitation	FMIS	139
25	Dhabar Irrigation System	Seasonal river	Gravity	Farmer managed	62	60	30	20	Partly malfunctioning	Under rehabilitation	FMIS	70
26	Khori Irrigation System	Seasonal river	Gravity	Farmer managed	32	32	15	5	Partly malfunctioning	Under rehabilitation	FMIS	40
27	Lalkhola Irrigation System	Seasonal river	Gravity	Farmer managed	30	30	15	5	Partly malfunctioning	Under rehabilitation	FMIS	25
28	Laghuwa Kabilashi Irrigation System	Seasonal river	Gravity	Farmer managed	327	327	200	100	Partly malfunctioning	Under rehabilitation	FMIS	166
29	Bagdah Pond Irrigation System	Dam/reservoir	Gravity	Farmer managed	10	10	10	5	Maintenance and repair are done and functioning	Under rehabilitation	FMIS	40
30	Chani Mahato Pond Irrigation System	Dam/reservoir	Gravity	Farmer managed	11	11	10	5	Maintenance and repair are done and functioning	Under rehabilitation	FMIS	16
31	Gohari Pond Irrigation System	Dam/reservoir	Gravity	Farmer managed	11	11	10	5	Maintenance and repair are done and functioning	Under rehabilitation	FMIS	20
32	Dhale Pond Irrigation System	Dam/reservoir	Gravity	Farmer managed	10	10	10	5	Maintenance and repair are done and functioning	Under rehabilitation	FMIS	17
33	Bela Ramjanki Pond Irrigation System	Dam/reservoir	Gravity	Farmer managed	12	12	10	5	Maintenance and repair are done and functioning	Under rehabilitation	FMIS	16
34	Rajghat Pond Irrigation System	Dam/reservoir	Gravity	Farmer managed	10	10	10	5	Maintenance and repair are done and functioning	Under rehabilitation	FMIS	26
35	Amrit Narayan Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	11	11	10	5	Maintenance and repair are done and functioning	Under rehabilitation	NITP	23
36	Ram Mandir Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	16	16	15	10	Maintenance and repair are done and functioning	Under rehabilitation	NITP	25
37	Bhagyamani Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	14	14	10	7	Maintenance and repair are done and functioning	Under rehabilitation	NITP	26
38	Dhanbarsha Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	12	12	10	6	Maintenance and repair are done and functioning	Under rehabilitation	NITP	17

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
39	Tola Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	15	15	10	7	Maintenance and repair are done and functioning	Under rehabilitation	NITP	21
40	Laxmipur Kodraha Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	10	10	10	5	Maintenance and repair are done and functioning	Under rehabilitation	NITP	36
41	Hariyali Bhutal Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	11	11	10	5	Maintenance and repair are done and functioning	Under rehabilitation	NITP	16
42	Patharkot Well Tubewell Irrigation Project	Groundwater	Pumping	Farmer managed	10	0	0	0	Maintenance and repair are done and functioning	Under rehabilitation	NITP	19
43	Kalari Irrigation Project	Perennial river	Gravity	Farmer managed	265	200	125	100	Maintenance and repair are done and functioning	Under rehabilitation	CMIASP_AF	213
44	Parwanipur Irrigation Project	Perennial river	Gravity	Farmer managed	395	395	250	150	Partly malfunctioning.	Under Operation	CMIASP	742
45	Bakebaba Irrigation Project	Perennial river	Gravity	Farmer managed	269	269	200	100	Partly malfunctioning.	Under Operation	CMIASP	264

## 6. Parsa

1	Baugi ISP	1	Gravity	J	150	150	80	50	2	Major rehab. Immediately	ISP	250
2	Dora ISP	1	g	j	100	100	70	40	3	" "	ISP	220
3	Phanti ISP	1	g	J	260	260	240	100	3	" "	ISP	300
4	Naurangiya ISP	1	g	J	294	294	200	150	3	3	ISP	450
5	laxmipur ISP	1	g	J	135	135	100	50	3	3	ISP	150
6	Phokaha ISP	1	g	J	150	150	100	50	1	3	ISP	170
7	Kiyasot Bagmuhi ISP	1	g	J	350	350	250	200	1	3	SISP	250
8	Chamri ISP	1	g	J	395	395	280	175	1	3	SISP	280
9	Gulbariya ISP	1	g	J	250	250	200	150	1	3	SISP	260
10	Amuwa Khola ISP	1	g	j	135	135	100	75	1	3	SISP	175
11	Odhar Khola ISP	1	g	f	260	260	200	150	3	3	SISP	150
12	Thute Khola ISP	1	g	j	225	225	180	150	1	3	MIP	200
13	Naugachhi IS	1	g	j	774	350	300	200	1	1	MIP	320
14	Sadhuwa Khola ISP	1	g	f	202	202	150	100	1	3	CMIASP	220
15	Upper baugi ISP	1	g	f	225	225	175	150	1	3	CMIASP	250
16	Jaganaha ISP	1	g	f	213	213	175	150	1	3	CMIASP	170

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
17	Drip ISP	4	p	f	10	10	10	10	1	3	NITP	10
<b>7. Rauthat</b>												
1	Jhahj Irrigation System	Seasonal River	Gravity	Farmer Managed (MFLA)	4000 ha	4000	4000	4000	2	2	Jhahj Sinchai Aayojna Chaur	.....
2	Chadi Irrigation Program	2	G	F	250	250	250	250	2	2	Irrigation Program	
3	Lohaniya Irrigation Program	2	G	F	466	466	466	466	1	2	Irrigation Program	
4	Kaamdehi Irr. Program	2	G	F	200	200	200	200	2	3	Kaamdehi Irr. Program	
5	Aruwa Irrigation Prog.	2	G	F	250	250	250	250	2	1	Irrigation Program	
6	Hariharpur Irri. Prog.	2	G	F	250	250	250	250	2	1	Hariharpur Irri. Prog.	
7	Patharabudhram Irri. Program	2	G	F	432	432	432	432	2	2	Patharabudhram	
8	Simrabhabanipur Irri. Program	2	G	F	406	406	406	406	2	2	Simrabhabanipur irri. program	
9	Bhakuwa Irrigation Program	2	G	F	395	395	395	395	2	1	Bhakuwa Irrigation Program	
10	Aruwa irrigation Prog.	2	G	F	500	500	500	500	2	1	Irrigation Program	
11	Lalmatiya Irrigation Program	2	G	F	200	200	200	200	2	1	Lalmatiya irrigation Program	
12	Paurai irrigation Program	2	G	F	25	25	25	25	2	1	Paurai	
<b>8. Kapilvastu</b>												
1	Bhutaha IP	Bhutaha khola	g	f	715	715	270	50	4	1 3		800
2	Nagdariya IP		g	f	300	300	170	50	4	1 3		300
3	Niglihawa Belwa IP		g	f	960	960	750	250	4	1 3		1200
4	Madwan shikari khola IP	Madwan shikari khola	g	f	538	538	300	198	4	1 1		1103
5	Bharai khola IP	Bharai khola	g	f	200	200	180	100	4	1 1		160
6	Shayar Bandh IP	Surai khola	g	f	400	400	250	150	4	2 1		124
7	Galaha Bangawa IP	Sukli kothi khola	g	f	800	800	350	160	4	2 1		260
8	Gangauliya Gautariya IP	Local Spri	g	f	220	220	100	30	4	1 1		127

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
9	Shringighat IP	Banganga khola	g	f	2500	2500	1400	800	4	3	3	4200
10	Mahendrakot IP , Buddhabatika Na.Pa.	Gudrung khola	g	f	430	430	250	50	2	3	ILC	712
11	Beti IP, Banskhor	Beti khola	g	f	700	700	450	250	4	1	1	800
<b>9. Bardiya</b>												
1	Ambasa Balanti ISP project				213							296
2	Batule Kurule ISP				70							99
3	Chepang ISP				40							179
4	Ghatte Khola ISP				19							81
5	Karmala ISP				202							354
6	Kurule ISP				6							11
7	Suryapatuwa ISP				375							1385
<b>10. Nawalparasi</b>												
1	Tokre Irrigation Project	Devsat khola	Gravity irrigation	Farmer managed	520				Maintenance and repairing are done	Under final stage of Rehab	Iwrmp	
2	Tmasariya Baruwa	Girwari	Gravity	Farmer managed	217				Maintenance and repair are done	Under Operation	Iwrmp	
3	Naya Belhani	Arung khola	Gavity	Farmer managed	320	200	200	50	Complete	Complete	Iwrmp	For 120 ha should be upgraded
4	Panbhar	NA	Gavity	Farmer managed					Maintenance and repair are done		Mip	
5	Bhalayatar	NA	Gavity	Farmer managed					Maintenance and repair are done		Mip	Should be upgraded
6	Baskhola	Baskhola	Gavity	Farmer managed					Maintenance and repair are done		Mip	
7	Sikhraulti sonbarsa	kakarshot	Gavity	Farmer managed					Not functioning		Mip	Should rehab
8	Ghumaure Jhaluke	N/a	Gavity	Farmer managed					Maintenance and repair are done		Mip	
9	Daunedevi surya nagar	Local kholsi	Gavity	Farmer managed					Maintenance and repair are done		NITP	
10	Lamsal phant	boring	pumping	Farmer managed					few instances, functioning properly		NITP	

S/N	Name of IS	#1 Water Sources	#2 System Type	#3 Management Type	Command Area (ha)	Irrigated Area (ha)			#4 Facility Condition	#5 Status	#6 Name of programme	WUA No. of Households
						Monsoon	Winter	Spring				
11	Gajendra mokhsa	lift	pumping	Farmer managed					functioning		NITP	
12	Tilakpur pokhari	reservoir		Farmer managed					Maintenance and repair are done		NITP	
13	Manari lift	lift	pumping	Farmer managed					Maintenance and repair are done		NITP	
14	Jugepani pokhari	reservoir		Farmer managed					Maintenance and repair are done		NITP	
15	Bulingtar Irrigation project	Devsat khola	Gavity	Farmer managed					Maintenance and repair are done		Old project	Should be rehabed
<b>11.Rupandehi</b>												
1	Itiya Kulo IP	Perenial	Gravity	Jointly-managed	2500				1	1	IWRMP	8450
2	Jhim-Jhime IP	Perenial	Gravity	Jointly-managed	240				1	1	IWRMP	384
3	Chartapa IP	/Perenial	Gravity	Jointly-managed	3300				1	1	MIP	5842
4	Kanchan IP, Saljhandi	Perenial	Gravity	Jointly-managed	200				1	1	MIP	360
5	Bagahabandh IP	Perenial	Gravity	Jointly-managed	240				1	1	MIP	305
6	Rohini IP	Perenial	Gravity	Farmer-managed	1500						MIP	1900
7	Siyari Baburiya IP	Perenial	Gravity	Farmer-managed	910						MIP	600
8	Tallo Khaireni Chappar Khola IP	Perenial	Gravity	Farmer-managed	200						MIP	250
9	Kanchan Bandh IP, Suryapura	Perenial	Gravity	Farmer-managed	1510						MIP	4780

**ANNEX 5 Summary Tables of Questionnaire Answers (GWID)**





1. Name of 6 Groundwater Irrigation Division and technical staff

S/N	Name of Division	No. of Technical staff/sociologist
1	Ground Water Irrigation Development Division, Mahottari	Senior Divisional Hydrogeologist-1 Engineer-1 Hydrogeologist-1 Sub-engineer (Asst. Hydrogeologist)-1 Sociologist (AO)-x Others, if any
2	Ground Water Irrigation Development Division, Sarlahi	Hydrogeologist A.Groundwater Hydrogeologist Driller
3	Ground Water Irrigation Development Division, Chitwan	Engineer-1 Hydrogeologist-1 Sub-engineer-0 Sociologist (AO)-0 Senior Mechanics-1 Assistant Hydrogeologist-1
4	Ground Water Irrigation Development Division, Dang	Officer-Incharge - 1 Engineer - 0 Hydrogeologist - 1 Sub-engineer - 0 Sociologist (AO) – 0 Others, if any
5	Ground Water Irrigation Development Division, Banke	Engineer-1 Hydrogeologist-1 Sub-engineer -1 Sociologist (AO)-1
6	Ground Water Irrigation Development Division, Kailali	Engineer Hydrogeologist - 1 Sub-engineer - 1 Sociologist (AO) - 1 Others, if any ( mechanical overseer)

2. Budget of this fiscal year of Groundwater Irrigation Development Division

Name of Division	Total Budget	Administrative budget	Project Budget
Mahottari	Rs.60,672,000	Rs.5,572,000	Rs.55,100,000
Kailali	Rs.110,000,000	Rs.10,000,000	Rs.100,000,000
Bunke	Rs. 69,205,000	Rs. 5,805,000	Rs. 63,400,000
Sarlahi	RS.46,100,000	Rs.759,000	Rs.40,341,000
Chitwan	RS.51,800,000	-	-
Dang	Rs. 66,706,000	Rs. 5,310,000	Rs. 61,350,000

3. List of Irrigation System (IS) under Groundwater Division in Terai

District	S/N	Name of IS	Groundwater Irrigation Division	DTW or STW	No. of Tube wells	Design discharge per pump (Litre/sec)	Command Area (ha)	#1 Conjunctive use ? Yes or No	Year construct ed	#2 Facility Condition	#3 Manage-ment type
Mahottari	1	Laximiniya DTW ISP	Mahottari	DTW	9	30-50	360	No		3 & 5	FM
	2	Bijalpur DTW ISP	Mahottari	DTW	3	30-40	180	No		3& 5	FM
	3	Other DTW ISP (mahottari District)	Mahottari	DTW	15	25-40	600	No		3&5	FM
	4	STW ISPs (mahottari District)	Mahottari	STW	3074	5-10	7685	No		1	FM
	5	Different DTW ISP (Dhanusha District)	Mahottari	DTW	7	25-40	280	No		3	FM
	6	STW ISPs (Dhanusha District)	Mahottari	STW	3006	5-10	7515	No		1	FM
	7	STW/DW ISPs (Sindhuli District)	Mahottari	Dug well	645	4-6	1612.5	No		1	FM
Kailali	1	Jhalari Cluster	Dhangadhi	DTW	26	30	104	No	2000	3	f
	2	Daiji Cluster	Dhangadhi	DTW	6	30	240	No	2012	1	f
	3	Krishnapur Cluster	Dhangadhi	DTW	8	30	320	No	2014	1	f
	4	Jugeda Cluster	Dhangadhi	DTW	10	30	400	No	1998	3	f
	5	Godawari Cluster	Dhangadhi	DTW	10	40	400	No		2	f
	6	Sadepani Cluster	Dhangadhi	DTW	6	30	240	No	On going cluster		
	7	Oter scatterd DTW system	Dhangadhi	DTW	12	30	480	No		2+3	f
Banke	1	Radhapur Sitapur	Nepalgunj, Banke	DTW	19	40	760	2	2055-2060	3	f
	2	Hirminiya, Udayapur, Piparhawa, and Bhawaniyapur	Nepalgunj	DTW	17	40	680	2	2054-2060	4	f
	3	Basudevpur	Nepalgunj	DTW	3	40	120	2	2055-57	4	f
	4	Banghusra Molhapurwa	Nepalgunj	DTW	10	40	400	2	2055-57	4	f
	5	Puraini	Nepalgunj	DTW	1	40	40	2	2056/57	4	f
	6	Mohanpur	Nepalgunj	DTW	1	40	40	2	2057/58	4	f
	7	Paraspur	Nepalgunj	DTW	1	40	40	2	2058-2060	4	f
	8	Puraini	Nepalgunj	DTW	2	40	80	2	2057-2060	4	f
	9	Puraina	Nepalgunj	DTW	2	40	80	2	2057-2061	4	f
	10	Chisapani	Nepalgunj	DTW	6	40	240	2	2061-2065	1	f
	11	Titahariya	Nepalgunj	DTW	1	40	40	2	2063-2065	3	f
	12	Khaskusma	Nepalgunj	DTW	2	40	80	2	2065-2066	3	f
	13	Bankatwa	Nepalgunj	DTW	2	40	80	2	2068-2069	4	f

	14	Jaispur	Nepalgunj	DTW	1	40	40	2	2068-2069	3	f
	15	Indrapur	Nepalgunj	DTW	1	40	40	2	2068-2069	1	f
	16	Samsherganj	Nepalgunj	DTW	9	40	360	2	2068-2069	1	f
	17	Kusum	Nepalgunj	DTW	2	40	80	2	2070-2073	2	f
	18	Different clusters	Nepalgunj	STW	3844	6	9610	1	051 to 072	-	f
Bardiya	1	Shantipur Jamuni	Nepalgunj	DTW	14	40	560	2	051-54	3	f
	3	Gulariya	Nepalgunj	DTW	1	40	40	2	055-56	1	f
	4	Belwa	Nepalgunj	DTW	2	40	80	2	066-67	1	f
	5	Taratal	Nepalgunj	DTW	5	40	200	2	067-73	1	f
	6	Sanoshree	Nepalgunj	DTW	1	40	40	2	067-68	1	f
	7	Dhodhari	Nepalgunj	DTW	1	40	40	2	068-69	1	f
	8	Sanoshree Taratal	Nepalgunj	DTW	6	40	240	2	071-73	1	f
	9	Different clusters	Nepalgunj	STW	6238	6	15595	2	051-072	-	f
	Surkhet	1	Different clusters	Nepalgunj	Dugwell	277	3	310	2	066-072	-
Rautahat	1	Bariyarpur I. S. , Bariyarpur 1,3,6	Sarlahi	STW	30	14	75	2	2072/73	1	F
	2	Maryadpur I. S., Maryadpur 5,7	Sarlahi	STW	15	13	37.5	2	2072/73	1	F
	3	Jayanagar I. S., Jayanagar 9	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	4	Madanpur I S, Madanpur 7	Sarlahi	STW	10	11	25	2	2072/73	1	F
	5	Dharahari I S, Dharahari 5,8	Sarlahi	STW	10	14	25	2	2072/73	1	F
	6	Kheshariya I S, Kheshariya 4	Sarlahi	STW	5	15	12.5	2	2072/73	1	F
	7	Jigadwa Belbichwa I S, Jigadwa Belbichwa	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	8	Pataura I S, Pataura 7,8	Sarlahi	STW	40	13	100	2	2072/73	1	F
	9	Pothiyahi I S, Pothiyahi 6	Sarlahi	STW	5	11	12.5	2	2072/73	1	F
	10	Hathiyahi I S, Hathiyahi 1,6	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	11	Bramhapuri I S, Bramhapuri 1	Sarlahi	STW	15	13	37.5	2	2072/73	1	F
	12	Shitalpur I S, Shitalpur 3	Sarlahi	STW	40	15	100	2	2072/73	1	F
	13	Gogdaul I S, Gogdaul 2	Sarlahi	STW	10	14	25	2	2072/73	1	F
	14	Pachrukhi I S, Pachrukhi 4	Sarlahi	STW	25	14	62.5	2	2072/73	1	F
	15	Ganga Pipra IS, Ganga Pipra 6	Sarlahi	STW	5	12	12.5	2	2072/73	1	F

	16	Malahi I S, Malahi 7	Sarlahi	STW	5	13	12.5	2	2072/73	1	F
	17	Jethrahiya I S, Jethrahiya 1,7	Sarlahi	STW	10	11	25	2	2072/73	1	F
	18	Mohammadpur I S, Mohammadpur 1,4,9	Sarlahi	STW	25	12	62.5	2	2072/73	1	F
	19	Saruatha IS, Saruatha 5,7,	Sarlahi	STW	10	12	25	2	2072/73	1	F
	20	Pipra Pokhariya I S, Pipra Pokhariya 3	Sarlahi	STW	5	14	12.5	2	2072/73	1	F
	21	Bhasedwa I S, Bhasedwa	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	22	Bagahi I S, Bagahi 4	Sarlahi	STW	5	11	12.5	2	2072/73	1	F
	23	Jatahara I S, Jatahara 7,8	Sarlahi	STW	20	13	50	2	2072/73	1	F
	24	Jhunkhunwa I S, Jhunkhunwa 2	Sarlahi	STW	5	15	12.5	2	2072/73	1	F
	25	Mithuawa I S, Mithuawa 3,4,9	Sarlahi	STW	10	14	25	2	2072/73	1	F
	26	Dharmapur I S, Dharmapur 6	Sarlahi	STW	10	11	25	2	2072/73	1	F
	27	Bhalohiya I S, Bhalohiya 4	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	28	Laukaha I S, Laukaha 4	Sarlahi	STW	10	13	25	2	2072/73	1	F
	29	Phatuwa harsaha I S, Phatuwa harsaha 5	Sarlahi	STW	5	15	12.5	2	2072/73	1	F
	30	Sanatapur Do. I S, Santapur Do. 1	Sarlahi	STW	5	14	12.5	2	2072/73	1	F
	31	Kanakpur I S, Kanakpur 4,8	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	32	Pipra Rajwada I S, Pipra Rajwada 4	Sarlahi	STW	10	13	25	2	2072/73	1	F
	33	Judibela I. S., Judibela-1	Sarlahi	DTW	1	25	25	2	2072/73	2	F
Sarlahi	1	Pakadi I S, Pakadi 1,4	Sarlahi	STW	10	11	25	2	2072/73	1	F
	2	Sekhauna I S, Sukhuna 7,8	Sarlahi	STW	16	12	40	2	2072/73	1	F
	3	Simara IS, Simara 3	Sarlahi	STW	5	13	12.5	2	2072/73	1	F
	4	Sakraul I S, Sakraul 7	Sarlahi	STW	5	14	12.5	2	2072/73	1	F
	5	Sundarpur IS, Sundarpur 5	Sarlahi	STW	5	15	12.5	2	2072/73	1	F
	6	Bahadurpur I S, Bahadurpur 1	Sarlahi	STW	10	15	25	2	2072/73	1	F
	7	Rohuwa I S, Rohuwa 9	Sarlahi	STW	10	12	25	2	2072/73	1	F

	8	Ishorpur I S, Ishorpur 9	Sarlahi	STW	25	14	62.5	2	2072/73	1	F
	9	Manpur I S, Manpur	Sarlahi	STW	25	12	62.5	2	2072/73	1	F
	10	Belhi I S, Belhi 7	Sarlahi	STW	10	13	25	2	2072/73	1	F
	11	Sahodwa I S, Sahodwa 3	Sarlahi	STW	5	14	12.5	2	2072/73	1	F
	12	Phulparasi I S, Phulparasi 4	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	13	Jabdi I S, Jabdi 5	Sarlahi	STW	5	11	10	2	2072/73	1	F
	14	Netragunj I S, Netragunj 1	Sarlahi	STW	4	12	12.5	2	2072/73	1	F
	15	Musaili I S, Musaili 4	Sarlahi	STW	5	15	17.5	2	2072/73	1	F
	16	Jamuniya I S, Jamuniya 7	Sarlahi	STW	7	14	12.5	2	2072/73	1	F
	17	Motipur I S, Motipur 3	Sarlahi	STW	5	13	12.5	2	2072/73	1	F
	18	Balara I S, Balara 8	Sarlahi	STW	5	12	12.5	2	2072/73	1	F
	19	Kaudena I S, Kaudena 1	Sarlahi	STW	5	11	12.5	2	2072/73	1	F
	20	Mahinathpur I S, Mahinathpur 6	Sarlahi	STW	5	14	12.5	2	2072/73	1	F
	21	Hathioul I S, Hathioul 3	Sarlahi	STW	5	12	25	2	2072/73	1	F
	22	Khoriya I S, Khoriya 5	Sarlahi	STW	5	15	12.5	2	2072/73	1	F
	23	Kishanpur I S, Kishanpur	Sarlahi	STW	10	11	2.5	2	2072/73	1	F
	24	Babargunj I S, Babargunj 8	Sarlahi	STW	5	13	5	2	2072/73	1	F
	25	Hariwan I.S., Hariwan-9	Sarlahi	DTW	1	30	30	2	2072/73	2	F
	26	Bhaktipur, Pokhariya	Sarlahi	DTW	1	25	25	2	2068/69	2	F
	27	Nareshkhor, Sarlahi	Sarlahi	DTW	1	25	25	2	2068/69	3	F
Chitwan	1	STW IS	Chitwan	STW	430	Equal or less than 10	1075	Yes	2072/073	Functioning properly	Farmer-managed
	2	DTW IS	Chitwan	DTW	6	12-35	Ongoing work	Yes	2072/073	Construction ongoing	Will be handed to farmer after the completion of construction works
Dang	1	Sonpur DTW Cluster	Dang	DTW	6		245	2		3	F
	2	Lalmatiya DTW Cluster	Dang	DTW	9		340	2		1	F
	3	Goberdiha DTW Cluster	Dang	DTW	5		235	2		1	F
	4	Satbariya Kamanpur`	Dang	DTW	1		40	2		1	F
	5	Dharna DTW Cluster	Dang	DTW	12		425	2		1	F
	6	Goltakuri DTW Cluster	Dang	DTW	4		120	2		3	F
	7	Tarigaun DTW Cluster	Dang	DTW	11		425	2		3	F

8	Duruwa DTW	Dang	DTW	1		15	2		1	F
9	Balapur Rampur DTW	Dang	DTW	1		15	2		1	F
10	Dhanauri DTW	Dang	DTW	1		15	2		1	F
11	Dhakana Fulbari DTW	Dang	DTW	1		40	2		1	F
12	Laxipur DTW Cluster	Dang	DTW	4		90	2		1	F
13	Dhikpur DTW Cluster	Dang	DTW	1		40	2		1	F
14	Duruwa VDC STW	Dang	STW	143		378	2		1	F
15	Bela VDC STW	Dang	STW	299		781	2		1	F
16	Rajpur VDC STW	Dang	STW	305		755	2		1	F
17	Sonpur VDC STW	Dang	STW	14		35	2		1	F
18	Gangapraspur VDC STW	Dang	STW	328		818	2		1	F
19	Gadhawa VDC STW	Dang	STW	518		1318	2		1	F
20	Chailahi VDC STW	Dang	STW	78		185	2		1	F
21	Satbariya VDC STW	Dang	STW	1024		2613	2		1	F
22	Dhikpur VDC STW	Dang	STW	5		12	2		1	F
23	Urahari VDC STW	Dang	STW	38		97	2		1	F
24	Hekuli VDC STW	Dang	STW	10		25	2		1	F
25	Ghorahi VDC STW	Dang	STW	10		24	2		1	F
26	Goberdiha VDC STW	Dang	STW	161		407	2		1	F
27	Pawannagar VDC STW	Dang	STW	6		15	2		1	F
28	Tulsipur Municipality	Dang	STW	13		32	2		1	F
29	Dhanauri	Dang	STW	7		17	2		1	F
30	Shreegaun	Dang	STW	5		12	2		1	F

#1 1. Conjunctive use with surface water 2. Groundwater only

#2 1.Maintenance and repair are done and functioning properly,2. Warning signs (flaws) are found but functioning, 3. Partly malfunctioning,4.Dilapidated and malfunctioning in whole, 5. Some pumps disabled, 6. Water dried up

#3 a. Agency-managed, j. Jointly-managed, f. Farmer-managed

#### 4. Problems of Irrigation Systems

Groundwater Irrigation Division	S/N	Name of the Irrigation System	Description
Mahottari	1	DTW ISPs (Laximinya, Pashupatinagar, Belgachhi, gaushala, Ramnagar, pashupatinagar etc.	Diesel pump should be replaced with electric pump
	2	DTW ISPs (Few in laximinya, and Sripur, Papara )	Maintainence of pump and transformer etc. should be done
Kailali	1	Jhalari, Daiji, Jugeda and other scattered DTW systems	Mostly the system are old and overall rehabilitation i.e. redrill, electrification, distribution system maintenance required.
Rautahat	1	Judibela DTW I.S., Judibela-1	
	2	STW of Rautahat district	All are well maintained. There is problem of electricity. Proper electrification could be a possible solution
Sarlahi	1	Bhaktipur, Pokhariya	need maintenance
	2	Nareshkhor, Sarlahi	need maintenance
	3	STW of Sarlahi district	All are well maintained. There is problem of electricity. Proper electrification could be a possible solution
Dang	1	Sonpur DTW Cluster	1 DTW is not in operation for a long time due to social conflict. The condition of transformer, panel board and submersible pump motor ave tol be checked
	2	Goltakuri DTW Cluster	1 DTW is filled up with sand. Sand have to be removed by means of bailing and then developed by air compressor
	3	Tarigaun DTW Cluster	1 DTW have reduced its yield, so the DTW has to be developed by air compressor
	4		Most of all DTWs were constructed 15-20 years ago, so repair, maintenance of Distribution System, Electrification and transformer and Submersible pump motor is required for all most all DTW Irrigation Systems.



## **ANNEX 6 Training Materials of IMD**



### **Trainings to DOI staff and WUAs by IMD**

IMD gives trainings to DOI staff and WUAs so as to improve their capacity. IMD has prepared system management training materials in 2007, whose titles and contents are shown in the following pages. Trainings are demand-basis.

#### IDD/IDSD

IDDs/IDSDs apply for training to IMD every year. Then, IMD gives trainings to IDD/ISDS staff: usually 10 – 25 times a year. Training contents are prepared based on respective demands. Such training demand is high and IMD has to select IDD/IDSDs for training. Also, IMD can give training to WUAs of FMISs with DOI staff.

#### FIMDs

IMD also gives trainings to FIMD staff and WUAs of JMISs, whose managements are under IMD responsibility, every year. This is also demand-basis. However, IMD collects demand more actively because FIMDs are closer to IMD than IDD/IDSD. Since FIMDs know the irrigation system/facilities, irrigated area and WUAs of JMIS as the managing entity, it is easier to identify and analyze needs for capacity building.

#### Projects/Programmes

IMD gives technical assistance to staff working for projects/programs, e.g. the water management component of CMIASP-AF and IWRMP-AF. The technical assistance includes not only system management and WUA strengthening but also integrated crop water management.

**List of 16 Training Guideline and Help Booklets published by**  
**Dol**  
**Training Help Booklets**

**Book let no. 1**

**Title: WUAs Concept, Formation Process & Procedures**

<b>Content-Syllabus</b>	<b>1-2</b>
1. Introduction on Irrigation System Structures	3-14
2. Governmental Policy and Water Resources act for mobilization of Participant	15-34
3. Concept at Water User's Association	35-49
4. Organizing process of Water users Association: pre organizing phase	50-70
5. Organizing Process of Water users Association: On going Phase	71-49
6. Statute of Water uses Association	84-113
7. Organizing Procedure of WUA, Approval of statute & Registration of WUA office	114-137
8. References	

**Book let no. 2**

**Title: Assets Management of Water User's Association**

<b>Content-Syllabus</b>	<b>1-2</b>
1. Assists Management	3-17
2. Auditing and Monitoring of Assists records	18-31
3. Approval of assets and its Management	32-41
4. Account Keeping	42-53
5. Depreciated and Compensation	54-65
6. Exercise on Depreciation Method	66-73
7. Glossiness & Review exercises on Assets Management	74-85
8. References	

**Book let no. 3**

**Title: Agricultural Production & Management**

<b>Content-Syllabus</b>	<b>1-2</b>
1. Factors of Crop Production	5-13
2. Soil	14-26
3. Water	27-43
4. Seeds	44-60
5. Nutrients	61-75
6. Climate (Meteorology)	76-92
7. Agricultural Practice	93-112
8. Diseases and Pests	113-130

9. Farm Management	131-144
10. Crop Planning and Budgeting	145-155
11. Crop Harvesting and processing	156-170
12. Agriculture Mechanization	171-182
13. References	

#### **Book let no. 4**

##### **Title: Awareness Campaign on Irrigation Management Transfer (IMT)**

<b>Content-Syllabus</b>	<b>1-2</b>
1. Government Policy over Irrigation Development and its Management Transfer	3-14
2. Irrigation Management Transfer Project	15-24
3. Role of related agencies on IMT Program Implementation	25-36
4. Participation of WUA in IMT Program Implementation	37-44
5. <i>References</i>	45

#### **Book let no. 5**

##### **Title: Basic Data of Command Area**

<b>Content-Syllabus</b>	
1. Basic know-how of data of Irrigation Management transfer	1-16
2. Baseline data of Project inflected area	17-32
3. Sources of data	33-46
4. Practice and Management of data	47-60
5. <i>References</i>	61

# Training Guidelines

## Book let no. 1

### Title: Water Measurement Techniques

Content or Syllabus	1-2
1. Water Measurement in Irrigation System	2-14
2. Float Method	15-30
3. Current meter	31-42
4. Use of cut throat flumes	43-73
5. Practical Knowledge of Current meter	74-86
6. Practical Knowledge of cut throat flume	87-99
7. Float Method Knowledge of Water Measurement	100-111
8. <i>References</i>	112

## Book let no. 2

### Title: Canal Maintenance

Content or Syllabus	1-4
1. Introduction of Irrigation System	5-17
2. Canal Maintenance Identifying Survey	18-30
3. Maintenance of Canal Structure	31-44
4. Prioritization and Clarification of Canal Maintenance	45-56
5. Need of Canal Maintenance	57-60
6. Rule of Cost Estimate	61-73
7. Work Plan and its Categorizing	74-83
8. Implementation Process of Canal Maintenance	84-94
9. Limitation in Canal Maintenance and Preventive Measures	95-105
10. Supervision of Canal Maintenance	106-117
11. Preparation of Canal Maintenance Plan	118-129
12. Organizing Canal Maintenance work force	130-143
13. Protection and repair of canal structure	144-158
14. Silt Clearance and Leakage repair in Canals	159-171
15. Consisting Canal Bank and tree Plantation	172-190
16. <i>References</i>	191

**Book let no. 3****Title: Construction Management and Quality Contract**

<b>Content or Syllabus</b>	<b>1-3</b>
1. Construction Management and Quality contract	4-17
2. Setting Construction Plan	18-37
3. Preliminary Preparation of Construction work	38-48
4. Practical Exercises	49-51
5. Design and drawings of Constructing works	52-64
6. Contract	65-76
7. Work details and work accomplishment Report	77-85
8. Specification	86-101
9. Construction Management	102-112
10. Quality Standard of Construction Materials.	113-129
11. Construction Procedure and its Standardization	130-145
12. Method of field level Quality Monitoring of Construction materials	146-152
13. <i>References</i>	153

**Book let no. 4****Title: Canal Operation Plan**

<b>Content or Syllabus</b>	<b>1-3</b>
1. Introduction in of Irrigation System	4-17
2. Water Control Structures	18-33
3. Water Distribution Process	34-45
4. Irrigation Scheduling	46-63
5. Method of Canal Operation	64-75
6. Irrigation for Paddy (Crop)	76-89
7. Irrigation for Wheat	90-100
8. Irrigation for Sugarcane	101-110
9. Irrigation for legume and vegetables	111-120
10. Field Observation of Irrigation Canals	121-124
11. Practical exercise of Irrigation Scheduling	125-128
12. <i>References</i>	129

**Book let no. 5****Title: Action Plan Preparation**

<b>Content or Syllabus</b>	<b>1-3</b>
1. Action Plan	4-15
2. Joint Walk Through	16-26
3. Action area of Irrigation Management Transfer Program	27-37
4. Printing Work, cost estimate and Categorizing Works	38-63
5. Action Plan Preparation and Implementation	64-85
6. Sub Project Management and implementation Procedure	86-95
7. Contract Document	96-112
8. Familiar Model of Action Plan	113-142
9. Joint Observation of Irrigation System	143-149
10. Action Plan Preparation M 412	150-156
11. <i>References</i>	157

**Book let no. 6****Title: On Farm Water Management**

<b>Content or Syllabus</b>	<b>1-3</b>
1. Farm Water Management	4-19
2. Water flow Measurement Techniques	20-36
3. Lets Know our Farm Soil Gradation	37-49
4. Soil Water Relationship	50-67
5. Soil and Plant Relationship	68-80
6. Plant and Water Relationship	81-94
7. Water Application Method	95-116
8. Furrow Irrigation Method	117-138
9. Flood Irrigation Method	139-151
10. Practices of Discharge Measurement	152-158
11. Practices of Canal Water flow Measurement	159-160
12. Irrigation in Paddy	161-174
13. Irrigation in Wheat	175-185
14. Irrigation in Sugarcane	186-195
15. Irrigation Scheduling	196-213
16. Water Control Structures	214-229
17. <i>References</i>	290



## Book let no. 7

### Title: Basic Administration and Office Management

#### Content or Syllabus

1-3

- Basic Administration of WUA and Office Administration
- Direction to Trainers : WUA Administration; why, how and for what purpose
- Subject Matter : WUA Administration; why, how and for what purpose
- Direction to Trainers : WUA Office ; why, how and for what purpose
- Subject Matter : WUA Office ; why, how and for what purpose
- Direction to Trainers : WUA Organization role and responsibilities of its execution; why, how and for what purpose
- Subject Matter: WUA Organization role and responsibilities of its execution; why, how and for what purpose
- Direction to Trainers : WUA Meeting and Implementation of action; why, how and for what purpose
- Subject Matter : WUA Meeting and Implementation of action; why, how and for what purpose
- Direction to Trainers : Plan/Program Preparation and Implementation; why, how and for what purpose
- Subject Matter : Plan/Program Preparation and Implementation; why, how and for what purpose
- Direction to Trainers : Office record keeping and its management; why, how and for what purpose
- Subject Matter: Office record keeping and its management; why, how and for what purpose
- Direction to Trainers: File Management; why, how and for what purpose
- Subject Matter: File Management; why, how and for what purpose
- Direction to Trainers: Office Administration Monitoring and Evaluation; why, how and for what purpose
- Subject Matter: Office Administration Monitoring and Evaluation; why, how and for what purpose
- Model of WUA sub rules

## Book let no. 8

### Title: Basic Account Keeping of 6th Type: WUA Basic Account Keeping

• Trainers: WUA Account recording; why how and for what purpose	3
○ Subject Matter: WUA Account recording; why how and for what purpose	11
• Account recording system Historical Background	14
• Trainers: WUA account recording; why how and for what purpose	17
○ Subject Matter : WUA account recording; why how and for what purpose	22
• Merits, demerits and limitation of Single Entry account keeping	23
• Meaning, objectives and merits of double Entry account keeping	24
• Importance, Limitation and demerits of double Entry account keeping	27
• Differences between single Entry and Double Entry account keeping	27
• Subject Matter: Account Record Keeping System; why how and for what purpose	28
Accessories of accounting	32
• Trainers Direction : Assets and liabilities, property source identification & its meaning	34
○ Subject Matter: Assets and liabilities, property source identification & its meaning	42
• Trainers Direction : WUA account, Record keeping; why how and for what purpose	48
○ Subject Matter: WUA account, Record keeping; why how and for what purpose	57
• Trainers Direction : WUA account; why how and for what purpose	63
○ Subject Matter : WUA account; why how and for what purpose	72
• Trainers Direction : WUA Balance sheet; why how and for what purpose	79
○ Subject Matter : WUA Balance sheet; why how and for what purpose	87
• Trainers Direction : WUA Cash Management; why how and for what purpose	92
○ Subject Matter: WUA Cash Management; why how and for what purpose	97
• Trainers Direction : Audit in WUA; why how and for what purpose	100
○ Subject Matter: Audit in WUA; why how and for what purpose	108

## **Book let no. 9**

### **Title: Women's Participation in Irrigation**

#### **Syllabus**

1. Women's Participation in Irrigation	3-15
2. Institutional decision making procedure of WUA	16-29
3. Training Procedure for Women	30-41
4. Job oriented programs for Women	42-51
5. Resources collection and mobilization	52-64
6. Sectoral Allocation for women's participation	65-74
7. Skill and awareness development for women's participation in Irrigation	75-90
8. Refreshment Programs to enhance Women's participation	91-102
9. References	103

## **Book let no. 10**

### **Title: Resource Generation and Moralization**

#### **Syllabus**

1. Resource generation and its practices	3-16
2. Categories of resources and its generation process in WUA	17-30
3. Resources collection for Irrigation System, operation and maintenance	31-45
4. Resource mobilization and its practices	49-59
5. References	60

## **Book let no. 11**

### **Title: Basic Share System Development and Administration Contents**

Development and implementation of Basic share system syllabus

1

- Trainers Direction: General process of WUA development; why how and for what purpose  
3
- Subject Matter: General process of WUA development; why how and for what purpose  
10
- Trainers Direction: Set General sketch of WUA; why, how and for what purpose  
15
- Subject Matter: Set General sketch of WUA; why, how and for what purpose  
25
- Trainers Direction: WUA as Commercial Organization; why, how and for what purpose  
31
- Subject Matter: WUA as Commercial Organization; why, how and for what purpose  
35
- Trainers Direction: Share System development; why how and for what purpose  
40
- Subject Matter: Share System development; why how and for what purpose  
50

- Trainers Direction: Share System Implementation for WUA; why, how and for what purpose 57
- Subject Matter: Share System Implementation for WUA ;why, how and for what purpose 61
- Trainers Direction: Internal Administration Working procedure Part I; why how and for what purpose 64
- Subject Matter: Internal Administration working procedure Part I; why how and for what purpose 72
- Trainers Direction: Internal Administration working procedure Part II; why how and for what purpose 78
- Subject Matter: Internal Administration working procedure Part II; why how and for what purpose 82
- Trainers Direction: WUA rules and regulations; why how and for what purpose 86
- Subject Matter: WUA rules and regulations; why how and for what purpose 90
- Trainers Direction: Financial Records of WUA; why how and for what purpose 93
- Subject Matter: Financial Records of WUA; why how and for what purpose 98
- Trainers Direction: General work style of water distribution; why how and for what purpose 101
- Subject Matter: General work style of water distribution; why how and for what purpose 108

**ANNEX 7 List of IWRMP Irrigation Sub-projects**



Additional Financing–AF–On–going

SN	District	Name of Sub–project	CA (ha)
	Western Region		
	Mountain		
1	Mustang	Syang	42
2	Mustang	Jhong Putak	50
3	Manang	Tilche	25
	0		117
	Hill		
4	Gulmi	Waorgati Sanichaur	55
5	Gulmi	Damkaphant/Sota	100
6	Lamjung	Bangrebeshi	75
7	Lamjung	Kesidi Lamabagar	25
8	Parbat	Sibdi Chiluwa	37
9	Tanahun	Bhanu Barah	40
10	Baglung	Chhisti	52
11	Baglung	Tallo Lamahi Phant	38
12	Kaski	Kharikhola Bhalabhat	34
13	Kaski	Dhiprangbesi	28
14	Kaski	Kotre Kafaltar	38
15	Palpa	Serakhet	26
16	Syangja, Palpa	Aandhi khola (AKWUA)	330
17	Syangja	Kamtitar	32
18	Arghakhanchi	Kopche Damare	64
19	Gorkha	Pokharatar	70
20	Gorkha	Bakrang Besi	75
21	Myagdi	2023 Sale kulo	33
	0		1152
	Terai–Surface		
22	Nawalparasi	Tokare	520
23	Kapilvastu	Madwan Sikari	535
24	Kapilvastu	Bharai khola	200
25	Rupandehi	Itiyakulo	2500
26	Rupandehi	Jhimjhime	240
	0		3995
	Terai–GW		
27	Kapilvastu	Valwad DTW –18 Nos.(Reh.)	460
28	Rupandehi	BLGWP– DTW–25 Nos.–Reh.	3000
	0		3460
	0		8724
	Mid–Western Region		
	Mountain		
29	Humla	Maspatal	100
30	Humla	Gangru Pinathang	28
31	Jumla	Giri Khola	110
	0		238
	Hill		
32	Surkhet	Malarani Sahare	200
33	Surkhet	Jharkhet	28
34	Surkhet	Mathillo Bahuni Chaur	44
35	Surkhet	Gamkhola Kholte Pani	40
36	Rukum	Chauke Takuri	45
37	Rukum	Sakure	45
38	Jajarkot	Chaukha Rauli Jyula	27
39	Pyuthan	Lamasera	25
40	Pyuthan	Pindali Phat	45
41	Rolpa	Manghat	50
42	Rolpa	Oat ISP	45

	0		594
	Terai-Surface		
43	Dang	Lohadabre	800
44	Dang	Bahundanda	270
45	Bardiya	Ambasa-Balanti	213
46	Banke	Paruwa	200
47	Banke	Thure	215
	0		1698
	Terai-GW		
48	Dang	Bela DTW (New-4 Nos)	160
49	Banke	Radhapur Sitapur DTW-Reh.-19 Nos	760
	0		920
	0		3450
	Far-Western Region		
	Mountain		
50	Bajhang	Bhairabnath	50
51	Bajhang	Subeda Tallo Jyula	35
52	Bajhang	Subeda Mallo Jyula	60
53	Bajhang	Kuch ISP	40
54	Darchula	Naktad	72
55	Darchula	Pant Pali	40
	0		297
	Hill		
56	Baitadi	Limuda	50
57	Baitadi	Manekuda	27
58	Doti	Kadamandu	200
59	Doti	Kala Patthareswar	150
60	Dadeldhura	Dhittadi	29
61	Dadeldhura	Bhitte Sal	32
	0		488
	Terai-Surface		
62	Kanchapur	Bagun	256
63	Kanchapur	Kalapani	600
64	Kailali	Ratipur	367
	0		1223
	Terai-GW		
65	Kailali	Sadhepani DTW-New- 6 Nos.	240
	0		240
	0		2248
	Total of 3 Regions - 65 Nos.		14422



### Additional Financing–AF–Completed

SN	District	Name of Sub-project	CA (ha)
<b>Western Region</b>			
	Hill		
1	Gulmi	Jherdi khola	25
2	Parbat	Aguwa khola	35
3	Tanahun	Bilmade Mulpani	45
4	Palpa	Itiya khola	29
5	Palpa	Sardewa	50
6	Palpa	Gairapanari, Binapate	56
7	Arghakhanchi	Damaidhunga	50
	Total –west–Hill		290
<b>Western Total</b>			<b>290</b>
<b>Mid–Western Region</b>			
	Hill		
8	Pyuthan	Ghari kulo	30
9	Pyuthan	Gartung khola	55
10	Salyan	Darimjyuala	56
	0		141
	Terai–Surface		
11	Dang	Ratgaiyan	495
12	Bardiya	Batule– Kurule	70
	0		565
	Terai–GW		
13	Bardiya	Sanoshree DTW (New–6 Nos)	240
	0		240
<b>Mid–Western Total</b>			<b>946</b>
<b>Far–Western Region</b>			
	Mountain		
14	Darchula	Goiladi	26
	0		26
	Hill		
15	Baitadi	Nwali	40
16	Doti	Dhanrasankhet	72
17	Dadeldhura	Jogijala (Re–appraised)	29
18	Dadeldhura	Badhuwa	26
	0		167
<b>Far–Western Total</b>			<b>193</b>
<b>Total of 3 Regions – 18 Nos.</b>			<b>1429</b>

<b>AF Total Ongoing</b>	<b>14422</b>
<b>AF Total Completed</b>	<b>1429</b>
<b>Total Compl. + Ongoing–83</b>	<b>15851</b>

**Completed – Original Scope**

SN	SN	Region	Ecological Belt	District	Name of Sub-project	CA (ha)
<b>Western Region</b>						
1	1	1-WDR	A-Mountain	Mustang	Namgel	32
2	2	1-WDR	A-Mountain	Mustang	Dhakmaar	90
3	3	1-WDR	A-Mountain	Manang	ShyarkhuGhatte	25
4	4	1-WDR	A-Mountain	Manang	Gowa khola	26
<b>Total-West-Mountain</b>						173
5	1	1-WDR	B-Hill	Lamjung	Tarawali	25
6	2	1-WDR	B-Hill	Lamjung	Sheraphant (Re-appraised)	65
7	3	1-WDR	B-Hill	Lamjung	Eklephant	25
8	4	1-WDR	B-Hill	Lamjung	Majuwa khola	80
9	5	1-WDR	B-Hill	Lamjung	Kirincheckandabote (Re-appraised)	52
10	6	1-WDR	B-Hill	Lamjung	Sitikhola Bhatbesi	50
11	7	1-WDR	B-Hill	Syangja	Suraudi	80
12	8	1-WDR	B-Hill	Syangja	Tamakhubari	30
13	9	1-WDR	B-Hill	Syangja	Jyagdi thulokulo	40
14	10	1-WDR	B-Hill	Kaski	Puranbesi	48
15	11	1-WDR	B-Hill	Kaski	Bagadi Birauta	75
16	12	1-WDR	B-Hill	Kaski	Polyangtar	110
17	13	1-WDR	B-Hill	Palpa	Aath Bishe	25
18	14	1-WDR	B-Hill	Palpa	Churi Chaurasi	30
19	15	1-WDR	B-Hill	Palpa	Gethi Chaur	34
20	16	1-WDR	B-Hill	Palpa	Dailatung	40
21	17	1-WDR	B-Hill	Palpa	Legduwa Jhumsa	34
22	18	1-WDR	B-Hill	Palpa	Jhyangla Phant	35
23	19	1-WDR	B-Hill	Palpa	Maidani Phant	45
24	20	1-WDR	B-Hill	Palpa	Amerai (Re-appraised)	53
25	21	1-WDR	B-Hill	Palpa	Talmul (Re-appraised)	78
26	22	1-WDR	B-Hill	Palpa	Argali	215
27	23	1-WDR	B-Hill	Palpa	Materi kulo	28
28	24	1-WDR	B-Hill	Baglung	Lekhani	62
29	25	1-WDR	B-Hill	Myagdi	Babiyachaur	34
30	26	1-WDR	B-Hill	Myagdi	Ghara	80
31	27	1-WDR	B-Hill	Gorkha	Hajariphant	38
32	28	1-WDR	B-Hill	Gorkha	Dhumwakot	54
33	29	1-WDR	B-Hill	Gorkha	Nimel phant	25
34	30	1-WDR	B-Hill	Gorkha	Kaldheri khet	25
35	31	1-WDR	B-Hill	Gorkha	Bhandarthok	50
36	32	1-WDR	B-Hill	Parbat	Khurkot	95
37	33	1-WDR	B-Hill	Parbat	Thulakhet	30
38	34	1-WDR	B-Hill	Tanahun	Nayatar	100
39	35	1-WDR	B-Hill	Tanahun	Golme Shankhe	45
40	36	1-WDR	B-Hill	Tanahun	Pokhrel phant	30
41	37	1-WDR	B-Hill	Tanahun	Chundi khola	29
42	38	1-WDR	B-Hill	Tanahun	Chundi Barah	45
43	39	1-WDR	B-Hill	Tanahun	Gadi Jhauritar	51
44	40	1-WDR	B-Hill	Tanahun	Shera phant	50
45	41	1-WDR	B-Hill	Tanahun	Bhulke kulo	44
46	42	1-WDR	B-Hill	Gulmi	Jethi Kulo	50
47	43	1-WDR	B-Hill	Gulmi	Dalli khola	29
48	44	1-WDR	B-Hill	Gulmi	Lampate	45
49	45	1-WDR	B-Hill	Gulmi	Tardi khola	50
50	46	1-WDR	B-Hill	Gulmi	Pahadi phant	29
51	47	1-WDR	B-Hill	Arghakhanchi	Thuladhunga	40
52	48	1-WDR	B-Hill	Arghakhanchi	Durga phant	35
53	49	1-WDR	B-Hill	Arghakhanchi	Bangi khola	31
<b>Total-West-Hill</b>						2493
54	1	1-WDR	C-Terai-Surface	Kapilvastu	Gangauliya Gautaria	220
55	2	1-WDR	C-Terai-Surface	Kapilvastu	Sayar Bandh	400
56	3	1-WDR	C-Terai-Surface	Kapilvastu	Galaha Bangawa	800
57	4	1-WDR	C-Terai-Surface	Rupandehi	Gajedi (Re-appraised)	419
58	5	1-WDR	C-Terai-Surface	Rupandehi	Gonaiya	800
59	6	1-WDR	C-Terai-Surface	Rupandehi	Motipur Khadwa	1500
60	7	1-WDR	C-Terai-Surface	Nawalparasi	Tamsariya Baruwa	217
<b>Total-West-Terai-Surface</b>						4356
61	1	1-WDR	D-Terai-GW-DTW-New	Rupandehi	Parroha-Semlar DTW (10 nos.) New	400
62	2	1-WDR	D-Terai-GW-DTW-New	Nawalparasi	Tamsariya DTW- 240 ha-developd- 200 ha only	200
63	3	1-WDR	E-Terai-GW-DTW-Rehab.	Nawalparasi	Sunol Swathi DTW Rehab.	240
64	4	1-WDR	F-Terai-GW-STW-Electrification	Rupandehi	Suryapura STW-Electrification	200
<b>Total-West- GW</b>						1040
<b>Total of Western Region</b>						<b>8062</b>
<b>Mid-Western Region</b>						
65	1	'2 -MWDR	A-Mountain	Kalikot	Ghunkhaya	104
66	2	'2 -MWDR	A-Mountain	Kalikot	Khatikulo	150
67	3	'2 -MWDR	A-Mountain	Dolpa	Khatijyula	100

68	4	'2 -MWDR	A-Mountain	Dolpa	Jugeni to Rangaon	52
69	5	'2 -MWDR	A-Mountain	Mugu	Barkhu	90
70	6	'2 -MWDR	A-Mountain	Humla	Yanchujyula	50
71	7	'2 -MWDR	A-Mountain	Jumla	Bandi Raaj	120
<b>Total-Mid-West-Mountain</b>						<b>666</b>
72	1	'2 -MWDR	B-Hill	Surkhet	Ratataar Goremare	85
73	2	'2 -MWDR	B-Hill	Surkhet	Itaura	60
74	3	'2 -MWDR	B-Hill	Surkhet	Kharkhola	225
75	4	'2 -MWDR	B-Hill	Surkhet	Chanaute	87
76	5	'2 -MWDR	B-Hill	Surkhet	Baghkhori	40
77	6	'2 -MWDR	B-Hill	Pyuthan	Kasi kulo	35
78	7	'2 -MWDR	B-Hill	Pyuthan	Badahara Saribang	30
79	8	'2 -MWDR	B-Hill	Pyuthan	Aarang Khola	25
80	9	'2 -MWDR	B-Hill	Rolpa	Madichaur	30
81	10	'2 -MWDR	B-Hill	Rolpa	Puran Gaun	40
82	11	'2 -MWDR	B-Hill	Rukum	Chandribang	30
83	12	'2 -MWDR	B-Hill	Rukum	Bhalachaur	31
84	13	'2 -MWDR	B-Hill	Jajarkot	Oriwaul	40
85	14	'2 -MWDR	B-Hill	Jajarkot	Kolgad	25
86	15	'2 -MWDR	B-Hill	Salyan	Reshamjyula	100
87	16	'2 -MWDR	B-Hill	Salyan	Bhumeshworjyula	40
88	17	'2 -MWDR	B-Hill	Salyan	Pandheri Palesi	45
89	18	'2 -MWDR	B-Hill	Salyan	Mantura	50
90	19	'2 -MWDR	B-Hill	Salyan	Syalpani	27
<b>Total-Mid-West-Hill</b>						<b>1045</b>
91	1	'2 -MWDR	C-Terai	Dang	Baruwa Guale	228
92	2	'2 -MWDR	C-Terai	Dang	Malware	1200
93	3	'2 -MWDR	C-Terai	Dang	Dohate	38
94	4	'2 -MWDR	C-Terai	Dang	koraban	210
95	5	'2 -MWDR	C-Terai	Dang	Patukhola	250
96	6	'2 -MWDR	C-Terai	Dang	Oineriya	60
97	7	'2 -MWDR	C-Terai	Dang	Chhotekulo	180
98	8	'2 -MWDR	C-Terai	Dang	Manpure	400
99	9	'2 -MWDR	C-Terai	Banke	Malaiya Pathraiya	285
100	10	'2 -MWDR	C-Terai	Bardiya	Kaaligaudi	230
101	11	'2 -MWDR	C-Terai	Bardiya	Pratappur	235
<b>Total-M. west-Terai-Surface</b>						<b>3316</b>
102	1	'2 -MWDR	D-Terai-GW-DTW-New	Banke	Shamshergunj DTW-9 Nos.360 ha-developed-270 ha only	270
103	2	'2 -MWDR	F-Terai-GW-STW-Electrification	Banke	Jaispur Saigaon STW-115 Nos.	315
<b>Total-MidWest- GW</b>						<b>585</b>
<b>Total of Mid- Western Region</b>						<b>5612</b>
<b>Far-Western Region</b>						
104	1	'3 -FWDR	A-Mountain	Bajura	Pilchaur Majhkulo	35
105	2	'3 -FWDR	A-Mountain	Bajura	Dungreekhola	64
106	3	'3 -FWDR	A-Mountain	Bajhang	Purchauri	30
107	4	'3 -FWDR	A-Mountain	Darchula	Chaud	60
108	5	'3 -FWDR	A-Mountain	Darchula	Chholaigad	58
<b>Total-Far-West-Mountain</b>						<b>247</b>
109	1	'3 -FWDR	B-Hill	Doti	Salenigad	60
110	2	'3 -FWDR	B-Hill	Achham	Ranisera	58
111	3	'3 -FWDR	B-Hill	Achham	Badabinayak	51
112	4	'3 -FWDR	B-Hill	Dadeldhura	Ghatteplot	45
113	5	'3 -FWDR	B-Hill	Dadeldhura	Goalghar Bhitrisen	30
114	6	'3 -FWDR	B-Hill	Dadeldhura	Choud Rupal	48
115	7	'3 -FWDR	B-Hill	Baitadi	Paudi Surinayagad	277
<b>Total Far-west-Hill</b>						<b>569</b>
116	1	'3 -FWDR	C-Terai-Surface	Kailali	Amarawati	200
117	2	'3 -FWDR	C-Terai-Surface	Kailali	Gaidakheda	450
<b>Total-Far-west Terai-Surface</b>						<b>650</b>
118	1	'3 -FWDR	E-Terai-GW-DTW-Rehab.	Kanchanpur	Parashan DTW Rehab.-2 Nos.	80
119	2	'3 -FWDR	F-Terai-GW-STW-Electrification	Kailali	Udasipur STW Electrification -67	200
<b>Total-Far-west -GW</b>						<b>280</b>
<b>Total of Far- Western Region</b>						<b>1746</b>
<b>Total of 3 Regions</b>						<b>15420</b>

**On-going – Original Scope**

SN	Region	Ecological Belt	District	Name of Sub-project	CA (ha)
1	1-WDR	A-Mountain	Manang	Tenki	45
<b>Total-West-Mountain</b>					<b>45</b>
2	1-WDR	B-Hill	Baglung	Kusmishera	57
<b>Total-West-Hill</b>					<b>57</b>
3	1-WDR	C-Terai-Surface	Kapilvastu	Gudrung khola	400
4	1-WDR	C-Terai-Surface	Kapilvastu	Bethi	470
5	1-WDR	C-Terai-Surface	Nawalparasi	Nayabelhani	320
<b>Total-West- Terai</b>					<b>1190</b>
<b>Total of Western Region</b>					<b>1292</b>
6	'2 -MWDR	A-Mountain	Kalikot	Sukatiya	71
7	'2 -MWDR	A-Mountain	Mugu	Gulm	90
<b>Total-Mid-West-Mountain</b>					<b>161</b>
8	'2 -MWDR	B-Hill	Surkhet	Ghat Gaun	400
9	'2 -MWDR	B-Hill	Surkhet	Chaur khola	50
10	'2 -MWDR	B-Hill	Surkhet	Tatekulo	90
11	'2 -MWDR	B-Hill	Dailekh	Jugeni khola	50
12	'2 -MWDR	B-Hill	Dailekh	Khadapalchaur	80
<b>Total-West-Hill</b>					<b>670</b>
<b>Total of Mid- Western Region</b>					<b>831</b>
13	'3 -FWDR	C-Terai-Surface	Kailali	Banikulo	1800
14	'3 -FWDR	C-Terai-Surface	Kailali	Bandegada	205
<b>Total-Far-West-Terai</b>					<b>2005</b>
15	'3 -FWDR	D-Terai-GW-DTW	Kanchanpur	Daiji DTW -New -9 Nos.	360
<b>Total-Far-West- GW</b>					<b>360</b>
<b>Total of Far- Western Region</b>					<b>2365</b>
<b>Total of 3 Regions</b>					<b>4488</b>

<b>OS Total Ongoing</b>	<b>4488</b>
<b>OS Total Completed</b>	<b>15420</b>
<b>Total Compl. + Ongoing-134</b>	<b>19908</b>
<b>Approved CA by PICC</b>	<b>20038</b>
<b>Difference</b>	<b>130</b>

## **ANNEX 8 IWRMP Irrigation Sub-projects' Salient Features**



**IRRIGATION AND WATER RESOURCES MANAGEMENT PROJECT (IWRMP)  
SALIENT FEATURE OF THE SUB PROJECT**

Feb. 2014

District		Kapilyasta
Sub Project Name/Location		Madwan Sikari Khola ISP Bhalwad 1-7 & 9.
1	Classification:- Rehab Major/Minor	Major
2	Location(VDC-Ward no.)	Bhalwad 1,2,3,4,5,6,7 & 9.
<b>Social Informations</b>		
3	Total Household (Nos.)	1103
4	Total Population (Nos)	5678
a	Male (Nos)	2783
b	Female (Nos)	2895
c	Dalit (Nos)	97
d	Janjati (Nos)	280 HHs.
i	Tharu	142 hhs
ii	Magar	120 hhs
iii	Newar	8 hhs
iv	Gurung	5 hhs
v	Kumal	2 hhs
vi	Majhi	2 hhs
vii	Bitalu	1 hhs
<b>WUA Composition</b>		
5	Total Executive committee member (Nos)	11
a	Male (Nos)	7
b	Female (Nos)	4
c	Janjati (Nos)	3
d	Dalit (Nos)	2
<b>Engineering Informations</b>		
6	Name of the source	Madwan Sikari Khola
7	Type of Source	Perinial
8	Catchment area (km <sup>2</sup> )	18.00
9	Catchment area Condition (eg. land use, land slides, erosion etc)	Dense forest with monor land slide and erroision
10	Maximum flood Discharge (m <sup>3</sup> /s)	115.00
11	Measured Discharge (lps) (date)	2620.31/23 March 2013
12	GCA(ha)	668.50
13	Total CCA(ha)	535.00
14	CCA of Main Canal-1 (Existing/Extension)	535.00
15	Canal Design Discharge at H/W (lps)	1600.00
16	Duty (lps/ha)	2.99
17	Diversion structure (Weir, Side Intake)	Side Intake
18	Canal type	Earthen and lining
19	Nos. of Main canal	1.00
a	Length (existing/ Extension)	6.20km/0
b	Design discharge (lps)	1600.00
c	Alignment Passing through (forest, agri. land, slide zone, settlement etc.)	Forest, Agriculture land and barren land.
21	Nos. of Branch canal	LS Br-2/RS Br-9
24	Total Idle Length (Km)	0.49

Detailed Estimate.xlsx

IRRIGATION AND WATER RESOURCES MANAGEMENT PROJECT (IWRMP)  
SALIENT FEATURE OF THE SUB PROJECT

Feb. 2014

District		Kapilvasta
Sub Project Name/Location		Madwan Sihar Khola ISP Bhalwad 1-7 & 9
	<b>Project Cost</b>	
25	Total cost (NRs.)	83,896,000.00
a	Cost of civil works (NRs.)	4,589,367.35
b	WUA Payable (NRs.)	5,889,364.10
c	Others (contingencies+general items) NRs.	79,306,632.65
d	WUA contribution	10.51%
e	Cost / ha	156,814.95
f	EIRR(%)	23.70%
g	B/C ratio@ 10% discount rate	2.41
26	<b>Canal Structures</b>	
a	Intake Structure (Nos.)	1.00
b	Desilting basin/Gravel/sediment trap (Nos.)	1.00
c	Lined Canal (m.)	3500.00
d	Aqueduct (Nos./Span)	2.00/20m
e	VRB/ Culvert (Nos.)	5.00
f	Culvert/Division box	1.00
g	Foot bridge (Nos.)	5.00
h	Division Box (Nos.)	4.00
i	Drop Structure (Nos)	5.00
j	Outlets (Nos.)	8.00
k	Escape (Nos.)	3.00
l	Protection Works (m)	100.00
m	Proportional divider(nos)	2.00
n	Cross Regulator	3.00
	<b>Agriculture Informations</b>	
27	Existing Cropping intensity (%)	112.90
28	Proposed Cropping intensity (%)	185.05
29	<b>Cropping pattern (Crops and total area)</b>	
a	Existing	Monsoon Paddy,wheat,Pulses Oilseed,Potato and Winter Vegetable(604Ha)
b	Proposed	Monsoon Paddy,wheat,Pulses Oilseed,Potato and Winter and summer Vegetable Maize(990Ha)
30	<b>Crop Yield (ton/ha)</b>	
a	Paddy:-Existing/Proposed	2/3.2
b	Wheat :-Existing/Proposed	2.5/2.8
c	Maize:-Existing/Proposed	2/3.2
d	Oil seeds :-Existing/Proposed	0.70/0.95
e	Potato:- Existing/Proposed	8/12
f	Pulse	0.75/1
g	Vegetables :-Existing/Proposed	8/12



## Salient Features

1	Sub-Project	Bhairahawa Lumbini Deep Tubewell Rehab ISP
a	Name	Ground Water
b	Type	Rehab
c	Classification	
2	Location	Various
a	VDC	Rupandehi
b	District	Lumbini
c	Zone	Western
d	Region	East West Highway
e	Nearest Road Head	
3	Social Information	
a	Household (Nos)	3008
b	Population (Nos)	15306
c	Male (Nos)	7347
d	Female (Nos)	7960
		Dalit, Janjati, Madhesi
4	System Structures	
e	Submersible Pump (Nos)	1*25=25
f	Transformer 100 KVA	10
g	Transformer 125 KVA	5
j	Maintenance of Open Canal (Km)	40
5	Water Source and Design Parameters	
a	Source Name	Deep Aquifer
b	Type	Deep Tubewell
c	Size of the DTW	14/10 inch
d	Housing length (m)	50
e	Screen length (m)	20-30
f	Design Discharge (lps)	100-120
g	Drawdown (m)	10-30
h	Total Head (m)	50
i	Pump Capacity (HP)	100-115
6	Command Area	
a	Gross Command Area (Ha)	3200
b	Net Command Area (Ha)	3000

<b>7</b>	<b>Agriculture Information</b>	
<b>A</b>	<b>Cropping Pattern (Crops/Area)</b>	
a	Existing Cropping Pattern	Paddy/Maize -Wheat/Vegetables/Potato (9/100)
b	Proposed Cropping Pattern-	Paddy/Vegetables -Wheat /Potato /Vegetables - Sp.maize/Sp.paddy
<b>B</b>	<b>Cropping Intensity</b>	
a	Existing Cropping Intensity (%)	160
b	Proposed Cropping Intensity (%)	208
<b>C</b>	<b>Crop Coverage (Ha)</b>	
a	Existing (Ha)	4790
b	Proposed (Ha)	6250
<b>D</b>	<b>Crop Yields (Ton/Ha)</b>	
a	Paddy: Existing/Proposed	2.8/3.5
b	Wheat :-Existing/Proposed	1.8/2.5
c	Maize:-Existing/Proposed	1.8/2
d	Oil seeds :-Existing/Proposed	0.7/1
e	Pulses:- Existing/Proposed	0.7/1
f	Potato:- Existing/Proposed	7/12
g	Vegetables:- Existing/Proposed	7/12
<b>8</b>	<b>Environment</b>	
a	Soil Erosion	Insignificant
b	Over Extraction	Insignificant
c	SEMP required	Along with SEMP
d	Water Quality	Insignificant
<b>9</b>	<b>Institutional</b>	
a	Water User Committee	9-13 Member WUA in each 25 TW units
b	Total Executive member (Nos)	267=(25 WUAs each having 9-13 Executives)
	Female (Nos)	58
	Janjati (Nos)	70
c	Water Right Conflict	Insignificant
<b>10</b>	<b>Project Cost</b>	
a	Total Cost (NRs.)	182305919.52
b	SEMP mitigation cost NRs	1050000.00
c	DOI Share (NRs.)	155117531.59
d	WUA Share (NRs.)	27188387.93 (In cash/kind)

*Detail Feasibility Study of Bhairahawa Lumbini DTW Irrigation Rehabilitation Sub-project, Rupandehi*

e	Cost per ha (NRs.)	60768.64
11	<b>Economic Analysis</b>	
a	EIRR	22.55
b	Incremental Benefit (Nrs/ha/yr)	24136.87
c	Economic Life (yr)	20
d	Benefit Cost Ratio @ 10% discount rate	2.00
12	<b>Recommendation</b>	
The Proposed project is genuine, there is not any alternative of irrigation system, so it is strongly recommended for implementation, because the area is feasible for ground water irrigation, farmers are interested and agreed to share their own contribution as well.		

## 2. Salient Features

1. Sub-Project	(a) Name (b) Type	: Lohadabre Irrigation Sub-Project : 'Major Rehab' (inner valley)
2. Location	(a) VDC (W. No.) (b) District (c) Zone (d) Region (e) Nearest Road Head	: Dhikpur-5, 8, 9, Duruwa-3,4, Manpur-9 : Dang : Rapti : Mid-Western : Ghorahi-Tulsipur Highway (blacktopped); offtake at Khaira to project site by all weather gravel road
3. People	(a) Household (b) Population (c) Ethnic Groups (Percent)	: 689 Nos <sup>4134</sup> : 4130 Nos (Male:2000, Female:2134) : Tharu (38%), Kshetri (28%), Bhramin (20%), Dalit (14%)
4. Canal System	(a) Main Canal Length (km) (b) Idle Length (km) (c) Secondary/Branch Canal Length (km) (d) Main Canal Design Discharge	: 7.6 Km : 1.5 km : 12 Km : 1.6 m <sup>3</sup> /s
5. Water Source	(a) Name (b) Type (c) Catchment Area (d) Measured Flow / Date (e) High Flood Discharge	: Patre Khola, Hapur Khola : Perennial : 29.29 Km <sup>2</sup> , 51.2 km <sup>2</sup> : 3000 lps, 4000 lps on 1 <sup>st</sup> Nov,2010 : 143 m <sup>3</sup> /s
6. Command Area	(a) Net Command Area (Ha)	: 800 Ha
7. Canal Structures	(a) Headwork (Diversion work with intake) (b) Super passage (c) Canal Lining (d) Retaining and Protection (e) Proportional Dividers/ outlets (f) Earthwork in Excavation	: 1 no' : 1 No : 100 m : 2 Nos : 4 no : 1 Job
8. Agriculture	<u>Existing</u> (a) Crops  (b) Cropping Intensity (c) Crop Yields (Ton/Ha)  <u>Future</u> (a) Crop  (b) Cropping Intensity (%) (c) Crop Yields (Ton/Ha)	: Paddy, Maize, Wheat, Oilseed, Pulse, Potato, Vegetable : 113 % : Paddy-3, Wheat-2.5, Maize-2.1; Oilseed- 0.64, Pulse 0.55, Potato-7, Vegetable-7 : Paddy, Maize, Wheat, Oilseed, Pulse, Potato, Vegetable : 202.88 % : Paddy-4, Wheat-3.5, Maize-4, Oilseed-1.5, Pulse 1.8, Potato-12, Vegetable-13
9. Hydrology/ Climate	(a) Water Balance (+ / -) (b) Temperature (°c) (c) Annual Rainfall (mm) (d) Average Elevation (MSL)	: (+) : 3°-39 ° : 1627 : 600 m
10. Environment	(a) Land Slide Zone (b) Soil Erosion (c) Environmental Impact Evaluation	: None : Insignificant : No significant negative impact Significant beneficial impact in terms socio-economic benefit
11. Institutional	(a) Water User Association (b) Upfront Cash Deposit (NRs)	: Active and functional WUA in place : Cash =41,000 @ NRs 50/ha deposited

	(c) Water Right Conflict	:	along with application. None
12. Cost Analysis	(a) Total Cost	:	NRs 11,69,67,000.00
	(b) Cost/Ha	:	NRs 1,46,208.75
	Cost Sharing	:	
	(c) DoI/IDA Share	:	NRs 108,414,945.11
	(d) (WUA Share)	:	NRs 8,552,054.89 (~10% of civil cost)
13. Economic Analysis	(a) EIRR	:	29.61 %
	(b) Benefit Accrued	:	NRs 4,28,35,511.20 /Year
	(c) Economic Life	:	20 years
	(d) Benefit Cost Ratio (@10%)	:	2.45
	(e) Sensitivity Analysis	:	
	1. EIRR at 10% decrease in benefit and 10% increase in cost	:	24.46 %
2. EIRR at 10 % increase in cost	:	27.18%	

SALIENT FEATURES

	(a) Name (b) Type	: Bahundanda Irrigation Project : 'Major Rehab' (lower hill)
	(a) VDC (W. No.) (b) District (c) Zone (d) Region (e) Nearest Road Head	: Ghorahi (Ward No 7,8,9) : Dang : Rapti : Mid-Western : Ghorahi to project site by all weather road
	(a) Household (b) Population (c) Ethnic Groups (Percent)	: 201 nos : 1670 nos : Chhetri (51%), Brahmin (10%), Dalit (2%), Tharu (28%)
Canal System	(a) Main Canal Length (km) (b) Secondary/Branch Canal Length (km) (c) Main Canal Design Discharge	: 6.00 Km : 2.5 : 1.08 m <sup>3</sup> /s
Source	(a) Name (b) Type (c) Catchment Area (d) Measured Flow (lps)/Date (e) High Flood Discharge (m <sup>3</sup> /s)	: Schar khola : Perennial : 20 Km <sup>2</sup> : 240 l/s : 140 m <sup>3</sup> /s
Command Area	(a) Net Command Area (Ha)	: 270Ha
Proposed Works	(a) Headworks with regulator (b) Canal Lining (c) Canal Drops (d) Division Boxes (e) Canal Road Crossing (VRB) (f) Trifurcation Structure (g) Earthwork in Excavation	: 1 no : 3550m : 15 Nos : 5 Nos : 3 Nos : 1 no : 1 Job
Culture	Existing (a) Crops (b) Cropping Intensity (c) Crop Yields (Ton/Ha)	: Paddy, Maize, Wheat, Oilseed, Pulse, Potato, Vegetable : 151.48 % : Paddy-4.0, Wheat-2.30, Maize-2.5, Oilseed-0.80, Pulse 0.90, Potato-11.80

irrigation and Water Resources Management Project (IWRMP)

	<b>Future</b>	
	(a) Crop	: Paddy, Maize, Wheat, Oilseed, Pulse, Potato, Vegetable
	(b) Cropping Intensity (%)	: 171.48%
	(c) Crop Yields (Ton/Ha)	: Paddy-4.1, Wheat-2.54, Maize-2.50, Oilseed-0.90, Pulse-1.00, Potato-11.80, Vegetable-13.64
<b>Climate</b>	(a) Water Balance (+ / -)	: (+)
	(b) Temperature (°c)	: 3°- 39°
	(c) Annual Rainfall (mm)	: 1627
	(d) Elevation (MSL)	: 550
<b>Environment</b>	(a) Land Slide Zone	: None
	(b) Soil Erosion	: Insignificant
	(c) Environmental Impact Evaluation	: No significant negative impact Significant beneficial impact in terms socio-economic benefit
<b>Institutional</b>	(a) Water User Association	: Active and functional WUA in place
	(b) Upfront Cash Deposit (NRs)	: Cash @ NRs 50/ha deposited along with application. Upfront cash to be collected after project is approved for implementation
	(c) Water Right Conflict	: None
<b>Cost Analysis</b>	(a) Total Cost	: NRs 68,835,500.00
	(b) Cost/Ha	: NRs 254, 946.00
	Cost Sharing	: NRs. 65,793,270. 27
	(c) DoI/IDA Share	: NRs. 3,042,229.73
	(d) (WUA Share	: (4. 42% of cost of sub-project cost)
<b>Economic Analysis</b>	(a) EIRR	: 21.98%
	(b) Benefit Accrued	: NRs 17,863,940.55
	(c) Economic Life	: 20 years
	(d) Benefit Cost Ratio	: 1.83
	(e) Sensitivity Analysis	
	1. EIRR at 10% decrease in benefit and 10% increase in cost	: 17.80%
	2. EIRR at 10 % increase in cost	: 20.04%

## Salient Features

<b>1. Sub-Project</b>	(a) Name	: Ambasa-Balanti ISP project
	(b) Type	: 'Major Rehab' (Terai)
<b>2. Location</b>	(a) VDC (W. No.)	: Neulapur- 1
	(b) District	: Bardiya
	(c) Zone	: Bheri
	(d) Region	: Mid-Western
	(e) Nearest Road Head	: Bhurigaun, Mahendra Highway
<b>3. People</b>	(a) Household	: 296, Permanent Resident
	(b) Population	: 2208
	(c) Ethnic Groups (Percent)	: Brahmin (25.88%), Chhetris (6.07%), Tharu (51.81 %), Dalits (9.34%), Magars (6.89 %)
<b>4. Canal System</b>	(a) Main Canal Length (km)	: 4.5 Km
	(b) Feeder Canal Length (km)	:
	(c) Branch Canal (Name/No)	: 2
	(d) Total Branch Canal Length (km)	: 2.20 km
	(e) Main Canal Design Discharge	: 400 lps
<b>5. Water Source</b>	(a) Name	: Ambasa Khola
	(b) Type	: Perennial
	(c) Catchment Area (km <sup>2</sup> )	: 9.6
	(d) Measured Flow (lps)/Date	: 670 lps / 25 th dec 2013
	(e) Highest Flood Discharge (cumcc)	: 55 m <sup>3</sup> /sec / by SCS method
<b>6. Command Area</b>	(a) Gross Command Area (Ha)	: 220
	(b) Net Command Area (Ha)	: 213 (113 ha Extentation)
<b>7. Canal Structures</b>	(a) H/W Site	: Headworks
	(b) Aqueduct (No.)	: 2
	(c) VRBs (No.)	: 3
	(d) Foot Bridge (No.)	: 5
	(e) Division boxes (No.)	: 7
	(f) Escapes (No.)	: 1
	(g) Canal lining	: 3200m
	(h) Drain Underpass (No.)	: 2
<b>8. Agriculture</b>	<u>Existing</u>	
	(a) Cropping Pattern	: Maize - Paddy - Wheat
	(b) Cropping Intensity	: 145.54 %
	(c) Crop Yields (Ton/Ha)	: Paddy-2.4, Maize-1.55, Wheat-1.65, Oilseed -0.45, Pulses -0.45, Potatoes- 8,



	(d) Food Deficit	:	Yes, nearly 4 months of the year.
	(e) Soil Type	:	Loamy Clay, sandy soil
	<u>Future</u>	:	
	(a) Cropping Pattern	:	Paddy - Paddy - Wheat Maize - Paddy - Wheat or Pulses etc 263%
	(b) Cropping Intensity (%)	:	Paddy-3.6, Maize-2.6, Wheat-2.55,
	(c) Crop Yields (Ton/Ha)	:	Oilseed-0.75, Pulses -0.75, Potato-12, Vegetable-12.
	:	:	
<b>9. Hydrology</b>	(a) Water Balance (+ / -)	:	(+)
	(b) Temperature (°c)	:	13° - 40° C
	(c) Annual Rainfall (mm)	:	1479
	(d) Elevation (MSL)	:	
<b>10. Environment</b>	(a) Land Slide Zone	:	none
	(b) Soil Erosion	:	none
	(c) Predominant Rock	:	none
	(d) IEE Evaluation	:	none
<b>11. Institutional</b>	(a) WUA Committee	:	Formed & Registered
	(b) Upfront Cash Deposit (NRs)	:	15000.00
	(c) Water Right Conflict	:	None
<b>12. Cost Analysis</b>	(a) Total Cost	:	NRs 42553000.00
	(b) Cost per ha	:	NRs 199779.00
	(c) DOI Share	:	NRs 39511473.36
	(d) WUA Share	:	NRs 3041526.64
<b>13. Economic Analysis</b>	(a) EIRR	:	21.89 %
	(b) Benefit Accrued	:	NRs 13398236.45 per Annum
	(c) Economic Life	:	25 years
	(d) Benefit Cost Ratio	:	1.87 at 10% discount rate.
	(e) Sensitivity Analysis	:	At 20% decrease in benefit- 18.41, 1.180 At 20 % increase in cost - 18.32, 1.185
<b>14. Recommendation</b>		:	Highly Recommended for Early Implementation of the project as soon as possible.

## Salient Features

<b>1. Sub-Project</b>	(a) Name	: Paruwa Irrigation Sub project
	(b) Type	: 'Major Rehab' (Terai)
<b>2. Location</b>	(a) VDC (W. No.)	: Kachanapur- 8
	(b) District	: Banke
	(c) Zone	: Bheri
	(d) Region	: Mid-Western
	(e) Nearest Road Head	: Shamshergunj, Mahendra Highway, Banke
<b>3. People</b>	(a) Household	: 191, Permanent Resident
	(b) Population	: 1160
	(c) Ethnic Groups (Percent)	: Brahmin (10%), Chhetris (41.63%), Tharu (38.79 %), Dalits (3.02%), Magars (6.56 %)
<b>4. Canal System</b>	(a) Main Canal Length (km)	: 3.0 Km
	(b) Feeder Canal Length (km)	:
	(c) Branch Canal (Name/No)	: 3
	(d) Total Branch Canal Length (km)	: about 1.50 km
	(e) Main Canal Design Discharge	: 370 lps
<b>5. Water Source</b>	(a) Name	: Paruwa Khola
	(b) Type	: Perennial
	(c) Catchment Area (km <sup>2</sup> )	: 54
	(d) Measured Flow (lps)/Date	: 800 lps / 20 th January 2012
	(e) Highest Flood Discharge (cumec)	: 33 M3/sec
<b>6. Command Area</b>	(a) Gross Command Area (Ha)	: 205
	(b) Net Command Area (Ha)	: 200
<b>7. Canal Structures</b>	(a) H/W Site	: Existing core wall, protection work
	(b) Aqueduct (No)	: 1
	(c) VRBs (No)	: 7
	(d) Foot Bridge (No)	: 5
	(e) Division boxes (No)	: 4
	(f) Escapes (No)	: 1
	(g) Canal lining	: 1575m
	(h) Others	: Protection work
<b>8. Agriculture</b>	<u>Existing</u>	
	(a) Cropping Pattern	: Maize - Paddy - Wheat
	(b) Cropping Intensity	: 155 %
	(c) Crop Yields (Ton/Ha)	: Paddy-2.5, Maize-1.8, Wheat-1.8, Oilseed -0.50, Pulses -0.50, Potatoes- 8, and Vegetables-8.

	(d) Food Deficit	: Yes, nearly 4 months of the year.
	(e) Soil Type	: Loamy Clay
	<u>Future</u>	:
	(a) Cropping Pattern	: Paddy - Paddy - Wheat Maize - Paddy - Wheat or Pulses etc
	(b) Cropping Intensity (%)	: 248%
	(c) Crop Yields (Ton/Ha)	: Paddy-3.6, Maize-2.9, Wheat-2.7, Oilseed-0.9, Pulses -1.05, Potato-15 and Vegetable-15.
<b>9. Hydrology</b>	(a) Water Balance (+ / -)	: (-)
	(b) Temperature (°c)	: 5° - 36° C
	(c) Annual Rainfall (mm)	: 1440
	(d) Elevation (MSL)	: 151 m
<b>10. Environment</b>	(a) Land Slide Zone	: none
	(b) Soil Erosion	: none
	(c) Predominant Rock	: none
	(d) IEE Evaluation	: none
<b>11. Institutional</b>	(a) WUA Committee	: Formed & Registered
	(b) Upfront Cash Deposit (NRs)	: 5000
	(c) Water Right Conflict	: None
<b>12. Cost Analysis</b>	(a) Total Cost	: NRs 32802000.00
	(b) Cost per ha	: NRs 164010.00
	(c) DOI Share	: NRs 30461566.00
	(d) WUA Share	: NRs 2340433.00
<b>13. Economic Analysis</b>	(a) EIRR	: 38.87 %
	(b) Benefit Accrued	: NRs 17216032.01 per Annum
	(c) Economic Life	: 25 years
	(d) Benefit Cost Ratio	: 3.67 at 10% discount rate.
	(e) Sensitivity Analysis	: At 20% decrease in benefit- 34.48, 3.18 : At 20 % increase in cost - 32.98, 2.96
<b>14. Recommendation</b>		: Highly Recommended for Early : Implementation of the project as soon as possible.

## Salient Features

<b>1. Sub-Project</b>	(a) Name	: Thure Irrigation Sub project
	(b) Type	: 'Major Rehab' (Terai)
<b>2. Location</b>	(a) VDC (W. No.)	: Mahadevpuri-7
	(b) District	: Banke
	(c) Zone	: Bheri
	(d) Region	: Mid-Western
	(e) Nearest Road Head	: Shamshergunj, Mahendra Highway, Banke
<b>3. People</b>	(a) Household	: 298, Permanent Resident
	(b) Population	: 3457
	(c) Ethnic Groups (Percent)	: Brahmin (23.52%), Chhetris (36.53%), Tharu (22.27 %), Dalits 4.83%, Magars (10.15 %), Others (2.69%)
<b>4. Canal System</b>	(a) Main Canal Length (km)	: 9.75 Km
	(b) Feeder Canal Length (km)	:
	(c) Branch Canal (Name/No)	: 2
	(d) Total Branch Canal Length (km)	: 2.1 km
	(e) Main Canal Design Discharge	: 450 lps
<b>5. Water Source</b>	(a) Name	: Thure Khola
	(b) Type	: Perennial
	(c) Catchment Area (km <sup>2</sup> )	: 10
	(d) Measured Flow (lps)/Date	: 580 lps / 20 th march 2014
	(e) Highest Flood Discharge (cumec)	: 65 m <sup>3</sup> /sec / by SCS method
<b>6. Command Area</b>	(a) Gross Command Area (Ha)	: 220
	(b) Net Command Area (Ha)	: 215
<b>7. Canal Structures</b>	(a) H/W Site	: Permanent weir & Undersluice Str.
	(b) Drain Under pass (No)	: 2
	(c) VRBs (No)	: 2
	(d) Foot Bridge (No)	: 5
	(e) Division boxes (No)	: 7
	(f) Escapes (No)	: 1
	(g) Canal lining	: 2500m
	(h) Others	: -
<b>8. Agriculture</b>	<u>Existing</u>	
	(a) Cropping Pattern	: Maize - Paddy - Wheat
	(b) Cropping Intensity	: 140.47 %
	(c) Crop Yields (Ton/Ha)	: Paddy-2.4, Maize-1.6, Wheat-1.5, Oilseed -0.45, Pulses -0.45, Potatoes- 8,

		and Vegetables-8.
	(d) Food Deficit	: Yes, nearly 4 months of the year.
	(e) Soil Type	Loamy Clay -
	<u>Future</u>	
	(a) Cropping Pattern	Paddy - Paddy - Wheat Maize - Paddy - Wheat or Pulses etc 260%
	(b) Cropping Intensity (%)	Paddy-3.6, Maize-2.6, Wheat-2.5,
	(c) Crop Yields (Ton/Ha)	Oilseed-0.75, Pulses -0.75, Potato-12 and Vegetable-12.
<b>9. Hydrology</b>		
	(a) Water Balance (+ / -)	: (+)
	(b) Temperature (°c)	: 14° - 43° C
	(c) Annual Rainfall (mm)	: 1470
	(d) Elevation (MSL)	: 190m
<b>10. Environment</b>		
	(a) Land Slide Zone	: none
	(b) Soil Erosion	: none
	(c) Predominant Rock	: none
	(d) IEE Evaluation	: none
<b>11. Institutional</b>		
	(a) WUA Committee	: Formed & Registered
	(b) Upfront Cash Deposit (NRs)	: 10500
	(c) Water Right Conflict	: None
<b>12. Cost Analysis</b>		
	(a) Total Cost	: NRs 40120000.00
	(b) Cost per ha	: NRs 186604.00
	(c) DOI Share	: NRs 37253434.79
	(d) WUA Share	: NRs 2866565.21
<b>13. Economic Analysis</b>		
	(a) EIRR	: 23.43 %
	(b) Benefit Accrued	: NRs 17216032.01 per Annum
	(c) Economic Life	: 25 years
	(d) Benefit Cost Ratio	: 1.99 at 10% discount rate.
	(e) Sensitivity Analysis	: At 20% decrease in benefit-19.77, 1.264 : At 20 % increase in cost -19.67, 1.259
<b>14. Recommendation</b>		Highly Recommended for Early : Implementation of the project as soon as possible.

## SALIENT FEATURES

Subproject Name	: <i>Bela Deep Tubewell Irrigation Sub-project</i>
Sub-project Type	: <i>New</i>
VDC	: <i>Bela -4</i>
District	: <i>Dang</i>
Zone	: <i>Rapti</i>
Nearest Road Head	: <i>East-West Highway</i>
Net Command Area	: <i>160 ha</i>
Existing Cropping Intensity	: <i>150%</i>
Proposed Cropping Intensity	: <i>231.88%</i>
Type of Tube well	: <i>Deep Tube well</i>
Tube well Discharge Capacity	: <i>40 lps</i>
Number of Tube wells	: <i>4</i>
Size of Tube well	: <i>250 mm / 150 mm (average depth 100m)</i>
Distribution System	: <i>uPVC pipe with Alfa-Alfa type outlet</i>
Beneficiaries Household	: <i>276</i>
Beneficiaries Population	: <i>1578</i>
Total Subproject Cost (NRs)	: <i>38572307.00</i>
Construction Cost of I DTW	: <i>9643076.75</i>
Cost per Hectare (NRs)	: <i>241076.91</i>
Incremental Benefit / ha (NRs)	: <i>103860.83</i>
Project Period	: <i>25 years</i>
Tube well Life	: <i>25 years</i>
Life of Pump & Motor	: <i>15 years</i>
Major crops	: <i>Paddy, Wheat, Maize and Oilseeds</i>
B / C at 10% discount rate	: <i>2.83</i>
EIRR	: <i>19.02</i>
Remark	: <i>Technically Feasible &amp; Economically Viable</i>

## 2. ASSESSMENT OF EXISTING SITUATION

### 2.1. Demographic Characteristics

#### 2.1.1. Population

The population of the study area is about 1578. The population is increasing with an average growth of 2.4 percent. The population with respect to ethnic composition in the project area is presented in table 2.1.

Table 2.1: Populations and Ethnic Composition of the Sub-project

S.N.	Ethnic Group	Beneficiaries	
		Household	Population
1	Chhetri	51	290
2	Brahman	36	208
3	Limbu	4	26
4	Rai	24	145
5	Magar	28	170
6	Tamang	6	39
7	Dalit (Kami, Damai, Sharki, Dum)	28	168
8	Newar	11	81
9	Gurung	6	48
10	Gharti/Bhujel	6	33
11	Madheshi	17	101
12	Tharu	36	210
13	Other	14	59
	Total	267	1578

Source: Field Visit

#### 2.1.2. Distribution of Households by Sex

The total number of household in the study area is 481. About 51 percent of the total population of the study area is male and 49 percent is female. This is presented in the table below table 2.2.

Table 2.2: Distribution of Household by Sex of the Sub-project

S.N.	Household	Population	Male	Female
1	267	1578	776	802

Source: Field Visit

## 4. ASSESSMENT OF ANTICIPATED DEVELOPMENT OF THE SUB-PROJECT AREA

### 4.1. Agricultural Benefits from the Sub-project

#### 4.1.1. Proposed Cropping Pattern, Area and Intensity

The proposed cropping pattern will be more than that of existing one. The proposed pattern will certainly change the existing cropping practice and increase cropping intensity from existing 150 percent to 231.88 percent. The present and proposed cropping area of each crop and cropping intensity is presented in table 4.1.

Table 4.1 Present & Proposed Cropping Area and Intensity

S.N.	Crop	Present (without Project)		Future (With Project)	
		Crop Area (ha)	Cropping Intensity (%)	Crop Area (ha)	Cropping Intensity (%)
1	Paddy	146	91.25	130	81.25
2	Maize	29	18.13	80	50.00
3	Wheat	35	21.87	55	34.38
4	Oilseed	30	18.75	46	28.75
5	Potato			30	18.75
6	Vegetable			30	18.75
Total		240	150.00	371.00	231.88
Net Command Area (Ha) =				160	
Cropping Intensity =		150.00			231.88

#### 4.1.2. Anticipated Crop Yield and Production

The inputs have been proposed considering the availability of irrigation water and agricultural facilities. With introduction of DTW irrigation and adapting new practices on irrigated land the level of crop yields will be increased significantly. The anticipated and present yields for various crops are presented in table 4.2.

Table 4.2 Anticipated & Present Crop Yields

S. No	Crops	Yields (t / ha)		Differences
		Present	Anticipated	
1	Paddy	3.3	4.1	0.8
2	Maize	2.9	4.9	2
3	Wheat	2.5	2.9	0.4
4	Oilseed	0.8	1.05	0.25
5	Potato		6.8	6.8
6	Vegetable		12	12



## SALIENT FEATURES

1. Sub-Project
  - (a) Name : Batule-Kurule, ISP
  - (b) Type : Hill / Major Rehabilitation
2. Location
  - (a) Latitude/Longitude : 28° 20' 15" N to 28° 20' 30" N and 81° 44' 30" E to 81° 44' 45" E
  - (b) VDC (W.No.) : Belawa 7Kha
  - (c) District : Bardiya
  - (d) Zone : Bheri
  - (e) Region : Mid-Western
  - (f) Nearest Road Head : 3.0Km from the command area
3. People
  - (a) Household : 99
  - (b) Population : 540 (male 260, female 280)
  - (c) Ethnic Group : 4.81% of Brahmin, 31.34% of Kshetri, 19.09 % of Magar, 32.22% of Dalit and others 12.04%.
4. Canal System
  - (a) Main Canal Length (Km) : 2.76
  - (b) Branch Canal (Name/No.) : 1
  - (c) Total Branch Canal Length (km) : 0.75
  - (d) Main Canal Design Discharge : 95 lps and 52 lps
5. Water Source
  - (a) Name : Khote Khola
  - (b) Type : Run-off the river
  - (c) Catchment Area (Km<sup>2</sup>) : 10.5 Km<sup>2</sup>
  - (d) Measured Flow (lps)/Date : 500 / 22<sup>th</sup> January, 2012
  - (e) Highest Flood Discharge : 35 m<sup>3</sup>/s
6. Command Area
  - (a) Gross Command Area (Ha) : 120
  - (b) Net Command Area (Ha) : 70
7. Canal Structure
  - (a) H/W Type : site intake 2 nos.
  - (b) Aqueduct : 8
  - (c) Super Passage (No.) : 1
  - (d) Pipe chute (No.) : 1
  - (e) VRB (No.) : 1
  - (f) Escape (No.) : 2
  - (g) Division Box (No.) : 8
  - (h) Canal Lining (m) : 1935m
  - (i) Retaining Wall : 20m
  - (j) Pipe canal : 260m

<u>Existing</u>	
(a) Cropping Pattern	: Paddy, Wheat, Maize, Potato, Pulses, Oilseeds
(b) Cropping Intensity	: 144%
(c) Crop Coverage	:
(d) Crop Yield (Ton/Ha)	: Paddy-2.5, Wheat-1.8, Maize-1.8, Potato-8, Pulses-0.5, and Oilseeds-0.5
(e) Food Deficit	: Yes
(f) Soil Type	: Loamy
<u>Future</u>	
(a) Cropping Pattern	: Paddy, Wheat, Maize, Potato, Summer Vegetable, Winter Vegetable, Pulses, and Oilseeds.
(b) Cropping Intensity	: 269 %
(c) Crop Coverage	:
(d) Crop Yield (Ton/Ha)	: Paddy-3.4, Wheat-2.8, Maize-2.55, Potato-14, Veg-12, Veg (winter)-12.
8. Hydrology	
(a) Water Balance	: (+)
(b) Temperature	: 10° - 40°
(c) Annual Rainfall	: 156.5 mm
(d) Elevation(MSL)	: 325 to 375
9. Environment	
(a) Land Slide Zone	: 100 m
(b) Soil Errosion	: 30 m
(c) Predominante Rock	: 25m
(d) IEE Value	: D
10. Institutional	
(a) WUA Committee	: Registered Committee Existing
(b) Upfront Cash Deposite	: Yes
(c) Water Right Issue	: NONE
11. Cost Analysis	
(a) Total Cost	: 27761759.00
(b) Cost per Ha	: 396596.00
(c) DOI Share	: 25780147.00
(d) WUA Share	: 1981611.00
12. Economic Analysis	
(a) EIRR	: 14.75%
(b) Benefit Accured	:
(c) Economic Life	: 25 yr.
(d) Benefit Cost Ratio	: 1.34 at 10% discount rate
Recommendation	: Recommended for Implentation

SALIENT FEATURES

1. **NAME OF PROJECT** : Kalapani ISP  
 Category : Rehab.
2. **LOCATION**
  - 2.1 Location : North east of district headquarter
  - 2.2 VDCs/ Na. Pa. : Jhalari Na. Pa-6,7,9 & 10
  - 2.3 District/ District headquarter : Kanchanpur/ Mahendranagar
  - 2.4 Zone/ Development region : Mahakali/ Western
  - 2.5 Physiographic division : Middle Mountain
  - 2.6 Accessibility
    - a. Nearest Airport : Dhangadi
    - b. Nearest Roadhead : Site
  - 2.7 Geographical Features
    - a. Latitude : N 28° 57' 01"
    - b. Departure : E 80° 21' 37"
  - 2.8 Topographical Map No. : 2880 01 A & B (Scale 1:25000)
  - 2.11 Marketing Facilities : From Dhangadi (20km)
3. **COMMAND AREA**
  - 3.1 Gross Command area : 700 Ha.
  - 3.2 Net command area : 600 Ha.
  - 3.3 Soil (Suitability for rice) : Loamy, GBM
4. **HYDROLOGY**
  - 4.1 Hydrological region/Basin : 7
  - 4.2 Name of source : Shyali and Toti Khola
  - 4.3 Type of source : Perennial (Scale 1:25000)
  - 4.4 Measured discharge : 1041 lps (Shyali) and 57 lps (Toti) (10<sup>th</sup> April, 2013)
  - 4.5 Bed Material/River stage : Course Sand, Gravel, Boulder
  - 4.6 River Course : Perennial, Braided & Meandering/Flows zig-zaggy
  - 4.7 Water Right Problem : None
5. **CANAL**
  - 5.1 Main Canal length : 3 Km (Western) and 2 km (Eastern)
  - 5.2 Canal side Slope : 1:1 (earthen) & 1:0 (lined)
  - 5.3 Design Canal Discharge : 600 lps each canal system
6. **GEOLOGY**
  - a. Age of the geological formation: Quaternary. 57 lps (Toti) (10<sup>th</sup> April, 2013)
  - b. Geological formation : Alluvium plain lower predominant  
 Depositional and erosional/Flows zig-zaggy
  - c. Geology of diversion site : Slopy area with boulders.
  - d. Geology of canal alignment : Contour canal – major Soft soil

3 Km (Eastern)  
 700 Ha.

*Appraisal Report of Kalapani ISP, Kanchanpur*

**7. BENEFICIARIES**

- 7.1 Population : 3950 Nos.
- 7.2 Household : 627 Nos.
- 7.3 Household size : 6.3
- 7.4 Food Situation : Deficit

**8. CROPPING PATTERN**

- 8.1 Cropping intensity without Project : 139%
- 8.1 Cropping intensity with Project : 199%

**9. SCOPE OF WORKS**

SN	Description of Work	Unit	Quantity	Cost	Remarks
A	<b>Civil Works</b>				
1	Headworks	No	1	59,967,598.71	
2	Headworks Protection Works	m	200	13,314,233.49	
3	Canal Lining	m	390	4,696,170.63	
4	Canal Earth Work	m	5000	7,811,492.04	
5	Offtake	No	2	4,013,936.81	
6	VRB	No	3	2,401,657.61	
7	Outlet	No	20	2,268,979.76	
8	Old H/W Maintenance & other existing Canal Structure Rectification	LS	1	2,000,000.00	
A	<b>Sub-total</b>			<b>96,468,069.05</b>	

**10. PROJECT COST**

- 10.1 Total Project Cost : NRs. 13,71,76,000/-
- 10.2 Project Construction Cost : NRs. 9,64,68,069.05
- 10.2 Cost per Ha : NRs. 2,28,626.67
- 10.3 GoN/Contract Cost : NRs. 12,75,67,086.44
- 10.4 Cost sharing by WUA : NRs. 96,08,913.56 (10 % of construction cost)

**11. ECONOMIC ANALYSIS**

- 11.1 EIRR : 18.35%
- 11.2 B/C Ratio at 10.00 % discount rate : 1.68
- 11.3 B/C Ratio at 12% discount rate : 1.46
- 11.4 Benefit from project after irrigation : NRs. 3,20,16,170.00 per annum

- 12. ENVIRONMENTAL SITUATION : Environmentally friendly & Positive impact

- 13. DEMAND FOR PROJECT : Genuine and Demand Driven of construction cost

**Recommendation : Recommended for Implementation**

70.00 per annum

by friendly

benefit driven

## SUB-PROJECT PROFILE PROFORMA

Sub-Project Name : *Sadepani Deep Tubewell Irrigation Sub-project*  
Project Type : *New Deep Tubewell*

### A. PROJECT AREA

#### 1. Location

1.1 Region : *Far Western Development Region*  
1.2 Zone : *Seti*  
1.3 District : *Kailali*  
1.6 Village : *Sadepani*  
1.7 Elevation : *to m from mean sea level*  
1.8 Latitude : *28° 42' 48" to 28° 46' 48" N*  
1.9 Longitude : *80° 57' 20" to 81° 01' 09" E*  
1.10 Toposheet No : *2880 05 A*

#### 2. Access

2.1 By Road : *70 km from Dhangadhi*  
2.2 By Trail : *6 km from east-west high way*

#### 2.3 Description of route:

*The project area is about 450 km east from Kathmandu and about 70 km on the highway from district headquarter Dhangadhi. It is about 46 Km east of Ataria and 13 km west of Lamki. Gravel road links from highway to the sub-project area. The nearest airstrip from the project area is at Dhangadhi from where daily flight links with Kathmandu.*

#### 3. Climate

3.1 Seasons : *spring, monsoon, autumn, winter*  
3.2 Mean annual rainfall : *1740 mm*  
3.3 Temperatures : *Mean minimum- 7.15°C, Mean maximum- 38.8 °C*  
3.4 Evapo-transpiration : *Minimum- 1.75 mm/day, Maximum -6.74 mm/day*

#### 4. Topography

4.1 Topography : *Plan to Gentle Slope Topography*  
4.2 Pipe distribution : *9000 m (1500 m per tube well)*  
4.3 Command area : *240 ha (40 ha per tube well)*

#### 5 Water Resources

5.1 Name of the Source : *Ground Water*  
5.2 Type of Source : *Deep Aquifer*

5.3 Average flows : 40 LPS per Tubewell

## 6. Water Right

6.1 Water Right Issues : No Conflict Issue

## 7. Environmental Assessment

7.1 Aspects requiring only SEMP : SEMP Required

7.2 Aspects requiring IEE and their location : Not required

7.3 Aspects requiring EIA and their location : Not required

## 8 Existing Land Use

8.1 Land use

S.N.	Land use Type	Area in ha	Percentage
1	Agricultural land		
	Irrigated low land	45	14
	Rain fed low land	172	56
	Un-irrigated upland	48	15
2	Grazing Land	22	7
3	Forestland	33	10
	<b>Total</b>	<b>320</b>	<b>100</b>

8.2 Farm size : 1.4 ha of average land with farming

## B. SOCIO-ECONOMIC & ORGANIZATIONAL SITUATION

### 1. Population

1.1 Number of households : 404

1.2 Total population : 3092      Male- 1589      Female-1503

1.3 Ethnic groups

S.N.	Ethnic Group	Beneficiaries	
		Household	Population
1	Chhetri	178	1262
2	Brahman	82	617
3	Magar	15	75
4	Gurung	20	156
5	Tharu	62	607
6	Dalit	47	375
7	Other	7	66
	<b>Total</b>	<b>404</b>	<b>3092</b>

1.4 Migration

- Annual Migration Rates:

**ANNEX 9 List of CMIASP Irrigation Sub-projects**





## CMIASP Project list

S.No	District	Name of irrigation Project
	Batch I–Central Irrigation Regional Directorate	
1		Bachaaraja Irrigation Project
2	Dhanusha	Kaji Pains Irrigation Project
3		Geruka Irrigation project
4	Mahottari	Kaantawa Irrigation project
5		Kaantawa Pul Irrigation project
6	Parsa	Apar Baugee Irrigation project
7		Sadhawa Irrigation project
8	Lalitpur	Ekudraaha Irrigation project
9		Tilleshwor Mahadev 1(Rajkulo project)
10	Kavre	Tesro Kulo Irrigation project
11		Shikhar Chahare Irrigation project
12	Nuwakot	Sisneri Chahare Irrigation project
13		Tadi Khola Ghattey Budhuneey Faat Irrigation project
14	Dhading	Jaypuri Jogimara Irrigation project
	Batch II–Central Irrigation Regional Directorate	
15		Daltarvaltar Irrigation project
16	Ramechhap	Ghoptevir Irrigation project
17		Militkhola Irrigation project
18	Sindhuli	Valuwahi Bari Kulo Irrigation project
19		Parwanipur Kalinjor Irrigation project
20	Sarlahi	Banke Baba Irrigation project
21	Bara	Bagaiya Jamuni Irrigation project
22		Neureni Pani Irrigation project
23	Chitwan	Riu Tamatar Ghagar Irrigation project
24		Koirale Khola Irrigation project
25	Kathmandu	Mahankal Irrigation project
26		Champamati Irrigation project
27	Bhaktapur	Manikarnika Ghat Irrigation project
28		Thaujing Budepa Irrigation project
29	Sindhupalchowk	Ripeni Dhotar Irrigation project
30		Beteygauda Irrigation project
31	Rasuwa	Lamasoti Kunule Dande Kasepani Irrigation project
32		Gaudatar
33	Rutahat	Lohiniya Irrigation project
34		Motipur Irrigation project
35	Makwanpur	Diyalitol Irrigation project
36		Kmichaur Irrigation project
37	Dolakha	Serabesi Irrigation project
	Batch III–Central Irrigation Regional Directorate	
38	Mahottari	Aakushi Irrigation project
39	Dhanusha	Muglaiya Irrigation project
40		Jigra Khola Irrigation project
41	Sindhuli	Ghami Dumariya Irrigation project
42		Khimti Besi Irrigation project
43	Ramechhap	Chauri Khola Irrigation project
44	Parsa	Jagnamarniya Irrigation project
45	Bara	Praganna Jokha Irrigation project
46	Chitwan	Rapti Lothar Irrigation project
47	Bhaktapur	Dhusifaat Irrigation project
48	Kathmandu	Gahateri Irrigation project
49		Serakulo Irrigation project
50	Lalitpur	Tika Bhairab Khelbu Kuchabu Irrigation project
51	Sindhupalchowk	beltar Bhatar Irrigation project
52	Kavre	Tatle Baandh Irrigation project
53	Nuwakot	Sindhure Khola Bimire Duichago Irrigation project

54	Rasuwa	Tallo Rupsepani Irrigation project
55	Rautahat	Aruwa Irrigation project
56	Makwanpur	Jyati Irrigation project
57	Dhading	Balkultar Irrigation project
58	Dolakah	Rampa Irrigation project
59		Basthala Irrigation project
	Batch I – Eastern	Regional Irrigation Directorate
60		Ingla Khola Irrigation project
61	Illam	Talkharka Irrigation project
62		Tangting Kalikhola Irrigation project
63	Jhapa	Paliya Irrigation project
64	Sunsari	Jhulke Irrigation project
65		Lohandra Dataram Painsi Irrigation project
66	Morang	Kali Koshi No.1 Painsi Irrigation project
67		Basbote Irrigation project
68	Dhankuta	Kewa Khola Irrigation project
69		Ghattey Khola Irrigation project
70	Bhojpur	Aaakhuwa Asirey Khola Irrigation project
71		Annapurna Baruwa Irrigation project
72	Udayapur	Hokse Irrigation project
	Batch II–Eastern	Irrigation Regional Directorate
73		Higuwa Irrigation project
74	Terathum	Hattisar Irrigation project
75		Balan Irrigation project
76	Saptari	Bajrahiguthi Irrigation project
77	Siraha	Mainawati Irrigation project
78		Nagin Sarkari kulo Irrigation project
79	Panchthar	Labunglewa Kamfu Khola Irrigation project
80		Khaharey Chuwabotey Irrigation project
81	Taplejung	Unnat Katunje Irrigation project
82		Janatakulo Irrigation project
83	Sankhuwasaba	Sahutar Irrigation project
84		Gaunfarka Irrigation project
85	Khotang	Mewakhola Irrigation project
86		Hariboley Irrigation project
87	Okhaldhunga	Dovan Irrigation project
88		Chachare Irrigation project
89	Solukhumbu	Kampekk Irrigation project
	Batch III–Eastern	Irrigation Regional Directorate
90		Sadhutar Netey Sisney Irrigation project
91	Jhapa	Mawa Dhungray Irrigation project
92		Kanhan Samudayik Irrigation project
93	Illam	Saktiwan Irrigation project
94		Devasthan Irrigation project
95		Janasahayog Painsi Irrigation project
96	Morang	Nunsari Uralbari Irrigation project
97	Sunsari	Budhipaterawa Irrigation project
98		Leutifaat Irrigation project
99	Dhankuta	Leguwa Khola Irrigation project
100		Bataha Irrigation project
101	Siraha	Devipur Mainioti Irrigation project
102	Panchthar	Tindovaney Jantakulo Irrigation project
103	Taplejung	Happukhola Irrigation project
104	Bhojpur	Gogani Mul kulo Irrigation project
105	Khotang	Tukure Khola Irrigation project
106	Udayapur	Madiwas Irrigation project
107		Lipeyh Khola Baseri Irrigation project
108	Okhaldhunga	Belichameli Irrigation project
109		Dangkubirkhey Irrigation project
110	Solukhumbu	Ghatteythopney Irrigation project

**ANNEX 10 Salient Features of CMIASP-AF (Batch I) Irrigation Sub-projects  
in Terai Region**



1.	<b>Name of the Sub-project</b>	:	<b>Baluwaha Nadi ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Duhabi	
4.	District	:	Dhanusha	
5.	District Headquarter	:	Janakpur	
6.	Zone	:	Janakpur	
7.	Development Region	:	Central	
8.	No. of Hoseholds	:	250	
9.	DAG Households	:	NA	
10.	Population	:	1275	
11.	Land holding			
	- Landless	:	0	
	- Small / Marginal	:	70	
	- Middle	:	110	
	- Large	:	70	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Jogiyara	
	- Nearest Airport	:	Janakpur	
	- Nearest Market	:	Janakpur	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	3712	
	- Branch Canal (m)	:	1891	
15.	Gross Command Area	:	313 ha	
16.	Net Command Area	:	250 ha	
	- Existing Area	:	250 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Baluwaha Nadi	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	15 sq.km.	
20.	Canal Type	:	Earthen	
21.	Canal Discharge	:	0.600 Cumec	
22.	Side Slope	:	1.5:1	
23.	Bed Slope	:	1:1500	
24.	Existing Diversion Structure	:	Temporary earthen dam	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Weir / Bridge	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	50	25
	- Village Road Bridge (No)	:	5	3
	- Canal Reshaping (m)	:	3701	1893
	- Division Box (No)	:	3	
	-	:		
26.	Total estimated cost including contingency & VAT	:	NRs. 62,329,220.62	
27.	Cost per Hecatre	:	NRs. 249,317.00	
28.	Cost of ADP & LEF works	:	NRs. 800,000.00	
29.	WUA Contribution @ 3%	:	NRs. 1,869,876.62	
30.	Economic Internal Rate of Return (EIRR)	:	15.4%	

1.	<b>Name of the Sub-project</b>	:	<b>Belsi-Hajipur ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Ratnanagar Municipality ward no:-3	
4.	District	:	Chitwan	
5.	District Headquarter	:	Bharatpur	
6.	Zone	:	Narayani	
7.	Development Region	:	Central	
8.	No. of Hoseholds	:	335	
9.	DAG Households	:	60	
10.	Population	:	1436	
11.	Land holding			
	- Landless	:	0	
	- Small / Marginal	:	221	
	- Middle	:	86	
	- Large	:	28	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Ratnanagar -3	
	- Nearest Airport	:	Bharatpur	
	- Nearest Market	:	Tandi	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	2660	
	- Branch Canal (m)	:	3220	
15.	Gross Command Area	:	205 ha	
16.	Net Command Area	:	169 ha	
	- Existing Area	:	169 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Kyar Khola	
18.	Type of Source	:	Local stream	
19.	Catchment Area	:	7 sq.km.	
20.	Canal Type	:	Earthen	
21.	Canal Discharge	:	290 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	1:1200	
24.	Existing Diversion Structure	:	Temporary boulder / brush wood weir	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	R.C.C. core wall with gabion protection length = 55.0m	
	<b><u>Major Structures / Works</u></b>		<b><u>Main Canal</u></b>	<b><u>Branch Canals</u></b>
	- Double Side Canal Lining (m)	:	1500	300
	- RRM Retaining Wall (m)	:	10	
	- Gabion Retaining Wall (m)	:	100	
	- Village Road Bridge (No)	:	4	
	- Canal Reshaping (m)	:	2000	1500
	- Head & Cross Regulator (No)	:	1	
	- Direct Outlets with Regulator (no)	:	5	
	- HDPE Pipe Canal (m)	:	0	
	- Foot Bridge (No)	:	1	4
	- Division Box (No)	:	5	
26.	Total estimated cost including contingency & VAT	:	NRs.	35,231,106.61
27.	Cost per Hecatre	:	NRs.	208,468.09
28.	Cost of ADP & LEF works	:	NRs.	800,000.00
29.	WUA Contribution @ 3%	:	NRs.	1,058,256.06
30.	Economic Internal Rate of Return (EIRR)	:	16.8%	

1.	<b>Name of the Sub-project</b>	:	<b>Anar Gangar ISP</b>
2.	Sub-Project Classification	:	Terai : Rehabilliation
3.	Loaction (VDC & Ward No.)	:	Ayodhyapuri-6
4.	District	:	Chitwan
5.	District Headquarter	:	Bharatpur
6.	Zone	:	Narayani
7.	Development Region	:	Central
8.	No. of Hoseholds	:	264
9.	DAG Households	:	53
10.	Population	:	1926
11.	Land holding		
	- Landless	:	0
	- Small / Marginal	:	66
	- Middle	:	187
	- Large	:	11
12.	Accessibility (Nearest Road Head)		
	- Nearest Road head	:	Ayodhapuri-6
	- Nearest Airport	:	Bharatpur
	- Nearest Market	:	Bharatpur
13.	Command Area Characteristics	:	
14.	Total Canal Length		
	- Main Canal (m)	:	3600
	- Branch Canal (m)	:	47.5
15.	Gross Command Area	:	245 ha
16.	Net Command Area	:	233 ha
	- Existing Area	:	203 ha
	- Extension Area (if any)	:	30 ha
17.	Name of Source	:	Anar ghagar Khola
18.	Type of Source	:	Rain fed
19.	Catchment Area	:	6 sq.km.
20.	Canal Type	:	Earthen
21.	Canal Discharge	:	290 lps
22.	Side Slope	:	1:1
23.	Bed Slope	:	1:700
24.	Existing Diversion Structure	:	Temporary boulder / brush wood weir
25.	Physical Facilities Proposed		
	- Headworks / Diversion Structure	:	R.C.C. core wall length=78m
	<b>Major Structures / Works</b>		
			<b>Main Canal</b> <b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	1350      300
	- RRM Retaining Wall (m)	:	10
	- Gabion Retaining Wall (m)	:	150
	- Village Road Bridge (No)	:	7
	- Super Passage (No.)	:	1
	- Covered Canal (m)	:	65
	- Canal Reshaping (m)	:	3000
	- Direct Outlets with Regulator (no)	:	9
	- Head & Cross Regulator (No)	:	1
	- HDPE Pipe Canal (m)	:	0
	- Foot Bridge (No)	:	4
	- Tail Escape (No)	:	1
	- Division Box (No)	:	5
26.	Total estimated cost including contingency & VAT	:	NRs. 43,590,264.81
27.	Cost per Hecatre	:	NRs. 187,082.68
28.	Cost of ADP & LEF works	:	NRs. 800,000.00
29.	WUA Contribution @ 3%	:	NRs. 1,309,344.67
30.	Economic Internal Rate of Return (EIRR)	:	17.8%

1.	<b>Name of the Sub-project</b>	:	<b>Dudhmati ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Banauli Danauli	
4.	District	:	Mahottari	
5.	District Headquarter	:	Jaleswar	
6.	Zone	:	Janakpur	
7.	Development Region	:	Central	
8.	No. of Hoseholds	:	940	
9.	DAG Households	:	NA	
10.	Population	:	4500	
11.	Land holding			
	- Landless	:	0	
	- Small / Marginal	:	350	
	- Middle	:	450	
	- Large	:	100	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Janakpur	
	- Nearest Airport	:	Janakpur	
	- Nearest Market	:	Janakpur	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	2642	
	- Branch Canal (m)	:	0	
15.	Gross Command Area	:	230 ha	
16.	Net Command Area	:	200 ha	
	- Existing Area	:	200 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Dudhmati river	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	47 sq.km.	
20.	Canal Type	:	Earthen and Lining	
21.	Canal Discharge	:	670 lps	
22.	Side Slope	:	1:5:1	
23.	Bed Slope	:	1:2500	
24.	Existing Diversion Structure	:	No diversion	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Weir/Bridge	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	25	25
	- Canal Reshaping (m)	:	2643	755
	- Direct Outlets with Regulator (no)	:	5	3
	- HDPE Pipe Canal (m)	:	0	
	- Village Road Bridge (No)	:	5	
	- Division Box (No)	:	2	
26.	Total estimated cost including contingency & VAT	:	NRs. 54,886,395.28	
27.	Cost per Hecatre	:	NRs. 274,431.97	
28.	Cost of ADP & LEF works	:	NRs. 800,000.00	
29.	WUA Contribution @ 3%	:	NRs. 1,646,591.85	
30.	Economic Internal Rate of Return (EIRR)	:	14.71%	



1.	<b>Name of the Sub-project</b>	:	<b>Dumariya ISP</b>
2.	Sub-Project Classification	:	Terai : Rehabilliation
3.	Loaction (VDC & Ward No.)	:	Giddha
4.	District	:	Dhanusa
5.	District Headquarter	:	Janakpur
6.	Zone	:	Janakpur
7.	Development Region	:	Central
8.	No. of Hoseholds	:	700
9.	DAG Households	:	NA
10.	Population	:	4000
11.	Land holding		
	- Landless	:	0
	- Small / Marginal	:	290
	- Middle	:	300
	- Large	:	110
12.	Accessibility (Nearest Road Head)		
	- Nearest Road head	:	Gardaniya Chowk
	- Nearest Airport	:	Janakpur
	- Nearest Market	:	Yadukoha
13.	Command Area Characteristics	:	
14.	Total Canal Length		
	- Main Canal (m)	:	4040
	- Branch Canal (m)	:	0
15.	Gross Command Area	:	242 ha
16.	Net Command Area	:	220 ha
	- Existing Area	:	220 ha
	- Extension Area (if any)	:	0 ha
17.	Name of Source	:	Dumariya
18.	Type of Source	:	Local stream
19.	Catchment Area	:	83 sq.km.
20.	Canal Type	:	Earthen
21.	Canal Discharge	:	275 lps in EMC & 275 lps in WMC
22.	Side Slope	:	1.5:1
23.	Bed Slope	:	1:2000
24.	Existing Diversion Structure	:	Concrete weir
25.	Physical Facilities Proposed		
	- Headworks / Diversion Structure	:	Existing weir
	<b>Major Structures / Works</b>		
			<b>Main Canal</b>
			<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	100
	- Canal Reshaping (m)	:	3701
	- Direct Outlets with Regulator (no)	:	5
	- HDPE Pipe Canal (m)	:	0
	- Village Road Bridge (No)	:	5
26.	Total estimated cost including contingency & VAT	:	NRs. 38,526,414.24
27.	Cost per Hecatree	:	NRs. 175,120.05
28.	Cost of ADP & LEF works	:	NRs. 800,000.00
29.	WUA Contribution @ 3%	:	NRs. 1,155,792.43
30.	Economic Internal Rate of Return (EIRR)	:	18.38%

1.	<b>Name of the Sub-project</b>	:	<b>Bhuteni Khola ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Goldhap 4,5,6,7,8	
4.	District	:	Jhapa	
5.	District Headquarter	:	Chandragadhi	
6.	Zone	:	Mechi	
7.	Development Region	:	Eastern	
8.	No. of Hoseholds	:	750	
9.	DAG Households	:	21	
10.	Population	:	4120	
11.	Land holding			
	- Landless	:	23	
	- Small / Marginal	:	330	
	- Middle	:	292	
	- Large	:	105	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Birtamode	
	- Nearest Airport	:	Chandragadhi	
	- Nearest Market	:	Goldhap	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	7320	
	- Branch Canal (m)	:	13343	
15.	Gross Command Area	:	740 ha	
16.	Net Command Area	:	629 ha	
	- Existing Area	:	629 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Bhuteni Khola	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	25 sq.km.	
20.	Canal Type	:	Ridge	
21.	Canal Discharge	:	1123 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	Varying bed slope along length of hte canal	
24.	Existing Diversion Structure	:	Concrete weir	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Maintenance and strengthening of existing diversion structure	
	<b><u>Major Structures / Works</u></b>		<b><u>Main Canal</u></b>	<b><u>Branch Canals</u></b>
	- Double Side Canal Lining (m)	:	970	2353
	- RRM Retaining Wall (m)	:	35	22
	- Gabion Retaining Wall (m)	:	175	55
	- Covered Canal (m)	:	436	110
	- Canal Reshaping (m)	:	7230	13343
	- Single Side Canal Lining (m)	:	110	215
	- Direct Outlets with Regulator (no)	:	15	30
	- Drain Inlet (No)	:	2	5
	- Village Road Bridge (No)	:	5	10
	- Foot Bridge (No)	:	10	15
	- Drop Structure (No)	:	4	5
	- Tail Escape (No)	:	1	2
	- Division Box (No)	:	6	
26.	Total estimated cost including contingency & VAT	:	NRs. 95,214,932.24	
27.	Cost per Hectare	:	NRs. 151,375.09	
28.	Cost of ADP & LEF works	:	NRs. 500,000.00	
29.	WUA Contribution @ 3%	:	NRs. 2,852,891.97	
30.	Economic Internal Rate of Return (EIRR)	:	19.8%	

1.	<b>Name of the Sub-project</b>	:	<b>Biring Khola Birtamul Paini ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Budhabare 2,3,4,5 and Sanischare 3	
4.	District	:	Jhapa	
5.	District Headquarter	:	Chandragadhi	
6.	Zone	:	Mechi	
7.	Development Region	:	Eastern	
8.	No. of Hoseholds	:	510	
9.	DAG Households	:	15	
10.	Population	:	2575	
11.	Land holding	:	510	
	- Landless	:	40	
	- Small / Marginal	:	80	
	- Middle	:	350	
	- Large	:	40	
12.	Accessibility (Nearest Road Head)	:		
	- Nearest Road head	:	Budhabare	
	- Nearest Airport	:	Chandragadhi	
	- Nearest Market	:	Budhabare	
13.	Command Area Characteristics	:		
14.	Total Canal Length	:		
	- Main Canal (m)	:	5235	
	- Branch Canal (m)	:	11854	
15.	Gross Command Area	:	561 ha	
16.	Net Command Area	:	450 ha	
	- Existing Area	:	450 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Biring Khola	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	71 sq.km.	
20.	Canal Type	:	Ridge	
21.	Canal Discharge	:	693 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	Varying bed slope along length of canal	
24.	Existing Diversion Structure	:	Temporary boulder / brush wood weir	
25.	Physical Facilities Proposed	:		
	- Headworks / Diversion Structure	:	Temporary diversion works using gabion bed bar infront of side intake	
	<b><u>Major Structures / Works</u></b>		<b><u>Main Canal</u></b>	<b><u>Branch Canals</u></b>
	- Double Side Canal Lining (m)	:	1068	1010
	- RRM Retaining Wall (m)	:	22	43
	- Gabion Retaining Wall (m)	:	264	66
	- Aquaduct (No.)	:	1	
	- Canal Reshaping (m)	:	5235	11854
	- Covered Canal (m)	:	115	150
	- Single Side Canal Lining (m)	:	100	150
	- Direct Outlets with Regulator (no)	:	20	40
	- Drain Oultet (No)	:	2	
	- Village Road Bridge (No)	:	5	10
	- Foot Bridge (No)	:	10	25
	- Drop Structure (No)	:	10	5
	- Tail Escape (No)	:	1	2
	- Division Box (No)	:	7	
26.	Total estimated cost including contingency & VAT	:	NRs. 57,869,625.68	
27.	Cost per Hectare	:	NRs. 128,659.17	
28.	Cost of ADP & LEF works	:	NRs. 500,000.00	
29.	WUA Contribution @ 3%	:	NRs. 1,734,736.50	
30.	Economic Internal Rate of Return (EIRR)	:	21.41 %	

1.	<b>Name of the Sub-project</b>	:	<b>Hadiya Dama Rajpahini ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilliation	
3.	Loaction (VDC & Ward No.)	:	Budhabare 1,6	
4.	District	:	Jhapa	
5.	District Headquarter	:	Chandragadhi	
6.	Zone	:	Mechi	
7.	Development Region	:	Eastern	
8.	No. of Hoseholds	:	250	
9.	DAG Households	:	NA	
10.	Population	:	1150	
11.	Land holding			
	- Landless	:	25	
	- Small / Marginal	:	25	
	- Middle	:	190	
	- Large	:	10	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Charaali	
	- Nearest Airport	:	Chandragadhi	
	- Nearest Market	:	Charalli	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	2700	
	- Branch Canal (m)	:	4950	
15.	Gross Command Area	:	250 ha	
16.	Net Command Area	:	220 ha	
	- Existing Area	:	220 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Hadiya Khola	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	16 sq.km.	
20.	Canal Type	:	Ridge canal	
21.	Canal Discharge	:	428 lps	
22.	Side Slope	:	Earhten 1:1, Lined(1:0)	
23.	Bed Slope	:	Moderate	
24.	Existing Diversion Structure	:	Temporary boulder / brush wood weir	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Temporary	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	1000	200
	- Super Passage (No.)	:	2	
	- Covered Canal (m)	:	300	
	- Canal Reshaping (m)	:	2700	4768
	- Single Side Canal Lining (m)	:		
	- Direct Outlets with Regulator (no)	:	12	30
	- Village Road Bridge (No)	:	7	7
	- Foot Bridge (No)	:	5	17
	- Drop Structure (No)	:	8	
	- Side Escape (No)	:	1	
	- Tail Escape (No)	:	1	6
	- Division Box (No)	:	11	
26.	Total estimated cost including contingency & VAT	:	NRs.	41141212.20
27.	Cost per Hecatere	:	NRs.	187005.51
28.	Cost of ADP & LEF works	:	NRs.	500,000.00
29.	WUA Contribution @ 3%	:	NRs.	1234236.37
30.	Economic Internal Rate of Return (EIRR)	:	17.8%	

1.	<b>Name of the Sub-project</b>	:	<b>Bhaluwa ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilliation	
3.	Loaction (VDC & Ward No.)	:	Bayarban -3,4,5,6 and 7	
4.	District	:	Morang	
5.	District Headquarter	:	Biratnagar	
6.	Zone	:	Koshi	
7.	Development Region	:	Eastern	
8.	No. of Hoseholds	:	345	
9.	DAG Households	:	NA	
10.	Population	:	1962	
11.	Land holding			
	- Landless	:	22	
	- Small / Marginal	:	162	
	- Middle	:	132	
	- Large	:	29	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Ramailo	
	- Nearest Airport	:	Biratnagar	
	- Nearest Market	:	Ramailo bazaar	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	8111	
	- Branch Canal (m)	:	4967	
15.	Gross Command Area	:	338 ha	
16.	Net Command Area	:	312 ha	
	- Existing Area	:	312 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Bhaluwa Khola	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	12 sq.km.	
20.	Canal Type	:	Earthen	
21.	Canal Discharge	:	650 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	1:800	
24.	Existing Diversion Structure	:	Concrete weir	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Wier	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	100	
	- Aquaduct (No.)	:	2	
	- Canal Reshaping (m)	:	6000	2000
	- Direct Outlets with Regulator (no)	:	4	12
	- HDPE Pipe Canal (m)	:	0	
	- Village Road Bridge (No)	:	6	4
	- Foot Bridge (No)	:	4	5
	- Drop Structure (No)	:	1	
	- Tail Escape (No)	:	1	
	- Division Box (No)	:	8	
26.	Total estimated cost including contingency & VAT	:	NRs. 64,274,537.54	
27.	Cost per Hecatre	:	NRs. 206,008.13	
28.	Cost of ADP & LEF works	:	NRs. 800,000.00	
29.	WUA Contribution @ 3%	:	NRs. 1,928,236.13	
30.	Economic Internal Rate of Return (EIRR)	:	16.96%	

1.	<b>Name of the Sub-project</b>	:	<b>Keshaliya Majhi Gaun ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Dangihat -9, Majhitole	
4.	District	:	Morang	
5.	District Headquarter	:	Biratnagar	
6.	Zone	:	Koshi	
7.	Development Region	:	Eastern	
8.	No. of Hoseholds	:	266	
9.	DAG Households	:	NA	
10.	Population	:	2035	
11.	Land holding			
	- Landless	:	35	
	- Small / Marginal	:	52	
	- Middle	:	149	
	- Large	:	30	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	E/W Highway	
	- Nearest Airport	:	Biratnagar	
	- Nearest Market	:	Belbari	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	5020	
	- Branch Canal (m)	:	6778	
15.	Gross Command Area	:	298.73 ha	
16.	Net Command Area	:	288 ha	
	- Existing Area	:	288 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Keshaliya Khola spring source	
18.	Type of Source	:	Combination spring source/local stream	
19.	Catchment Area	:	12 sq.km.	
20.	Canal Type	:	Earthen canal	
21.	Canal Discharge	:	600 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	1:800	
24.	Existing Diversion Structure	:	Temporary boulder / brush wood weir	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Weir of span 20m	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	300	
	- Aquaduct (No.)	:	1	
	- Canal Reshaping (m)	:	4500	6778
	- Direct Outlets with Regulator (no)	:	7	10
	- HDPE Pipe Canal (m)	:	0	
	- Village Road Bridge (No)	:	4	2
	- Foot Bridge (No)	:	5	5
	- Drop Structure (No)	:	2	
	- Tail Escape (No)	:	1	1
	- Division Box (No)	:	8	
26.	Total estimated cost including contingency & VAT	:	NRs. 57,201,964.27	
27.	Cost per Hectare	:	NRs. 198,617.93	
28.	Cost of ADP & LEF works	:	NRs. 800,000.00	
29.	WUA Contribution @ 3%	:	NRs. 1,716,058.92	
30.	Economic Internal Rate of Return (EIRR)	:	17.27%	

1.	<b>Name of the Sub-project</b>	:	<b>Kuiri Khola Matigaon ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilitation	
3.	Loaction (VDC & Ward No.)	:	Dangihat -1,2,3 and 7	
4.	District	:	Morang	
5.	District Headquarter	:	Biratnagar	
6.	Zone	:	Koshi	
7.	Development Region	:	Eastern	
8.	No. of Hoseholds	:	231	
9.	DAG Households	:	NA	
10.	Population	:	1385	
11.	Land holding			
	- Landless	:	15	
	- Small / Marginal	:	85	
	- Middle	:	55	
	- Large	:	76	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Bhaunne	
	- Nearest Airport	:	Biratnagar	
	- Nearest Market	:	Belwari	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	3828	
	- Branch Canal (m)	:	12819	
15.	Gross Command Area	:	418 ha	
16.	Net Command Area	:	330 ha	
	- Existing Area	:	330 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Kuiri Khola	
18.	Type of Source	:	Spring source only	
19.	Catchment Area	:	10 sq.km.	
20.	Canal Type	:	Earthen canal	
21.	Canal Discharge	:	600 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	1:700	
24.	Existing Diversion Structure	:	Concrete Weir	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	RCC Weir cum under sluice headworks	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	500	
	- Aquaduct (No.)	:	1	
	- Canal Reshaping (m)	:	3500	12000
	- Direct Outlets with Regulator (no)	:	12	15
	- HDPE Pipe Canal (m)	:	0	
	- Village Road Bridge (No)	:	5	5
	- Foot Bridge (No)	:	4	5
	- Drop Structure (No)	:	2	1
	- Tail Escape (No)	:	1	2
	- Division Box (No)	:	8	
26.	Total estimated cost including contingency & VAT	:	NRs. 65,589,321.13	
27.	Cost per Hectare	:	NRs. 198,755.52	
28.	Cost of ADP & LEF works	:	NRs. 800,000.00	
29.	WUA Contribution @ 3%	:	NRs. 19,676,679.63	
30.	Economic Internal Rate of Return (EIRR)	:	17.26%	

1.	<b>Name of the Sub-project</b>	:	<b>Paurai ISP</b>	
2.	Sub-Project Classification	:	Terai : Rehabilliation	
3.	Loaction (VDC & Ward No.)	:	Paurai -7,8,9	
4.	District	:	Rautahat	
5.	District Headquarter	:	Gaur	
6.	Zone	:	Narayani	
7.	Development Region	:	Central	
8.	No. of Hoseholds	:	260	
9.	DAG Households	:	NA	
10.	Population	:	1650	
11.	Land holding			
	- Landless	:	0	
	- Small / Marginal	:	110 (42.31%)	
	- Middle	:	125 (48.08%)	
	- Large	:	25 (9.61%)	
12.	Accessibility (Nearest Road Head)			
	- Nearest Road head	:	Chandranigahpur	
	- Nearest Airport	:	Simara	
	- Nearest Market	:	Chandranigahpur	
13.	Command Area Characteristics	:		
14.	Total Canal Length			
	- Main Canal (m)	:	4022	
	- Branch Canal (m)	:	4500	
15.	Gross Command Area	:	300 ha	
16.	Net Command Area	:	275 ha	
	- Existing Area	:	275 ha	
	- Extension Area (if any)	:	0 ha	
17.	Name of Source	:	Paurai	
18.	Type of Source	:	Snow/Rainfed river	
19.	Catchment Area	:	40.02 sq.km.	
20.	Canal Type	:	Earthen, Lined	
21.	Canal Discharge	:	640 lps	
22.	Side Slope	:	1:1	
23.	Bed Slope	:	Mild	
24.	Existing Diversion Structure	:	No diversion	
25.	Physical Facilities Proposed			
	- Headworks / Diversion Structure	:	Core wall	
	<b>Major Structures / Works</b>		<b>Main Canal</b>	<b>Branch Canals</b>
	- Double Side Canal Lining (m)	:	61.5	
	- Gabion Retaining Wall (m)	:	45	
	- Super Passage/ Syphon (No.)	:	2	
	- Canal Reshaping (m)	:	4022	4500
	- Direct Outlets with Regulator (no)	:	-	6
	- Village Road Bridge (No)	:	8	12
	- Foot Bridge (No)	:	-	2
	- Side Escape (No)	:	1	
	- Tail Escape (No)	:	1	4
	- Division Box (No)	:	8	
26.	Total estimated cost including contingency & VAT	:	NRs. 58,294,884.90	
27.	Cost per Hectare	:	NRs. 211,981.25	
28.	Cost of ADP & LEF works	:	NRs. 800,000.00	
29.	WUA Contribution @ 3%	:	NRs. 1,216,307.66	
30.	Economic Internal Rate of Return (EIRR)	:	16.7%	



**ANNEX 11 Questionnaire Answers (JMIS)**





Spring season: (select one)

**Perennial River** (Name: Kankai ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

Winter season: (select one)

**Perennial River** (Name: Kankai ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion weir , Storage dam/reservoir, Pumping station, DTW, STW  
Spring :Diversion weir, Storage dam/reservoir, Pumping station, DTW, STW  
Winter: Diversion weir, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 8000 ha

Actual (net) command area by season:

Monsoon ( 7000 ha),Spring ( 2500 ha), winter (7000 ha) These area is based on the irrigation water availability in the source.

8. Canals

Main canal ( 1 nos.): Total length 36000 m (Lining : 11500 m),  
 2ndary canal ( 22 nos.): Total length 74000 m (Lining : m),  
 Tertiary canal (287 nos.): Total length 110000 m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

1) Diversion Dam : 142 m (Weir) - 1 no.

➤ Diversion Weir (RCC), length- 126 m, Scouring sluice- 16.5 m with 3 sets of manually operated gates (3.5m \* 1.85 m)

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: Diversion Weir )	142 m since july1977			
Main canal (Capacity : m <sup>3</sup> /s)	24.5 km	11.5 km	km	36 km

2ndary canal	57 km	17 km	km	74 km
Tertiary canal	70 km	40 km	km	110 km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	30 km	km	km	30 km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km
❖ Trunk Road	20 km	4 km		24 km

11. Date of start of water delivery, area at that time  
 (Month/Year) July 1977  
 (Area) 700 ha (Irrigation area seven hundred hectare at the begning in 1st phase)
12. Date of start of joint management  
 (Month/Year) 1 Dec. 1993  
 (Area) 7000 ha
13. As for joint management, where is the interface of system operation between the government and WUA?  
 (Select one from A, B or C)
- A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.**
- B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.
- C. Other (specify )
14. Number of irrigation blocks at present, if irrigation is rotational  
 ➤ Two for spring season. There is rotation of spring cultivation in two blocks annually.
15. Land holding size and number of households (HHs) : No. of HHs= 9315

Tabular data is not available.

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: 0.5 to 1 ha,  
 Maximum size of land holding: ha,

16. How many members are in the WUA? 31 members

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	31	13
2ndary-level	22	185	5
Tertiary-level	181	1236	20.3

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	1	M

19. Are the board members selected by election? (select “Yes” or “No”)

Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes, **No** (reason: Not now, but in new committee it will be even more than 33% as new provision is made for female participation. New committee will be formed by the mid of September. )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select “Yes” or “No”)

Yes, No (reason: )

22. Is there WUA constitution? (select “Yes” or “No”)

Yes, No (reasons: )

23. Is the WUA registered? (select “Yes” or “No”)

Yes, No (reasons: )

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IDDO, IMD, Other (specify: District Administration Office )

25. Please explain the procedure to register WUA.

Waters ad hoc committee will have to take initiation to register the WUA. They have to deposit @ of 50 per ha of irrigation land for the registration of WUA.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year, Not periodical (specify: )

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)

At the general assembly, Other (specify: )

28. How information such as date, time & venue of the general assembly is transferred to WUA members?  
(select one)

By FM radio, By cell phone, By cell phone & verbal message,  
Other (specify: Letter as well as by Cell Phone and Verbal Message and FM radio )

29. Irrigation Service Fee (ISF)

✓ How much is the ISF? Rupees per year, or Rupees per crop (season) - 300 Rupees

✓ When ISF is collected? :- June/July

✓ What is the ISF collection rate? 60 to 75 %

✓ What is the penalty against someone who does not pay ISF?

They are not allowed to participate in WUA member and for water delivery might be tough for them.  
Also, in those branches where ISF collection is less, government input is made lower.

30. Sharing of collected ISF

National Treasury 10 %

WUA 90 %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee 40 %

2ndary-level Committees% :- 20%

Tertiary-level Committees : 40 %

Others if any: specify ( This Percentage in accordance total amount remained after paying to revenue and ISF collector)

\_\_\_\_\_ %

\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, B, C, D, E

Main canals: A, B, C, D, E (mostly in Reach V extension area)

2ndary canals: A, B, C, D, E

Tertiary canals: A, B, C, D, E

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

- In Headworks RCC part of weir and undersluice is eroded, it is going to be renovate by government fund.
- D/S part of weir is retrograded heavily, so it should be maintained.
- In main canal, canal bank is disturbed in some places need to be maintained.
- In secondary structural improvement and desilting work is necessary.
- In tertiary, offtake structure, field channel and desilting is the problem.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

- ✓ Survey and Planning stage (select “Yes” or ”No”): Yes, No  
If “Yes”, how do they participate?  
➤ They participate in decision making and having some labor contribution.
- ✓ Design stage (select “Yes” or ”No”): Yes, No  
If “Yes”, how do they participate?  
\_\_\_\_\_
- ✓ Construction stage (select “Yes” or ”No”): Yes, No  
If “Yes”, how do they participate?  
➤ They monitor construction activities for quality.

35. Main canal cleaning

- ✓ Is it cleaned by the government or by WUA? By the Government
- ✓ How often (frequency) is it cleaned? Once a year but not in all parts.
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)  
Yes, No

36. 2ndary canal cleaning

- ✓ Is it cleaned by the government or by WUA? By Government
- ✓ How often (frequency) is it cleaned? once a year
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)  
Yes, No

37. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned? Once/twice a year
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)



Yes, No

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?
  - Structural protection, Slope Stabilization, Lining repair bush clearance, desilting etc
- ✓ How often they are required?
  - It depends as system is old, it is done in accordance with the requirement.
- ✓ Is there repair record? Yes, \_\_\_\_\_ No

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? By both \_\_\_\_\_
- ✓ What kinds of repair are usually required?
  - Desilting, Slope stabilization, Lining works, maintenance etc.
- ✓ How often they are required?
  - Once/twice a year as per requirement.
- ✓ Is there repair record? Yes, No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?
  - Desilting works & bush clearance
- ✓ How often they are required?
  - Once/twice a year as per requirement.
- ✓ Is there repair record? Yes, No

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? Yes, **No**
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No

If "No", what are reasons?

- Maintenance plan is not prepared \_\_\_\_\_

2ndary canal

- ✓ Is it maintained by the government or by WUA? By both \_\_\_\_\_
- ✓ Is there a maintenance plan? Yes, **No**
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No

If "No", what are reasons?

- Maintenance plan is not prepared \_\_\_\_\_

Tertiary canal (WUA)

- ✓ Is there a maintenance plan? Yes, **No**
- ✓ Is maintenance implemented properly in accordance with the plan?

Yes, No

If “No”, what are reasons?

- Maintenance plan is not prepared
- 

42. Water distribution

- ✓ Who makes a water allocation plan?
- ✓ Irrigation Office (IMD)
- ✓ Who makes a rotation/irrigation schedule?
  - IMD/WUA
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?
  - Prepared water allocation plan is discussed among the main committee members before implementation of the plan. When they get convinced on the irrigation schedule it gets implemented in the field.

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

On farm level, it is operated by tertiary committee members.

- ✓ Is there a written record of operation, that is, water delivery? **Yes,** No

If “Yes”, who keepsthe records? :- Irrigation Office

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

- It has been started from last april, before that onlt H/R record was recorded\_\_
- 

Is the record reported to WUA members? Yes, **No**

If “Yes”, how is it reported?

---

43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: very little %
- ✓ What jobs do they do for a living in addition to farming?
  - Business

- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical

cropping calendar below.

	First planting	Last Planting	First Harvesting	Last
Harvesting				
Monsoon - Rice-	25 June	20 July	28 October	22
November				
Winter- Wheat -	15 November	31 December	15 March	30 April
Maize-	15 November	28 February	18 March	7 July
Spring- Rice-	15 February	31 March	7 June	30
June				

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice- 4.35 tons/ha      NRs. 22 per kg  
 Spring rice- 5.5 tons/ha      NRs. 15 per kg  
 Maize- 4.5 tons/ha      NRs. 25 per kg  
 Other crops (specify)- wheat- 2.116 tons/ha      NRs. 25 per kg

- ✓ What kinds of government supports are necessary to improve yield?

In addition to Irrigation

- Drainage facility to have timely operation
- Mechanization
- Good quality seed
- Fertilizer input

- ✓ Percentage of farmers doing livestock business out of all WUA members:

Approximately % :- Not livestock business but they have livestock for their personal consumption of milk

- ✓ Percentage of farmers doing orchard business out of all WUA members:

Approximately % :- very few

- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:

Approximately % :- few farmers are doing vegetable farming in small scale

- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious,	Serious,	<b><u>Not a problem</u></b>
No cultivation in the dry season	Very Serious,	Serious,	<b><u>Not a problem</u></b>

Low yield per unit area	Very Serious,	<b><u>Serious.</u></b>	Not a problem
Access to market (market is far)	Very Serious,	<b><u>Serious.</u></b>	Not a problem
Low prices of agricultural products	<b><u>Very Serious.</u></b>	Serious,	Not a problem

**Note: No cultivation in winter is the problem.**

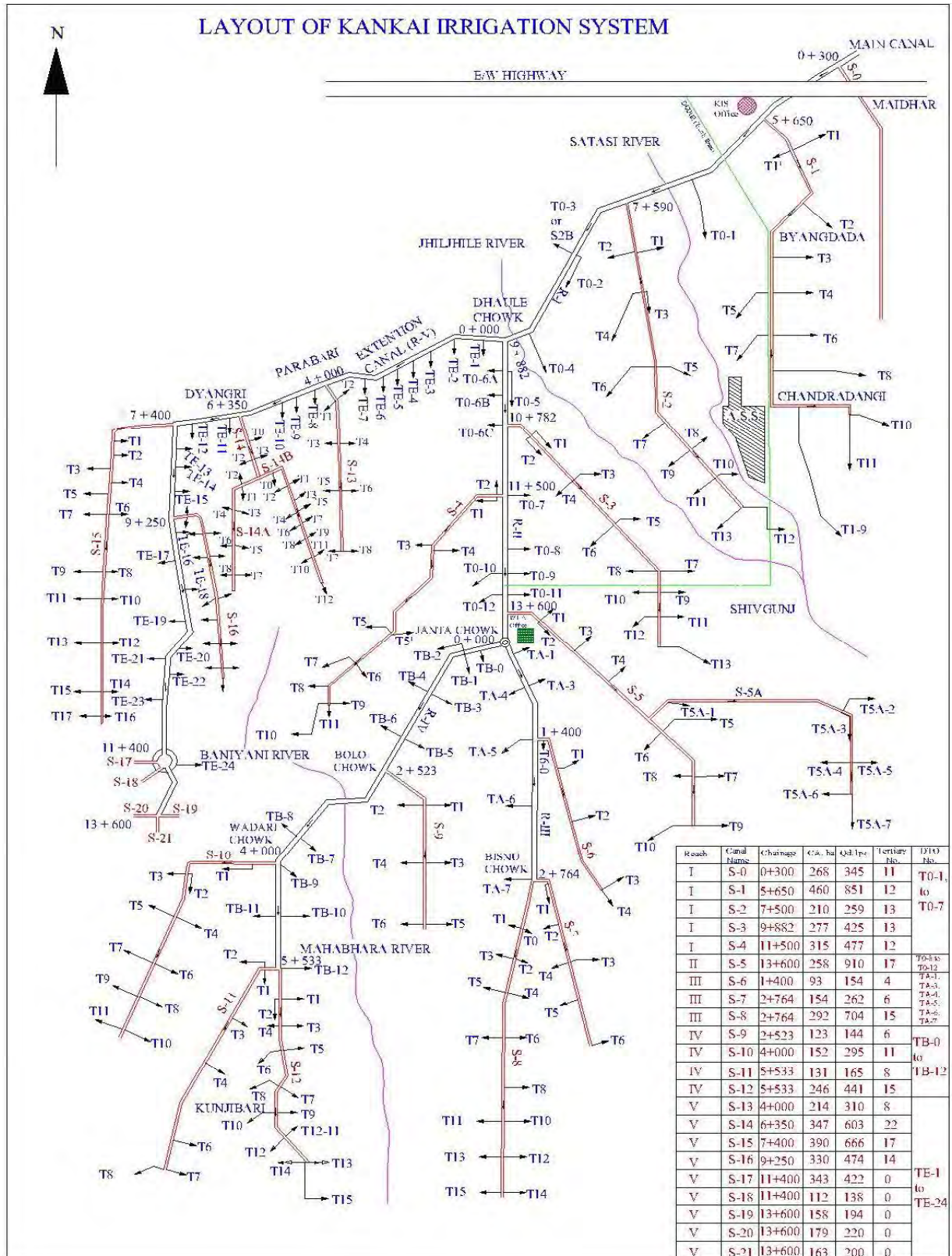
- ✓ What kinds of government supports are necessary to improve agricultural income?
  - Timely Irrigation
  - Crop Insurance
  - Price guarantee of agriculture production.
  - Market facility and storage facility to have good price.
  - Technical assistance to have good yield.

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities :- Field channel at field level. Less water available in the source during spring. So, effective utilization of water and proper management will enhance the water productivity.
  - Farmers perception to use more water for better production.
- ✓ About water management operation and maintenance, WUAs and agriculture.
  - Water Management:- U/S farmers always want to use more water .
  - Operation and Maintenance:- time is tough in irrigation time.
  - WUA's:- problem in collecting targeted ISF.
  - Agriculture:-price of agricultural product
- ✓ About farming:- Winter season farming: Farmers are not attracted towards wheat farming. They left the land fallow during winter instead of cropping it. They are not getting good yield and price while water availability is sufficient in winter. Need a research for winter cropping and possible profitable crop for that season.
- ✓ About institution and WUAs
  - Capable WUA's
- ✓ Others
  - Motivation towards winter cropping

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.



To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Sunsari Morang Irrigation Project

2. Location of the Irrigation System

Development Region: Eastern

District: Sunsari and Morang

Longitude&Latitude :

Headworks: 26 °15 'N, 87 ° 10 'E

Command area: from 26 °22'30"N to 26 °52'30"N  
from 87 ° 15"E to 87 °37"E

Elevation: 107 amsl (The elevation of the project area varies from 60m AMSL to 107 m AMSL at intake site.)

Nearest airport: Biratnagar

3. Catchment area : 58,000 km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: Project Manager-1,

Senior Divisional Engineer-3 (civil) & 1(Agri)

Chief Account officer-1, Account Officer-1

Senior Sociologist-1

Civil Engineers-25 Agri Engineers-2,

Electromechanical Engineer-1

Senior AO-2, AO-5, Sub-Engineers-6

Dredger Master-1

Technicians:

Gate operators: 12 (Headworks) 73 (Main canals) 91 (2ndary canals) (To be verified)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: **Koshi River** ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify):

Spring season: (select one)

Perennial River (Name: **Koshi River** ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: **Koshi River** ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: **Side Intake** (Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW)

Spring : **Side Intake** ( Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW)

Winter: **Side Intake** (Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW)

SMIP is the Run off the river system type irrigation scheme having no storage reservoir.

Headworks/water source structure is **side intake**.

7. Command area

Total command area: 68,000 ha

Actual (net) command area by season: 112142

Monsoon (60550 ha), spring (11300 ha), winter (40292 ha)

8. Canals

Main canal (1 nos.): Total length 53 km (Lining : m),

2ndary canal (12 nos.): Total length 222 km (Lining : m),

Tertiary canal (36 nos.): Total length 409 km (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

SMIS is run off the river system type irrigation scheme having no storage reservoir. The system works with side intake.

The present headwork consists of an intake, three-barrel-reinforced concrete super passage of about 1,000 m long, 300 m long pre-settling basin, primary settling basin of 950 m long, two dredging machines with 5 jetties and a micro-hydro power station. The intake has two tired eight gates; lower

gates are closed during the monsoon season to prevent ingress of coarse sediment and water passes only from the upper openings of the gates. During the low flow season lower gates are opened to allow free flow of the water to the barrels. The three barrel super passage has 3.5 m width and 4.5 m height for each barrel. The barrels carry excess water to flush the sediment from the pre-settling basin located at the site of old Chatra intake. The pre-settling basin is 300 m long and 20 m wide. It is equipped with flushing gates to flush the coarse sediment to the river channel once in a day during normal canal operation. During the flushing time of 30 minutes CMC is closed totally and the impact of this closure is negligible in water delivery.

10. Physical facilities of the system

Details	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: )			Side Intake (at 1300 m up from old intake)	
Main canal (Capacity : 60 m <sup>3</sup> /s)	km	km	km	53 km
2ndary canal	31 km	26 km	165 km	222 km
Tertiary canal	72 km	170 km	514 km	756 km
Canal structures	651 nos.	2566 nos.	7947 nos.	11164 nos.
Drainage canal	106 km	286 km	1728 km	2120 km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) – June, 1980

Area-35,000 ha

12. Date of start of joint management

(Month/Year) -April, 1991

Area-68,000 ha

13. As for joint management, where is the interface of system operation between the government and WUA?

(Select one from A, B or C)-B

- A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.



- B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.
- C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational-1604 nos

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	2%
Less than 0.5 ha	19 %
0.5 – 1.0 ha	61%
1.0 – 5.0 ha	13%
More than 5.0 ha	5%
TOTAL	

Average size of land holding: 0.96 ha,

Maximum size of land holding: 25 ha,

16. How many members are in the WUA?-

There are four different levels of user's organization. Name of four WUAs and members are tabulated below:

S.N.	WUAs	Level	Members
1	Water Users Group (Toli) (WUG)	Water Course Level	5
2	Water Users Committee (WUC)	Tertiary Level	7
3	Water Users Coordination Committee (WUCC)	Secondary (Branch canal)	9
4	Water Users Central Coordination Committee (WUCCC)	CMC Level	24

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	24	5
2ndary-level	20	220	10
Tertiary-level	125	1125	10

18. Board members of the main committee

No board system in this proje

Board members	Nos.	Sex (M or F)
President		
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select “Yes” or “No”)

**No** because there is no board system

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

**Yes**, (In WUG only) No (reason: In others WUAs level women representation is less than 33% due to reservation problen )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select “Yes” or “No”)

**Yes**, No (reason: )

22. Is there WUA constitution? (select “Yes” or “No”)

**Yes**, No (reasons: )

23. Is the WUA registered? (select “Yes” or “No”)

**Yes**, No (reasons: )

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)-

IDDO, IMD, Other (specify: SMIP also )

WUA is registered at District Water Resources Committee and also at Sunsari Morang Irrigation Project

25. Please explain the procedure to register WUA.

The procedure for register of WUA is as follow:

1. Water users of different system form Ad-hoc committee.
2. Constitution draft committee prepare constitution of WUA
3. Draft of constitution is approved by Ad-hoc committee
4. Ad-hoc committee registered the application with approved constitution of WUA at District Water Resources Committee or concerned organization.
5. District Water Resources Committee or concerned organization registered the WUA and issue the registration certificate with necessary action.

26. How often the WUA general assembly is held? (select “Yes” or “No”)  
**Once a year –within January 15,** Not periodical (specify: )
27. How the financial situation (income and expenditure) is reported to WUA members? (select one)  
**At the general assembly,** other (specify: in project office during renewing process )
28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
 By FM radio, By cell phone, **By cell phone & verbal message,**  
 Other (specify: verbal message by letter )

29. Irrigation Service Fee (ISF)
- ✓ How much is the ISF? Rupees per year-1500000, or Rupees per crop (season)
  - ✓ When ISF is collected? –Jan to June
  - ✓ What is the ISF collection rate? -300/ha
  - ✓ What is the penalty against someone who does not pay ISF?-10%
- 

30. Sharing of collected ISF
- |                   |      |   |
|-------------------|------|---|
| National Treasury | - 20 | % |
| WUA               | 80   | % |
- Note: Total should be 100%.

31. Sharing of collected ISF within WUA
- |                           |    |   |
|---------------------------|----|---|
| Main Committee            | 5  | % |
| 2ndary-level Committees   | 20 | % |
| Tertiary-level Committees | 25 | % |
| Others if any: specify    | 50 |   |
| Total-100 %               |    |   |

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)
- Headworks / water source structures: **A,** B, C, D, E
- Main canals: **A,** B, C, D, E
- 2ndary canals: **A,** B, C, D, E
- Tertiary canals: **A,** B, C, D, E

Here

- A = Maintenance and repair are done and functioning properly,
- B = Warning signs are found but functioning during the next crop season,
- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): **Yes,** No

If "Yes", how do they participate?

\_\_by cash and labor

✓ Design stage (select "Yes" or "No"): **Yes,** **No**

If "Yes", how do they participate?

\_\_\_\_\_

✓ Construction stage (select "Yes" or "No"): **Yes,** No

If "Yes", how do they participate?

In secondary, sub-secondary and tertiary- participate in resource mobilization and supervision

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? - **jointly**

✓ How often (frequency) is it cleaned? \_\_2 yrs

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

**Yes,** No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_jointly\_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_1 yr\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

**Yes,** No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? \_\_1 yr\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

**Yes,** No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

\_\_structure repair, service road, gates ect

✓ How often they are required?-Its depends on site condition and climatic condition (when become necessary)

✓ Is there repair record? **Yes,** No

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA? -Jointly

✓ What kinds of repair are usually required?

\_\_Structures and canal cleaning



\_WUG committee

- ✓ Is there a written record of operation, that is, water delivery? **Yes,** No

If “Yes”, who keeps the records?-secretary

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

---

Is the record reported to WUA members? - No

If “Yes”, how is it reported?

---

#### 43. Farming

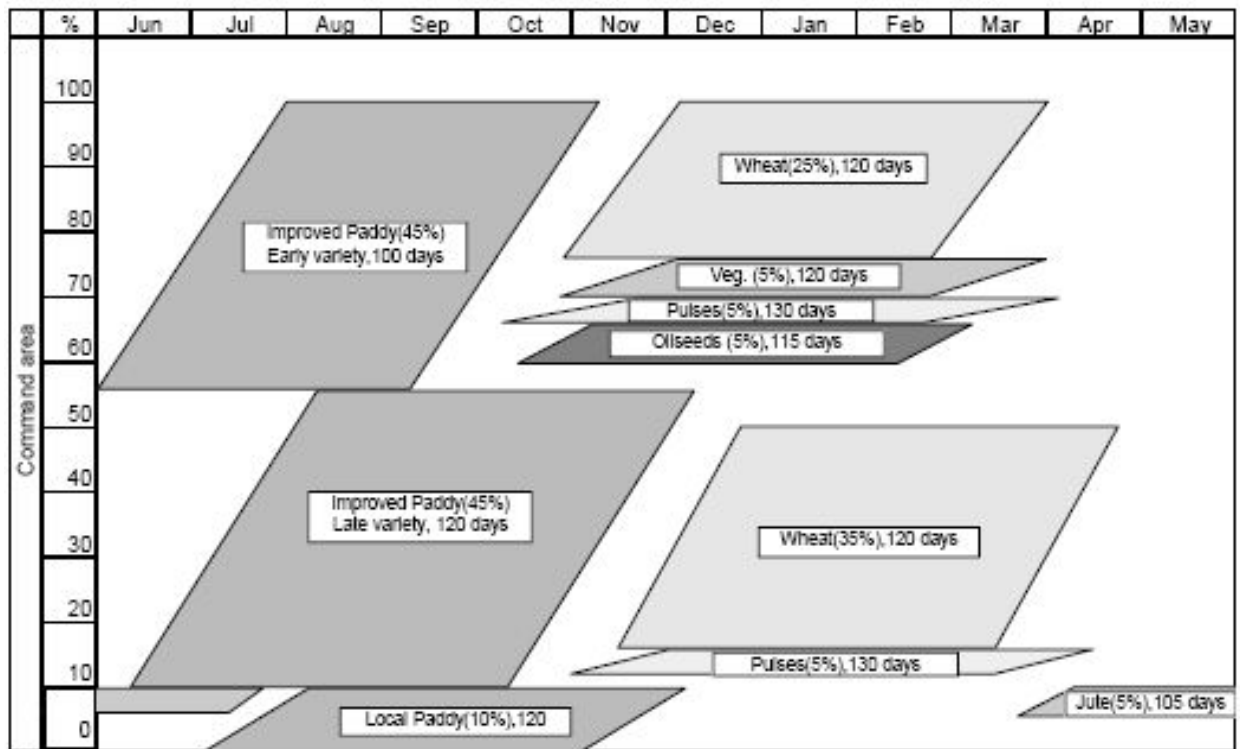
- ✓ Percentage of part-time farmers out of all WUA members: 15 %
- ✓ What jobs do they do for a living in addition to farming?  
Labour, Business and government job
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

The major crops in SMIS are Paddy and Wheat (Table1).The prevailing cropping intensity in the command area has reached to 175%.

Table 1: Prevailing cropping pattern in SMIS

Crops	Crop Area	Percentage of irrigated area	Percentage of command area	Cropping Season
Unit	ha	%	%	
Wheat	15932	14.2	24.9	Winter
Winter vegetable	2700	2.4	4.2	Winter
Winter Pulses	10200	9.1	15.9	Winter
Oilseeds	5475	4.9	8.6	Winter
Paddy-1	58559	52.2	91.5	Manson
Paddy-2	1991	1.8	3.1	Manson
Maize	400	0.4	0.6	Spring
Spring pulses	6900	6.2	10.8	Spring
Spring vegetables	4000	3.6	6.3	Spring
Jute	2950	2.6	4.6	Winter
Sugarcane	3035	2.7	4.7	All season
<b>Total</b>	<b>112142</b>	<b>100</b>	<b>175</b>	

Source: (Design Report, 1995), (Tamrakar, 2006)



- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?
  - Monsoon Rice-4.2 tons/ha and Rs.20/kg
  - Spring rice-4.25 tons/ha and Rs. 20/kg
  - Maize-4.0 tons/ha and Rs. 22/kg
  - Other crops (specify) wheat-2.07 tons/ha and Rs. 25/kg
  - Oil seeds-0.5 tons/ha and Rs. 60/kg
- ✓ What kinds of government supports are necessary to improve yield?
  1. Farmers training
  2. Subsidies is seeds and fertilizers
  3. Support in organic farming
  4. Soil test
  5. Subsidies in agriculture tools
- ✓ Percentage of farmers doing livestock business out of all WUA members:
  - Approximately 2 %
- ✓ Percentage of farmers doing orchard business out of all WUA members:
  - Approximately 2 %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:
  - Approximately 10 %

- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious, Serious, Not a problem
No cultivation in the dry season	Very Serious, Serious, <b><u>Not a problem</u></b>
Low yield per unit area	Very Serious, Serious, <b><u>Not a problem</u></b>
Access to market (market is far)	Very Serious, Serious, <b><u>Not a problem</u></b>
Low prices of agricultural products	Very Serious, <b><u>Serious</u></b> , Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?

Following supports are necessary by government to improve agricultural income:

1. Guaranty of year the round irrigation facility
2. Availability of seeds and nutrients/fertilizers in right time at affordable cost
3. Modernization in agricultural practice for e.g. Mechanization in agriculture
4. Agriculture road
5. Agriculture loan and insurance for crop and natural disaster e
6. Agriculture market
7. Cold storage
8. Storage for agricultural products

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities

All of the structure in CMC and a few in secondary canals are already 40 year old and so have lived up their life. Rehabilitation/replacement of these structures is inevitable.

The discharging capacity of CMC is 60m<sup>3</sup>/s. CMC flows full only in monsoon. In other season it is always less than half of maximum discharge. In monsoon, the discharge of 60m<sup>3</sup>/s is sufficient to irrigate the whole command area. In other season, the available water is not sufficient to irrigate the whole command area. But there is ample discharge in the source. It is to be found out whether the discharge of CMC can be increased in dry season just by lowering the present sill level of the intake without constructing a weir or barrage across the river. Another way of increasing the CMC discharge is to tap the perennial sources crossing it in its 53 Km long course and third is construction of permanent diversion weir in Koshi River and along with reconstruction and rehabilitation of Chatara main canal structures and the command area development work in the remaining 30,000 ha is of utmost requirement of SMIP for smooth operation in coming future.

Dredging is found to be more effective in removal of excessive silt collected in the settling basin. Both the dredging machines are in operation for last 8 years. They have so far been able to dispose off 3,70,000 to 5,00,000 M<sup>3</sup> of silt deposited in the settling basin per year. They are getting old, resulting in the decreased dredging efficiency. Problems of spare parts are mounting and the frequency of break



down has gone up. There is an urgent need for third dredge machine and a supplementary gravity flushing system should also be looked at.

The existing irrigation system of SMIP is the out come of a huge investment done in the last 40 years. The present value of the system is more than US\$ 300 million. To operate and maintain the system to design level, a significant amount of budget is to be allocated every year. For the last 5 years no budget allocation was made for the operation and maintenance of the system. The system is near to standstill. Higher authority should consider about this fact.

All the irrigation systems in Nepal, irrespective of small or big, are unable to irrigate the whole command area except during monsoon season. This is due to unavailability of required discharge in the source in other seasons. But in the case of SMIP, there is ample discharge in the source to command the whole area for any type of crops round the year. So scope is always there to meet the demand of the users for multi crops in a year. Some modifications are to be made in the systems for meeting the requirement and so the project becomes a never-ending process.

- ✓ About water management operation and maintenance, WUAs and agriculture.

The main intention of operation and maintenance work is to maintain good water control, to minimize water loss and to prevent system from probable problems. Regular maintenance keeps a system fit and healthy. SMIS has adopted following Operation and management plan (Figure 1).

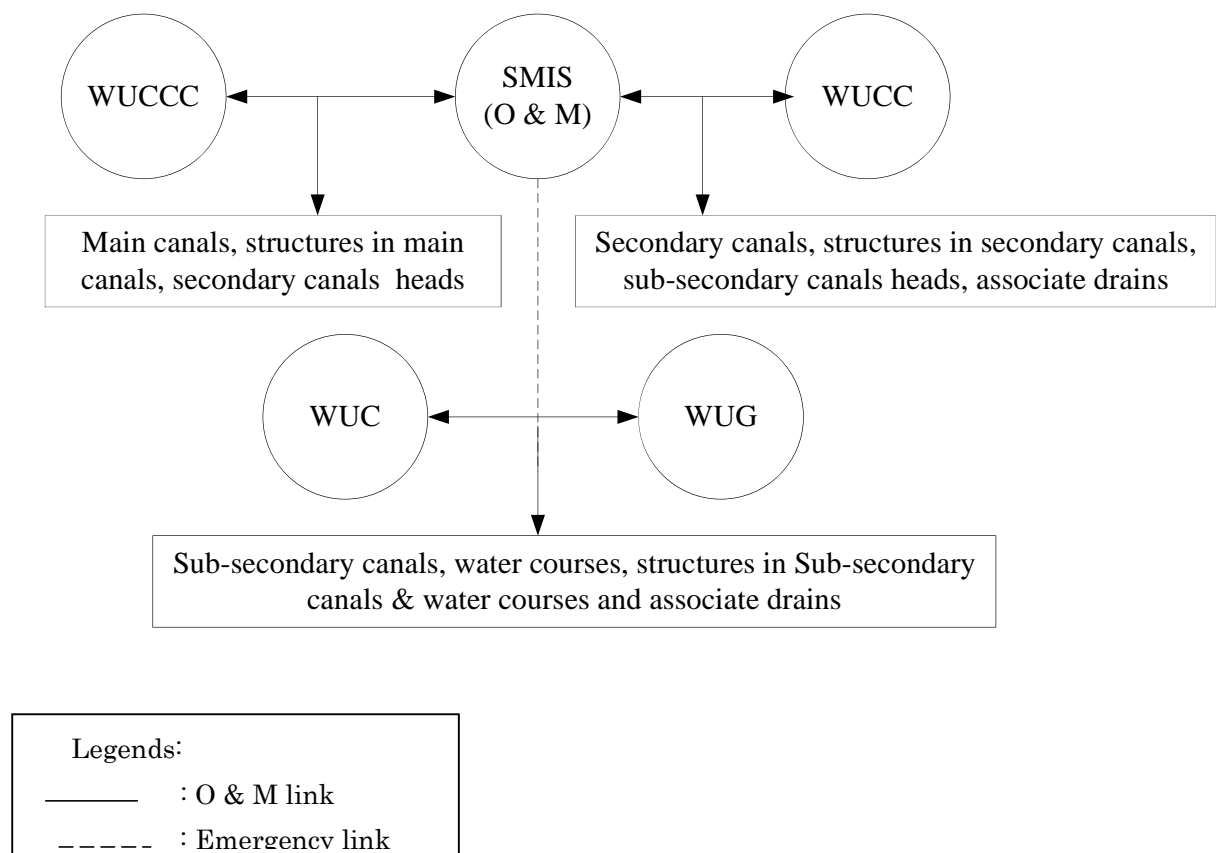


Figure 1:- O & M arrangement in SMIS

O &M work of the scheme is carried out with the coordination of scheme authority (SMIS) and water user's committee. It is the responsibility of SMIS to manage required maintenance fund up to secondary canal level, beyond this water users committee (WUC) and water users group (WUG) are sole responsible. These farmer's groups should prepare an annual maintenance plan as the basis for setting the annual maintenance cost that will be born through their Irrigation Service Charge. If a major maintenance is needed at the lowest level which is beyond the capacity of WUG, then WUCCC discusses with the scheme authority to provide technical assistance.

Operation and maintenance of the project is sole responsibility of Department of Irrigation, Sunsari Morang Irrigation Project, Biratnagar. At present, the operation and maintenance work is becoming more challenging day by day, as most of the canal structures already crossed their design life period, likewise the deflection of Koshi River towards the western bank in the recent year has limited the diversion of river flow into the main canal. Construction of permanent diversion weir in Koshi River and along with reconstruction and rehabilitation of Chatara main canal structures and the command area development work in the remaining 30,000 ha is of utmost requirement of SMIP for smooth operation in coming future. Due to heavy sediment entering into the system, operation and maintenance cost is increasing day by day. It has been increased by 110 % between 1992/93 and 2003/04.

Due to lack of budget for the O & M of dredgers, silt removal from the settling basin could not be done frequently. Consequently, the silt load in the canal system was increased by 3 times. If the dredger is operating normally in a typical year out of 327,000 m<sup>3</sup> of silt entering in the settling basin 118,000 m<sup>3</sup> goes to the canal system (rough estimate). Hence, lacking O &M cost of the dredger is causing huge sediment deposition in the system requiring tremendous maintenance cost of the canal system. Consequently it is influencing on the system's performance. Ultimately it will reduce the capacity of canal to deliver water, hence causing water stress in the crop will result less production.

✓ About farming

There are basically two cropping seasons in the command area, wet season for paddy (rice) and the dry season for wheat, pulses and other crops. During wet season canal runs with its full capacity. In spite of this canal supply can meet only about 55 % of the crop water requirement. Remaining 45% is supposed to be supplemented from rainfall. The farming practices are traditional mechanization in farming is necessary.

✓ About institution and WUAs

The WUAs are registered and functioning as per the rules and regulation prevailing to the act, Irrigation Regulation 2056, Irrigation Policy 2060. The formation of Water Users Groups has taken long time which was started in 2049 B.S and completed in

2065 B.S. The institutionalization and collective representation of Water Users Associations were not on time within certain period which affected the water management of command areas.

The elections of WUAs were not held as per scheduled time which affected the efficient management and representation of beneficiaries. Some WUCC are working efficiently and some are less efficient in water management, ISF collection, coordination with farmers as well as project, repair and maintenance work etc.

For the Sustainability of WUAs, there should be consideration on management aspect as follows;

1) Timely election of WUCC and WUCCC. The WUA should be updated and renewed on stipulated time. There should be coordination and involvement on planning, implementation and supervision and water management. Empowerment of WUAs by providing different kinds of training (organizational development, account management, technical skill etc.) Make effective and efficient on ISF collection with responsibility and authority to WUA. There should be transparency on management aspect of project and WUA in order to minimize the gap and misunderstanding.

2) One of the function of WUA is repair and maintenance of water system. There is high siltation in canal. There is shortage of labour for the silt removal and other works in the area which creates the problem for WUA to use the required labour on time to complete the works. According to procurement Act, WUA is not able to use heavy machines. As per the discussion with WUAs, there should be provision to use heavy machines to carry out the repair and maintenance work effectively and timely.

3) To transfer the ownership of canal to WUA, management handover of the system is necessary. The management of Sitagunj Branch Canal is handed over to WUCC under Irrigation and Water Resource Management Project. The handover process shall be continued to other canal system on SMIP. There should be joint project meetings with Project and WUCCC. The meetings of WUAs in all levels should be in timely and decision should be materialized. ISF collection should be made effective by creating the awareness and empowerment to farmers to encourage the use of ISF. WUA should be transparent on ISF collection and expenditure.

✓ Others

The CMC structures built in 1970 under Indian grant have endured their intended life periods and started showing the signs of wear and tear. Lack of regular repair and maintenance works most of the structures are at the verge of collapse or in very poor condition as compared to their designed functions. Inspection road of CMC has been serving as the main transportation route for the people of surrounding area. Vehicles loaded beyond the design capacity of the road and road crossings are great threat for the long life of these structures. Urgent attention to the improvement of such components is needed lest the system may not be defunct in near future.

Some specific problems associated with the structures of the CMC are:

a) Deterioration, with age, of brick masonry/concrete structures, thereby reducing the strength of

the structures considerably

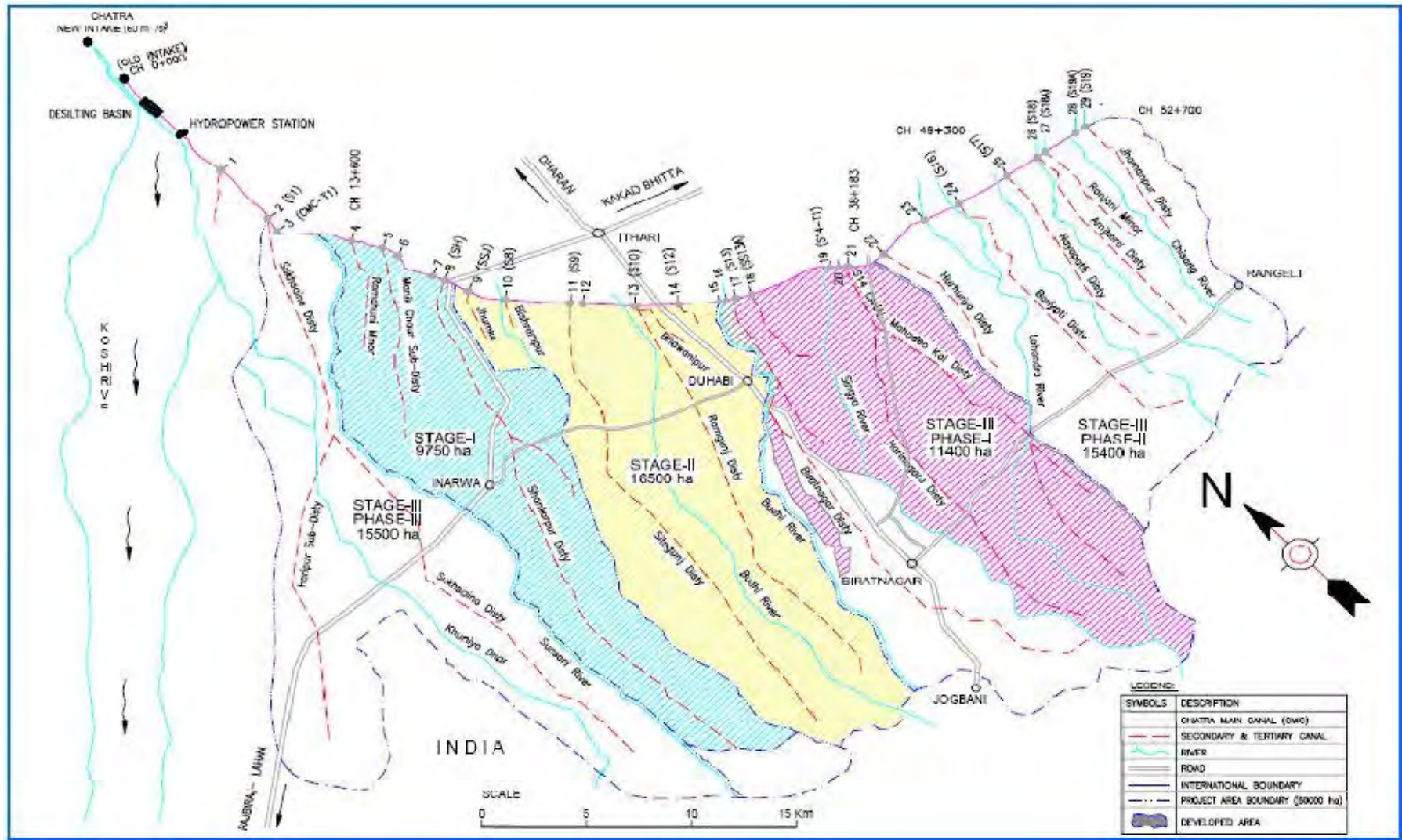
- b) Differential settlement of foundations of structural components
- c) Tilting of vertical walls of structures
- d) Exposure/heavy rusting of reinforcement in reinforced concrete works
- e) Rusting and wear and tear of steel gates
- f) Stripping of plaster off the structural members
- g) Exposure and heavy rusting of reinforcement

Out of total planned CAD works in 68,000 hectares, works in 38,000 hectares have already been completed in the past versions of project (namely, Stage-I, Stage-II and Stage-III, Phase-I). The CAD works in remaining 30,000 hectares needs to be implemented in order to bring all the command area of SMIP on equal level of development to accrue benefits as anticipated in the Project Master Plan.

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

Schematic layout of Sunsari Moran irrigation system Irrigation Project



31 July 2016

To Officer in Charge

JICA Expert, Irrigation

Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: ~~Koshi Pump Canal Irrigation System~~  
Chandra Nahar Irrigation system
2. Location of the Irrigation System  
Development Region: Eastern Development Region  
District: Saptari  
Longitude & Latitude:  
Headworks: 26° 31' N, 86° 47' E  
Command area: from °N to °N  
from °E to °E  
Elevation: 99 m to 120 m above MSL  
Nearest airport: Biratnagar
3. Catchment area: 800 km<sup>2</sup>
4. Number of government staff  
Engineers/Scientists: (Civil Engineers) 4 (Agri. Engineers) 1  
(Others) 1  
Technicians:  
Gate operators: (Headworks) 5 (Main canals) 10 (2ndary canals) 15  
Dhalpas
5. Type of water source by season  
Monsoon season: (select one)  
Perennial River (Name: Triguga), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify):

Spring season: (select one)

Perennial River (Name: Triyuga ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

Winter season: (select one)

Perennial River (Name: Triyuga ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW  
Spring: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW  
Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 10,000 ha  
 Actual (net) command area by season:  
 Monsoon ( 10000 ha), Spring ( 8000 ha), winter ( 10000 ha)

8. Canals

Main canal ( 1 nos.): Total length 31 km (Lining : m),  
 2ndary canal ( 12 nos.): Total length 43 km (Lining : m),  
 Tertiary canal ( 237 nos.): Total length 31 km (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

Headworks consists of Diversion type solid weir 309m long,  
 5 nos of gated undersluice having 22m length and  
 10 nos of main head regulator adjacent to the under  
 sluice. Source of River Triyuga - Max Discharge 4147 m<sup>3</sup>/s  
 Min " = 0.89 m<sup>3</sup>/s  
 Main canal Headwork capacity Q = 11.74 m<sup>3</sup>/s

10. Physical facilities of the system

Details	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: <u>Diversion</u> )				

Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) 1927AD

(Area) ha

12. Date of start of joint management

(Month/Year) 1993/94

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: 0.50ha,

Maximum size of land holding: ha,



16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	30 (33)	4
2ndary-level	22 (10)	(150)	
Tertiary-level	175 (259)	7~9 each	

15  
10 ~ 15 each

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	♂
Vice-president	1	♂
Secretary	1	♂
Treasurer	1	♂

19. Are the board members selected by election? (select "Yes" or "No")

✓ Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

✓ Yes, No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select "Yes" or "No")

✓ Yes, No (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

✓ Yes, No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

✓ Yes, No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: District water )

25. Please explain the procedure to register WUA.

Resources Committee

As per Water Resources Act.

26. How often the WUA general assembly is held? (select "Yes" or "No")

✓ Once a year, Not periodical (specify: )

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)  
 At the general assembly, Other (specify: \_\_\_\_\_ )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
 By FM radio, By cell phone,  By cell phone & verbal message,  
 Other (specify: \_\_\_\_\_ )

29. Irrigation Service Fee (ISF)  
 How much is the ISF? Rupees per year, or Rupees per crop (season)  
 When ISF is collected?  
 What is the ISF collection rate? \_\_\_\_\_ %  
 What is the penalty against someone who does not pay ISF?  
 \_\_\_\_\_ no penalty

*pay*  
*5-10% extra*

30. Sharing of collected ISF  
 National Treasury 10%  
 WUA 90%  
 Note: Total should be 100%.

31. Sharing of collected ISF within WUA  
 Main Committee 40%  
 2ndary-level Committees 60%  
 Tertiary-level Committees 0%  
 Others if any: specify \_\_\_\_\_ %  
 \_\_\_\_\_ %  
 Note: Total should be 100%.

*→ 2次レベル委員会*  
*→ VC committee*  
*→ 分庁*

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)  
 Headworks / water source structures: A,  B, C, D, E  
 Main canals: A,  B, C, D, E  
 2ndary canals: A, B,  C, D, E  
 Tertiary canals: A, B, C,  D, E

Here  
 A = Maintenance and repair are done and functioning properly,  
 B = Warning signs are found but functioning during the next crop season,  
 C = Partly malfunctioning,  
 D = Dilapidated and malfunctioning in whole, and  
 E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

Silted canals. Structures defunct. Gates are in miserable condition.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

By sharing their experience.

✓ Design stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

✓ Construction stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

Supervision

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA?

government

✓ How often (frequency) is it cleaned?

Annually

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA?

Government

✓ How often (frequency) is it cleaned?

Annually

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned?

WUA

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

Desilting

✓ How often they are required?

Annually

✓ Is there repair record? Yes No

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA? Government

✓ What kinds of repair are usually required?

Desilting

✓ How often they are required?

✓ Is there repair record? Yes, No

40. Tertiary canal repair (by WUA)

✓ What kinds of repair are usually required?

✓ How often they are required?

✓ Is there repair record? Yes, No

41. Maintenance plan

Main canal and headworks (Government)

✓ Is there a maintenance plan? Yes No

✓ Is maintenance implemented properly in accordance with the plan?

Yes, ~~No~~

If "No", what are reasons?

Insufficient Budget

2ndary canal

✓ Is it maintained by the government or by WUA? Government

✓ Is there a maintenance plan? Yes No

✓ Is maintenance implemented properly in accordance with the plan?

Yes, No

If "No", what are reasons?

Lack of Budget

Tertiary canal (WUA)

✓ Is there a maintenance plan? Yes, No

✓ Is maintenance implemented properly in accordance with the plan?

Yes, No

If "No", what are reasons?

42. Water distribution

✓ Who makes a water allocation plan?

- ✓ Who makes a rotation/irrigation schedule?

Office & WUA

- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?

In meeting

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

WUA

- ✓ Is there a written record of operation, that is, water delivery? Yes,  No

If "Yes", who keeps the records?

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

Is the record reported to WUA members? Yes, No

If "Yes", how is it reported?

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: %

- ✓ What jobs do they do for a living in addition to farming?

- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice

Spring rice  
Maize  
Other crops (specify)

- ✓ What kinds of government supports are necessary to improve yield?
  
- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately %
- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious,	Serious,	Not a problem
No cultivation in the dry season	Very Serious,	Serious,	Not a problem
Low yield per unit area	Very Serious,	Serious,	Not a problem
Access to market (market is far)	Very Serious,	Serious,	Not a problem
Low prices of agricultural products	Very Serious,	Serious,	Not a problem
- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
  
- ✓ About water management operation and maintenance, WUAs and agriculture.

- ✓ About farming
- ✓ About institution and WUAs
- ✓ Others

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.





Spring season: (select one)

Perennial River (Name: Koshi ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Koshi ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

*Barrage*

7. Command area

Total command area: 10500 ha

Actual (net) command area by season:

Monsoon ( ha), Spring ( ha), winter ( ha)

8. Canals

Main canal ( nos.): Total length m (Lining : m),

2ndary canal (12 nos.): Total length m (Lining : m),

Tertiary canal ( nos.): Total length m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: )				

Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) 1988 AD

(Area) 10500 ha

12. Date of start of joint management

(Month/Year)

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndry canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndry to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select "Yes" or "No")

Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes, No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select "Yes" or "No")

Yes, No (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

Yes, No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

Yes, No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: )

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select "Yes" or "No")

Once a year, Not periodical (specify: )

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)

At the general assembly,      Other (specify: \_\_\_\_\_ )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio,    By cell phone,     By cell phone & verbal message,  
Other (specify: \_\_\_\_\_ )

29. Irrigation Service Fee (ISF)

How much is the ISF? \_\_\_\_\_ Rupees per year, or \_\_\_\_\_ Rupees per crop (season)

When ISF is collected?

What is the ISF collection rate? \_\_\_\_\_ %

What is the penalty against someone who does not pay ISF?

No penalty

30. Sharing of collected ISF

National Treasury \_\_\_\_\_ %

WUA \_\_\_\_\_ %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee \_\_\_\_\_ %

2ndary-level Committees \_\_\_\_\_ %

Tertiary-level Committees \_\_\_\_\_ %

Others if any: specify \_\_\_\_\_ %

\_\_\_\_\_ %

\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures:    A,   B,   C,   D,   E

Main canals:    A,   B,   C,   D,   E

2ndary canals:    A,   B,    C,   D,   E

Tertiary canals:    A,   B,   C,    D,   E

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

Canal structures need repairs and maintenance  
Some new structures should be constructed.  
Desilting work should be done

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?  
\_\_\_\_\_

✓ Design stage (select "Yes" or "No"): Yes,  No  
If "Yes", how do they participate?  
\_\_\_\_\_

✓ Construction stage (select "Yes" or "No"):  Yes, No  
If "Yes", how do they participate?  
Supervision, WUA contribution

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_\_\_\_  
✓ How often (frequency) is it cleaned? \_\_\_\_\_  
✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? Mainly by government partly by WUA  
✓ How often (frequency) is it cleaned? Annually  
✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? Annually  
✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes,  No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?  
Desilting  
✓ How often they are required?  
Annually

✓ Is there repair record?

~~Yes~~

No

(Maintenance done by Govt. of India)

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA?

Government

✓ What kinds of repair are usually required?

Desilting

✓ How often they are required?

Annually

✓ Is there repair record?

Yes,

No

40. Tertiary canal repair (by WUA)

✓ What kinds of repair are usually required?

Desilting

✓ How often they are required?

Annually

✓ Is there repair record?

Yes,

No

41. Maintenance plan

Main canal and headworks (Government)

✓ Is there a maintenance plan?

Yes,

No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,

No

If "No", what are reasons?

2ndary canal

✓ Is it maintained by the government or by WUA?

government

✓ Is there a maintenance plan?

Yes,

No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,

No

If "No", what are reasons?

In sufficient budget

Tertiary canal (WUA)

✓ Is there a maintenance plan?

Yes,

No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,

No

If "No", what are reasons?

42. Water distribution

✓ Who makes a water allocation plan?

office & WUA

- ✓ Who makes a rotation/irrigation schedule?

office & WUA

- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?

In meeting

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

WUA

- ✓ Is there a written record of operation, that is, water delivery? Yes,  No

If "Yes", who keeps the records?

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

Is the record reported to WUA members? Yes, No

If "Yes", how is it reported?

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: %
- ✓ What jobs do they do for a living in addition to farming?
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice

Spring rice  
Maize  
Other crops (specify)

✓ What kinds of government supports are necessary to improve yield?

✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately %

✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately %

✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately %

✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious,	Serious,	Not a problem
No cultivation in the dry season	Very Serious,	Serious,	Not a problem
Low yield per unit area	Very Serious,	Serious,	Not a problem
Access to market (market is far)	Very Serious,	Serious,	Not a problem
Low prices of agricultural products	Very Serious,	Serious,	Not a problem

✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

✓ About irrigation facilities

✓ About water management operation and maintenance, WUAs and agriculture.



- ✓ About farming
- ✓ About institution and WUAs
- ✓ Others

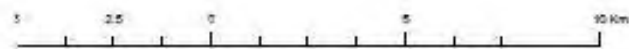
45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

LAYOUT MAP  
OF  
WESTERN KOSHI MAIN CANAL AND KOSHI PUMP CANAL



- Legend**
- Pump Station
  - Structure**
  - Existing Head Regulator
  - Proposed Head Regulator
  - Existing Inlet
  - Proposed Inlet
  - Existing Outlet
  - Proposed Outlet
  - Existing Fall
  - Proposed Fall
  - Existing Siphon
  - Proposed Siphon
  - Existing Pipe Culvert
  - Proposed Pipe Culvert
  - Existing Pipe Crossing
  - Proposed Pipe Crossing
  - Existing Road Crossing
  - Proposed Road Crossing
  - Existing Cross Drain Work
  - Proposed Cross Drain Work
  - Existing Foot Bridge
  - Proposed Foot Bridge
  - Existing VRI
  - Proposed VRI
  - Canal Network**
  - Main Canal
  - Distributory Canal
  - Minor Canal
  - Subminor Canal
  - Road
  - River
  - Country



31 July 2016

To Officer in Charge

JICA Expert, Irrigation

Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Koshi Pump Canal Irrigation System

2. Location of the Irrigation System

Development Region : *Eastern Region*

District : *Saptari*

Longitude & Latitude :

Headworks: ° 'N, ° 'E

Command area: from °N to °N  
from °E to °E

Elevation :

Nearest airport : *Biratnagar*

3. Catchment area : km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: (Civil Engineers) *4* (Agri. Engineers) *0*  
(Others) *1*

Technicians:

Gate operators: (Headworks) (Main canals) (2ndary canals)

5. Type of water source by season

Monsoon season: (select one)

Perennial River (Name: *Koshi*), Seasonal river: (Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

Other (specify):

Spring season: (select one)

Perennial River (Name: \_\_\_\_\_), Seasonal river: (Name: \_\_\_\_\_)  
 Groundwater (STW or DTW), Reservoir (Capacity: \_\_\_\_\_ m<sup>3</sup>)  
 Other (specify: \_\_\_\_\_):

Winter season: (select one)

Perennial River (Name: Koshi \_\_\_\_\_), Seasonal river: (Name: \_\_\_\_\_)  
 Groundwater (STW or DTW), Reservoir (Capacity: \_\_\_\_\_ m<sup>3</sup>)  
 Other (specify: \_\_\_\_\_):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 3180 ha

Actual (net) command area by season:

Monsoon ( \_\_\_\_\_ ha), Spring ( \_\_\_\_\_ ha), winter ( \_\_\_\_\_ ha)

8. Canals

Main canal ( 1 nos.): Total length 3310m (Lining : 290m), (33.1 km)

2ndary canal ( 6 nos.): Total length 68750m (Lining : \_\_\_\_\_ m),

Tertiary canal ( \_\_\_\_\_ nos.): Total length 352630 m (Lining : \_\_\_\_\_ m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

Pump House A

4 no. of vertical Turbine pumps of 2.75 m<sup>3</sup>/sec

2 no. of " " " of 1.50 m<sup>3</sup>/sec

pump House B

4 no. of vertical Turbine pumps of 2.75 m<sup>3</sup>/sec

2 no. of " " " " of 1.50 m<sup>3</sup>/sec

10. Physical facilities of the system

Details	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: _____ )				

Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) 1988 AD

(Area) ha

12. Date of start of joint management

(Month/Year)

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select "Yes" or "No")

Yes,                      No (specify:                      )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes,                      No (reason:                      )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select "Yes" or "No")

Yes,                      No (reason:                      )

22. Is there WUA constitution? (select "Yes" or "No")

Yes,                      No (reasons:                      )

23. Is the WUA registered? (select "Yes" or "No")

Yes,                      No (reasons:                      )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO,  IMD,      Other (specify:                      )

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select "Yes" or "No")

Once a year,                      Not periodical (specify:                      )

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)

At the general assembly, Other (specify: )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio, By cell phone,  By cell phone & verbal message,  
Other (specify: )

29. Irrigation Service Fee (ISF)

- How much is the ISF? Rupees per year, or Rupees per crop (season) 8,40/Bigaha/crop
- When ISF is collected?
- What is the ISF collection rate? %
- What is the penalty against someone who does not pay ISF?

No penalty

30. Sharing of collected ISF

National Treasury 20 %

WUA 80 %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee %

2ndary-level Committees %

Tertiary-level Committees %

Others if any: specify

\_\_\_\_\_ %

\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures:  A,  B,  C,  D,  E

Main canals: A,  B, C, D, E

2ndary canals: A, B,  C, D, E

Tertiary canals: A, B, C,  D, E

Here

A = Maintenance and repair are done and functioning properly.

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning.

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

Electrical & Mechanical equipments in pump houses are in miserable condition. Need of Rehabilitation. Canal structures ~~are~~ need repair and some new structures should be constructed.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes,  No

If "Yes", how do they participate?

✓ Design stage (select "Yes" or "No"): Yes,  No

If "Yes", how do they participate?

✓ Construction stage (select "Yes" or "No"): Yes,  No

If "Yes", how do they participate?

Supervision, WUA contribution

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? government

✓ How often (frequency) is it cleaned? As per required

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,  No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? Mainly by government, partially by WUA

✓ How often (frequency) is it cleaned? As per required

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,  No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? As per required

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,  No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

Desilting, gabion protection,

✓ How often they are required?

Annually



✓ Is there repair record?  Yes,  No

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA? Both

✓ What kinds of repair are usually required?

Desilting

✓ How often they are required?

Annually

✓ Is there repair record?  Yes,  No

40. Tertiary canal repair (by WUA)

✓ What kinds of repair are usually required?

Desilting

✓ How often they are required?

Annually

✓ Is there repair record? Yes,  No

41. Maintenance plan

Main canal and headworks (Government)

✓ Is there a maintenance plan?  Yes,  No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,  No

If "No", what are reasons?

Insufficient budget

2ndary canal

✓ Is it maintained by the government or by WUA? government

✓ Is there a maintenance plan?  Yes,  No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,  No

If "No", what are reasons?

Insufficient Budget

Tertiary canal (WUA)

✓ Is there a maintenance plan? Yes,  No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,  No

If "No", what are reasons?

42. Water distribution

✓ Who makes a water allocation plan?

- ✓ office and WUA  
Who makes a rotation/irrigation schedule?
- ✓ office and WUA  
How are the water allocation plan and rotation/irrigation schedule approved by WUA members?  
In Canal operation meeting.

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

WUA

- ✓ Is there a written record of operation, that is, water delivery?  Yes,  No

If "Yes", who keep the records?

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

Pump Log sheet in pump house A & B by staff.

Is the record reported to WUA members?  Yes,  No

If "Yes", how is it reported?

In meeting

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: %
- ✓ What jobs do they do for a living in addition to farming?
  
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.
  
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?  
Monsoon Rice

Spring rice  
Maize  
Other crops (specify)

- ✓ What kinds of government supports are necessary to improve yield?
  
  
  
  
  
  
  
  
  
  
- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately %
- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious, Serious, Not a problem
No cultivation in the dry season	Very Serious, Serious, Not a problem
Low yield per unit area	Very Serious, Serious, Not a problem
Access to market (market is far)	Very Serious, Serious, Not a problem
Low prices of agricultural products	Very Serious, Serious, Not a problem
- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
  
  
  
  
  
  
  
  
  
  
- ✓ About water management operation and maintenance, WUAs and agriculture.

- ✓ About farming
- ✓ About institution and WUAs
- ✓ Others

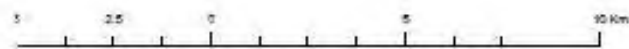
45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

# LAYOUT MAP OF WESTERN KOSHI MAIN CANAL AND KOSHI PUMP CANAL



- Legend**
- Pump Station
- Structure**
- Existing Head Regulator
  - Proposed Head Regulator
  - Existing Inlet
  - Proposed Inlet
  - Existing Outlet
  - Proposed Outlet
  - Existing Fall
  - Proposed Fall
  - Existing Siphon
  - Proposed Siphon
  - Existing Pipe Culvert
  - Proposed Pipe Culvert
  - Existing Pipe Crossing
  - Proposed Pipe Crossing
  - Existing Road Crossing
  - Proposed Road Crossing
  - Existing Cross Drain Work
  - Proposed Cross Drain Work
  - Existing Foot Bridge
  - Proposed Foot Bridge
  - Existing VRI
  - Proposed VRI
- Canal Network**
- Main Canal
  - Distributory Canal
  - Minor Canal
  - Subminor Canal
  - Road
  - River
  - Country



To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Kamala Irrigation System

2. Location of the Irrigation System

Development Region :Janakpur

District :Dahnusha & Siraha

Longitude&Latitude :

Headworks: 26 ° 53'11.23"N, 86 ° 08'13.82"E

Command area: from 26 °40'24.01" N to26 °51'21.30"N

from 86°00'14.44"E to 86°20' 55.30"E

Elevation :107.28 m

Nearest airport :Janakpur

3. Catchment area : 1550 km<sup>2</sup>

4. Number of government staff 18

Division Chief (Divisional Engineer) 1

Engineers/Scientists: (Civil Engineers) 8

(Agri.Engineers)1

Technicians(Civil sub Engineer)

Non Gazette officer 1

Accountant 1

A.O. (Agriculture) 1

Field Assistant 1

Office assistant 2

Senior Gate operators: (Headworks) 1

(Main canals)

(2ndary canals)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Kamala), Seasonal river:(Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify:):

Spring season: (select one)

Perennial River (Name: Kamala), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Kamala ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 25000 ha

Actual (net) command area by season:

Monsoon ( 25000 ha), Spring ( 25000 ha), winter ( 10000 ha)

8. Canals

Main canal ( 2 nos.): Total length 46k m (Lining : 3.5 km),

2ndary canal ( 12 nos.): Total length 123k m (Lining : 0 m),

Tertiary canal ( 70 nos.): Total length 210k m (Lining : 300 m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

- Head works length is 650 m having 2 no. of under sluice each 68 m length & length of weir is 514m. Design discharge of head works are 4500 cumec and 2 no of head regulator having length 30 m each having design discharge 16 cumec. The capacity of each main canal ( eastern & western) is 14 cumec .

10. Physical facilities of the system

Details	1st Phase (year 1960 )	2 <sup>nd</sup> Phase (year 1974 )	3 <sup>rd</sup> Phase (year 1984 )	Total
Headworks (Type: Barrage cum Weir )				
Main canal (Capacity : 14 m <sup>3</sup> /s)	km	24 km	22 km	46 km
2ndary canal	km	50 km	73km	123 km
Tertiary canal	km	100 km	110 km	210km
Canal structures	nos.	20 nos.	40 nos.	60nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) 1974

(Area) 15000 ha

12. Date of start of joint management

(Month/Year) 1991

(Area) 25000 ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

14. Number of irrigation blocks at present, if irrigation is rotational -12 block

15. Land holding size and number of households (HHs) 35886

Land holding size	Nos. of HHs
Landless	3252
Less than 0.5 ha	15560
0.5 – 1.0 ha	15880
1.0 – 5.0 ha	1145
More than 5.0 ha	49
TOTAL	35586



Average size of land holding: 0.70 ha,

Maximum size of land holding: 1 ha,

16. How many members are in the WUA? :-1004 member

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	2	54	33
2ndary-level	12	180	33
Tertiary-level	70	770	33

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	2	M
Vice-president	2	M
Secretary	2	M
Treasurer	2	M

19. Are the board members selected by election? (select "Yes" or "No")

Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes, No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select "Yes" or "No")

Yes, No (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

Yes, No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

Yes, No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: )

25. Please explain the procedure to register WUA.

After Election, They come to office with winning certificate, citizenship certificate including constitution and application for registration .



- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

33. If you answered B, C, D or E in the above 33., please specify possible causes of malfunctioning of respective facilities.

This system are very old and most of tertiary have not proper outlet.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

- ✓ Survey and Planning stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?

---

- ✓ Design stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?

---

- ✓ Construction stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?  
\_\_\_They participate by contribution

35. Main canal cleaning

- ✓ Is it cleaned by the government or by WUA? :- Government
- ✓ How often (frequency) is it cleaned? Once a year
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

36. 2ndary canal cleaning

- ✓ Is it cleaned by the government or by WUA? By Government
- ✓ How often (frequency) is it cleaned? Once a year
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

37. Tertiary canal cleaning (by WUA) : By WUA

- ✓ How often (frequency) is it cleaned? Twice a year
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?  
Reshaping , service road maintenance and structure maintenance



#### 42. Water distribution

- ✓ Who makes a water allocation plan?  
Jointly
- ✓ Who makes a rotation/irrigation schedule?  
Jointly
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?  
Jointly
- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
Jointly
- ✓ Is there a written record of operation, that is, water delivery? Yes, No  
If “Yes”, who keep the records? :-Government  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

---

Is the record reported to WUA members? Yes, No

If “Yes”, how is it reported?

By official Letter

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: 20 %
- ✓ What jobs do they do for a living in addition to farming?:  
Small jobs, work as labour small trade etc.
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.  
Paddy: June to December  
wheat : December to March  
pulse: December to March  
vegetables: Round year
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?  
Paddy: 4.7/ha Rs.22.00  
wheat : 2.5/ha. Rs. 30  
pulse: 0.7/ha. Rs 100

- ✓ What kinds of government supports are necessary to improve yield?  
Agriculture Technician, Fertilizer ,Hybrid seeds, Proper Irrigation etc.
- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately 10 %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately 5 %

- ✓ How much extent are the following problems?
 

Monoculture (no diversity)	Very Serious, Serious	,Not a problem
No cultivation in the dry season	Very Serious,	Serious, Not a problem
Low yield per unit area	Very Serious,	Serious, Not a problem
Access to market (market is far)	Very Serious,	Serious, Not a problem
Low prices of agricultural products	Very Serious,	Serious, Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?

Government need to open its own cold store

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities  
No sufficient water in resource
- ✓ About water management operation and maintenance, WUAs and agriculture.  
Lack of proper budget
- ✓ About farming  
Unskilled farming
- ✓ About institution and WUAs  
Sometimes lack of coordination

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Hardinath Irrigation System

2. Location of the Irrigation System

Development Region :Janakpur

District :Dahnusha

Longitude&Latitude :

Headworks: 26 ° 49'25.76"N, 85 ° 59'7.99"E

Command area: from 26 °45'32.93" N to26 °49'12.04"N

from 85°56'58.27"E to 85°59' 46.39"E

Elevation :104.23 m

Nearest airport :Janakpur

3. Catchment area : 225 km<sup>2</sup>

4. Number of government staff 18

Division Chief (Divisional Engineer) 1

Engineers/Scientists: (Civil Engineers) 8

(Agri.Engineers)1

Technicians(Civil sub Engineer)

Non Gazette officer 1

Accountant 1

A.O. (Agriculture) 1

Field Assistant 1

Office assistant 2

Senior Gate operators: (Headworks) 1

(Main canals)

(2ndary canals)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Jalad),

Seasonal river:(Name:

)

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify):

Spring season: (select one)

Perennial River (Name: Jalad), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Jalad ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 2000 ha

Actual (net) command area by season:

Monsoon ( 2000 ha), Spring ( 2000 ha), winter ( 1000 ha)

8. Canals

Main canal ( 2 nos.): Total length 15k m (Lining : 1 km),

2ndary canal ( 29 nos.): Total length 29 k m (Lining : 0 m),

Tertiary canal ( 0 nos.): Total length 0k m (Lining : 0 m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

- Head works length is 70 m having 2 no. of under sluice each 10 m length & length of weir is 50m. Design discharge of head works are 450 cumec and 2 no of head regulator having length 5 m each having design discharge 6 cumec. The capacity of each main canal ( eastern & western) is 2cumec .



10. Physical facilities of the system

Details	1st Phase (year 1967 )	2 <sup>nd</sup> Phase ( )	3 <sup>rd</sup> Phase (year 1984 )	Total
Headworks (Type: Barrage cum Weir )				
Main canal (Capacity : 14 m <sup>3</sup> /s)	15km	km	km	15 km
2ndary canal	29km	km	km	29 km
Tertiary canal	km	km	km	210km
Canal structures	15nos.	nos.	nos.	15nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) 1967

(Area) 2000 ha

12. Date of start of joint management

(Month/Year) 1991

(Area) 2000 ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

14. Number of irrigation blocks at present, if irrigation is rotational -12 block

15. Land holding size and number of households (HHs) 2650

Land holding size	Nos. of HHs
Landless	762
Less than 0.5 ha	924
0.5 – 1.0 ha	920
1.0 – 5.0 ha	29
More than 5.0 ha	15
TOTAL	2650

Average size of land holding: 0.81 ha,

Maximum size of land holding: 0.50 ha,

16. How many members are in the WUA? :-280 member

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	2	42	33
2ndary-level	34	238	33
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	2	M
Vice-president	2	M
Secretary	2	M
Treasurer	2	M

19. Are the board members selected by election? (select "Yes" or "No")

Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes, No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select "Yes" or "No")

Yes, No (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

Yes, No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

Yes, No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: )

25. Please explain the procedure to register WUA.

After Election, They come to office with winning certificate, citizenship certificate including constitution and application for registration .

26. How often the WUA general assembly is held? (select “Yes” or “No”)  
 Once a year,                      Not periodical (specify:                      )
27. How the financial situation(income and expenditure) is reported to WUA members? (select one)  
 At the general assembly,                      Other (specify:                      )
28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
 By FM radio,      By cell phone,      By cell phone & verbal message,  
 Other (specify:    Announcing by mic    )
29. Irrigation Service Fee (ISF)
- ✓ How much is the ISF?    Rupees per year, :-300.00    or    Rupees per crop (season)
  - ✓ When ISF is collected? :- December to June
  - ✓ What is the ISF collection rate?    :-    65 %
  - ✓ What is the penalty against someone who does not pay ISF?:-    double amount
- 

30. Sharing of collected ISF
- |                   |    |   |
|-------------------|----|---|
| National Treasury | 20 | % |
| WUA               | 80 | % |
- Note: Total should be 100%.

31. Sharing of collected ISF within WUA
- |                           |    |   |
|---------------------------|----|---|
| Main Committee            | 50 | % |
| 2ndary-level Committees   | 25 | % |
| Tertiary-level Committees | 25 | % |
| Others if any: specify    |    |   |
| _____                     |    | % |
| _____                     |    | % |
- Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)
- Headworks / water source structures:      A,    B,    C,    D,    E
- Main canals:      A,    B,    C,    D,    E
- 2ndary canals:      A,    B,    C,    D,    E
- Tertiary canals:      A,    B,    C,    D,    E

Here

- A = Maintenance and repair are done and functioning properly,  
 B = Warning signs are found but functioning during the next crop season,

- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

33. If you answered B, C, D or E in the above 33., please specify possible causes of malfunctioning of respective facilities.

This system are very old and most of tertiary have not proper outlet.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

- ✓ Survey and Planning stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?

---

- ✓ Design stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?

---

- ✓ Construction stage (select "Yes" or "No"): Yes, No  
If "Yes", how do they participate?  
\_\_\_ They participate by contribution

35. Main canal cleaning

- ✓ Is it cleaned by the government or by WUA? :- Government
- ✓ How often (frequency) is it cleaned? Once a year
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

36. 2ndary canal cleaning

- ✓ Is it cleaned by the government or by WUA? By Government
- ✓ How often (frequency) is it cleaned? Once a year
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

37. Tertiary canal cleaning (by WUA) : By WUA

- ✓ How often (frequency) is it cleaned? Twice a year
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes, No

38. Main canal repair (by the government)



Due to lack of proper Budget

42. Water distribution

- ✓ Who makes a water allocation plan?  
Jointly
- ✓ Who makes a rotation/irrigation schedule?  
Jointly
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?  
Jointly
- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
Jointly
- ✓ Is there a written record of operation, that is, water delivery? Yes, No  
If “Yes”, who keep the records? :-Government  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

---

Is the record reported to WUA members? Yes, No  
If “Yes”, how is it reported?  
By official Letter

43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: 20 %
- ✓ What jobs do they do for a living in addition to farming?:  
Small jobs, work as labour small trade etc.
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.  
Paddy: June to December  
wheat : December to March  
pulse: December to March  
vegetables: Round year
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?  
Paddy: 5.33/ha Rs.22.00  
wheat : 3.55/ha. Rs. 30  
pulse: 0.7/ha. Rs 100

- ✓ What kinds of government supports are necessary to improve yield?  
Agriculture Technician, Fertilizer ,Hybrid seeds, Proper Irrigation etc.
- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately 10 %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately 5 %

- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious, Serious	,Not a problem
No cultivation in the dry season	Very Serious, Serious,	Not a problem
Low yield per unit area	Very Serious, Serious,	Not a problem
Access to market (market is far)	Very Serious, Serious,	Not a problem
Low prices of agricultural products	Very Serious, Serious,	Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?

Government need to open its own cold store

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities  
No sufficient water in resource
- ✓ About water management operation and maintenance, WUAs and agriculture.  
Lack of proper budget
- ✓ About farming  
Unskilled farming
- ✓ About institution and WUAs  
Sometimes lack of coordination
- ✓ Others

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.





Spring season: (select one)

Perennial River (Name: Bagmati ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

Winter season: (select one)

Perennial River (Name: Bagmati ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

√Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW  
 √Spring: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW  
 √Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 1,22,000 ha (Proposal) Now – 37,600

Actual (net) command area by season:

Monsoon ( ha), Spring ( ha), winter ( ha)

8. Canals

Main canal ( 2 nos.): Total length 48.20 km (Lining : m),

2ndary canal ( 6 nos.): Total length 112 km (Lining : m),

Branch canals 60.54+61.85 = 122.39 km

distributary

Tertiary canal ( 21 nos.): Total length m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: Barrage )	1992			

Main canal 64.40+48.20 (Capacity : m <sup>3</sup> /s)	48.20km	km	km	km
2ndary canal 17.60 to 2.21	112 km	km	km	km
Tertiary canal 2.90 to 0.95	122.39 km	km	km	km
Canal structures 521	521 nos.	nos.	nos.	nos.
Drainage canal	X km	km	km	km
Farm road	215 km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery

(Month/Year) 1992

(Area) 37,000 ha

12. Date of start of joint management

(Month/Year)

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C) = B

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational (need water management system)

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha 17%	
0.5 – 1.0 ha 9	
1.0 – 5.0 ha 4	
More than 5.0 ha 1	
TOTAL 31%	

Average size of land holding: 1.40 ha,

Maximum size of land holding: 6.16 ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	X		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select “Yes” or “No”)

Yes, No (specify: not now)

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

√Yes, No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select “Yes” or “No”)

√Yes, No (reason: )

22. Is there WUA constitution? (select “Yes” or “No”)

√Yes, No (reasons: )

23. Is the WUA registered? (select “Yes” or “No”)

√Yes, No (reasons: )

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IDDO, IMD, Other (specify: in project)

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year, √Not periodical (specify: )

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)  
 At the general assembly,      other (specify:      from auditing)

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
By FM radio,      By cell phone,       By cell phone & verbal message,  
Other (specify:      by letter)

29. Irrigation Service Fee (ISF)  
❖ How much is the ISF?      Rupees per year, or      Rupees per crop (season) Rs.10/haet.  
❖ When ISF is collected?      At  
❖ What is the ISF collection rate?      %  
❖ What is the penalty against someone who does not pay ISF?

---

30. Sharing of collected ISF  
National Treasury      30%  
WUA      70%  
Note: Total should be 100%.

31. Sharing of collected ISF within WUA  
Main Committee      %  
2ndary-level Committees      40%  
Tertiary-level Committees      60%  
Others if any: specify  
\_\_\_\_\_ %  
\_\_\_\_\_ %  
Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)  
Headworks / water source structures:       A,      B,      C,      D,      E  
Main canals:      A,       B,      C,      D,      E  
2ndary canals:      A,       B,      C,      D,      E  
Tertiary canals:      A,      B,       C,      D,      E

Here

- A = Maintenance and repair are done and functioning properly,
- B = Warning signs are found but functioning during the next crop season,
- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

Main, branch & distributary canals needs lining, desilting & maintenance.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

❖ Survey and Planning stage (select “Yes” or ”No”):   √Yes,       No

    If “Yes”, how do they participate?

Manually\_\_\_\_\_

❖ Design stage (select “Yes” or ”No”):   Yes,       √No

    If “Yes”, how do they participate?

    \_\_\_\_\_

❖ Construction stage (select “Yes” or ”No”):   Yes,       No

    If “Yes”, how do they participate?

10% of total cost\_\_\_\_\_

35. Main canal cleaning

❖ Is it cleaned by the government or by WUA?       Government

❖ How often (frequency) is it cleaned?       \_\_\_\_\_

❖ Is there maintenance (cleaning) record? (select “Yes” or ”No”)

    √Yes,       No

36. 2ndary canal cleaning (Branch)

❖ Is it cleaned by the government or by WUA?       Govenment

❖ How often (frequency) is it cleaned?       \_\_\_\_\_

❖ Is there maintenance (cleaning) record? (select “Yes” or ”No”)

    √Yes,       No

37. Tertiary canal cleaning (by WUA) (distributary) partially

❖ How often (frequency) is it cleaned?       \_\_\_\_\_

❖ Is there maintenance (cleaning) record? (select “Yes” or ”No”)

    √Yes,       No

38. Main canal repair (by the government)

❖ What kinds of repair are usually required?

Disilting & structure maintenance

❖ How often they are required?

    \_\_\_\_\_

- ❖ Is there repair record?   √Yes,       No

39. 2ndary canal repair (Branch)

- ❖ Is it repaired by the government or by WUA?   Government
- ❖ What kinds of repair are usually required?  
disilting, lining & structure repairs.
- ❖ How often they are required?  
yearly & 2 yearly
- ❖ Is there repair record?   √Yes,       No

40. Tertiary canal repair (by WUA) (distriburay)

- ❖ What kinds of repair are usually required?  
same as above
- ❖ How often they are required?

- 
- ❖ Is there repair record?   √Yes,       No

41. Maintenance plan

Main canal and headworks (Government)

- ❖ Is there a maintenance plan?       √Yes,       No
- ❖ Is maintenance implemented properly in accordance with the plan?  
  √Yes,       No  
          If “No”, what are reasons?

2ndary canal (branch)

- ❖ Is it maintained by the government or by WUA?   Government
- ❖ Is there a maintenance plan?       √Yes,       No
- ❖ Is maintenance implemented properly in accordance with the plan?  
  √Yes,       No  
          If “No”, what are reasons?

Tertiary canal (WUA) (distriburay)

- ❖ Is there a maintenance plan?       √Yes,       No
- ❖ Is maintenance implemented properly in accordance with the plan?  
  √Yes,       No  
          If “No”, what are reasons?

42. Water distribution

- ❖ Who makes a water allocation plan?  
Government & WUA

- ❖ Who makes a rotation/irrigation schedule?  
Government & WUA
  - ❖ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?  
By project + WUA
  - ❖ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
Project staff
  - ❖ Is there a written record of operation, that is, water delivery?      ✓Yes,      No  
  
If “Yes”, who keeps the records? = Gate operator.  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level  
Canal water level & gate operating calibrations  
  
Is the record reported to WUA members?      Yes,      ✓No  
If “Yes”, how is it reported?
- 

#### 43. Farming

- ❖ Percentage of part-time farmers out of all WUA members:      %
- ❖ What jobs do they do for a living in addition to farming?      90%
- ❖ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.  
Paddy -      Wheat  
Paddy -      Maize -      Maize  
Paddy -      Maize -      Potato
- ❖ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?  
Monsoon Rice      -      4.5  
Cost      -      variable

Spring rice	-	X
Maize	-	12
Other crops (specify)		

- ❖ What kinds of government supports are necessary to improve yield?  
Good quality of seeds, marketing, good facilities of fertilities, roads etc.
  
- ❖ Percentage of farmers doing livestock business out of all WUA members:  
Approximately 20%
- ❖ Percentage of farmers doing orchard business out of all WUA members:  
Approximately 5%
- ❖ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately 5%
- ❖ How much extent are the following problems?

Monoculture (√no diversity)	Very Serious,	Serious,	√Not a problem
No cultivation in the dry season	Very Serious,	Serious,	√Not a problem
Low yield per unit area	Very Serious,	Serious,	√Not a problem
Access to market (market is far)	Very Serious,	√Serious,	Not a problem
Low prices of agricultural products	Very Serious,	√Serious,	Not a problem
- ❖ What kinds of government supports are necessary to improve agricultural income?  
Access road, marketing, dynamic agriculture practice, block development

44. Please write particular problems/challenges of the system, if any.

- ❖ About irrigation facilities  
Lack of budgeting for proper repair & maintenance



#### Water management

- ❖ About water management operation and maintenance, WUAs and agriculture.

Need water management & sufficient budgeting.

- ❖ About farming

Advance technology

- ❖ About institution and WUAs

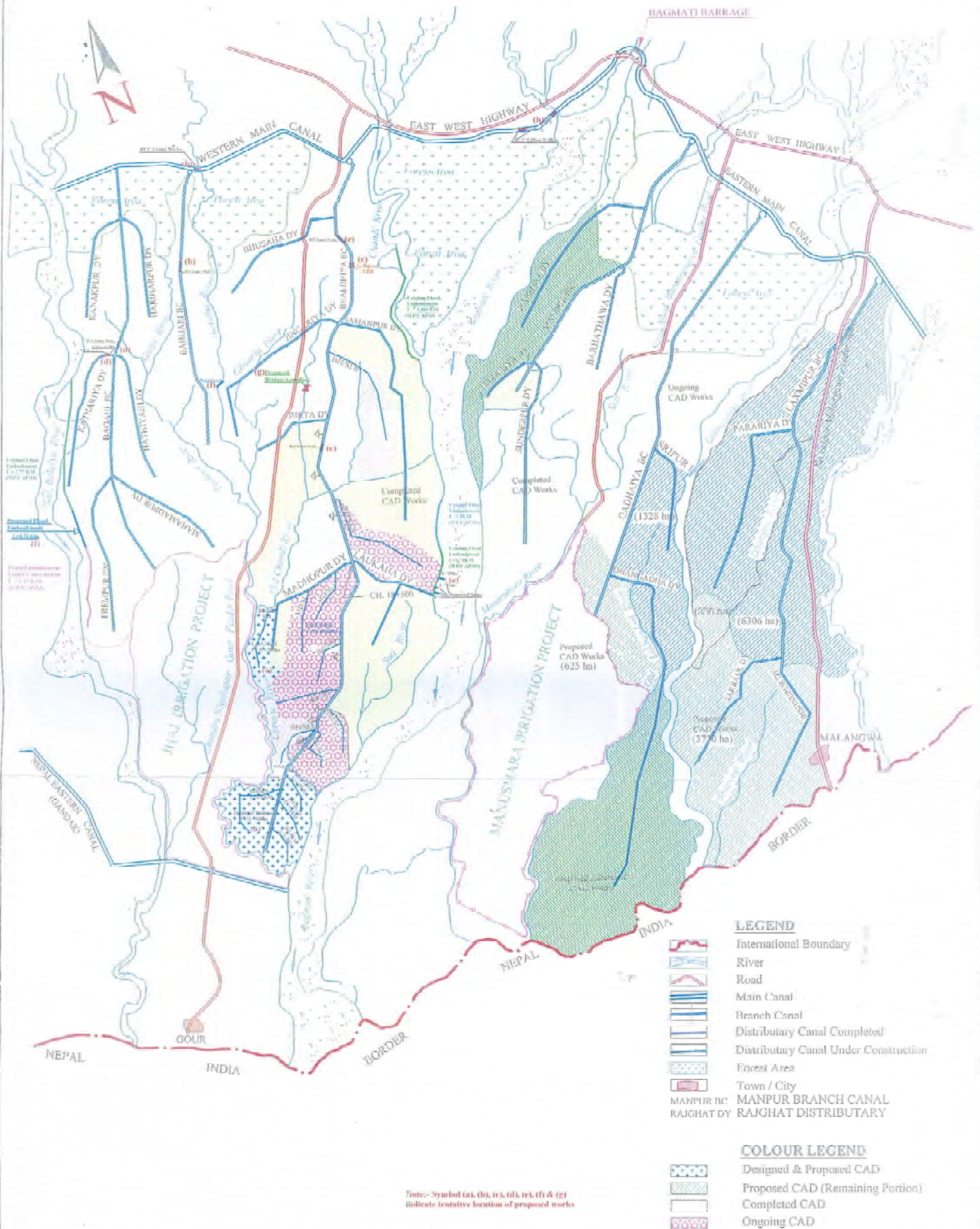
141 secondary level WUAs

- ❖ Others

#### 45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

# Proposed Works under CBIP/WMCS/ICB/WP-01 in WMC



Government of Nepal  
Ministry of Irrigation  
Department of Irrigation  
Bagmati Irrigation Project

**INDEX - MAP**  
Work Package No. 1 CBIP/WMCS/ICB/WP-01  
Command Area Development Works,  
Command Area Protection Works and  
Strengthening of WMC System at Different Locations

SFD Loan No. 5/465

**DRAWING**  
Not to scale

Submitted by:  
**SILT Consultants (P) Ltd.**  
MEH Consultants (P) Ltd.  
Masina Continental Associates (P) Ltd. and  
Full Bright Consultancy Pvt. Ltd.  
P.O. Box 3724, Mid-Central Tower, Kathmandu  
Tel: 4470000, 4467993, Fax: 4473573  
E-mail: silt@mos.com.np Web site: www.silt.com.np



Other (specify):

Spring season: (select one)

Perennial River (Name: Narayani ), Seasonal river: (Name: x )

Groundwater (STW or DTW), Reservoir (Capacity: x m<sup>3</sup>)

Other (specify: ):

Winter season: (select one)

Perennial River (Name: Narayani ), Seasonal river: (Name: x )

Groundwater (STW or DTW), Reservoir (Capacity: x m<sup>3</sup>)

Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir,  Pumping station, DTW, STW

Spring: Diversion dam, Storage dam/reservoir,  Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir,  Pumping station, DTW, STW

7. Command area

Total command area: 6251 ha

Actual (net) command area by season: 4750

Monsoon ( 3217 ha), Spring ( ha), winter ( ha)

8. Canals

Main canal ( 2 nos.): Total length 3600 m (Lining : m), B main canal : 19.5km ,  
C main canal : 16.5 km.

2ndary canal ( 16 nos.): Total length m (Lining : m), ( 9 nos.+7 nos.)

Tertiary canal ( nos.): Total length m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir,  Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
----------	----------------------	----------------------------------	----------------------------------	-------

Headworks (Type: )	√			1982/1985
Main canal (Capacity : 10 m <sup>3</sup> /s)	km	km	km	B Main 19.5 km C Main 16.5 km.
2ndary canal	km	km	km	B Main 15.5 km C Main 20.5 km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	150 km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time  
(Month/Year) : 2041  
(Area) : 2400 ha
12. Date of start of joint management  
(Month/Year) : 2051  
(Area) : 4700 ha
13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)
- A. √ The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.
- B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.
- C. Other (specify )
14. Number of irrigation blocks at present, if irrigation is rotationa :
15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha ( 15 Katha)	14236.00
0.5 – 1.0 ha( 15 Katha-1,5 Bigha)	1500.00
1.0 – 5.0 ha( 1.5 Bigha- 7.5	1000.00

Bigha	
More than 5.0 ha(More than 7.5 Bigha)	700.00
TOTAL	(11580+5856 ) = 17436

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	21	5%
2ndary-level		B-20 nos, C-15 nos	20%
Tertiary-level		9 nos	23%

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	-	-

19. Are the board members selected by election? (select "Yes" or "No")

Yes,  No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes,  No (reason: less capable )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select "Yes" or "No")

Yes,  No (reason: Not able to come in front. )

22. Is there WUA constitution? (select "Yes" or "No")

Yes,  No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

Yes,  No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: District Water Resources Committee at CDO office )

25. Please explain the procedure to register WUA. : 3 Tiers System : I ) Tertiary committee  
II ) Secondary committee  
III ) Main Committee
26. How often the WUA general assembly is held? (select “Yes” or “No”)  
√ Once a year, Not periodical (specify: )
27. How the financial situation(income and expenditure) is reported to WUA members? (select one)  
√ At the general assembly, Other (specify: )
28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
By FM radio, By cell phone, √ By cell phone & verbal message,  
Other (specify: )
29. Irrigation Service Fee (ISF)  
✓ How much is the ISF? Rupees per year, or Rupees per crop (season)  
✓ When ISF is collected? Bhadra To Aswin  
✓ What is the ISF collection rate? 225 per ha.  
✓ What is the penalty against someone who does not pay ISF?  
No penalty is applied till now .
30. Sharing of collected ISF  
National Treasury: 16.67 %  
WUA : 83.33 %  
Note: Total should be 100%.
31. Sharing of collected ISF within WUA  
Main Committee 30 %  
2ndary-level Committees 5%  
Tertiary-level Committees 65%  
Others if any: specify  
\_\_\_\_\_ %  
\_\_\_\_\_ %  
Note: Total should be 100%.
32. Overall condition of irrigation facilities (select one from A, B, C, D, E)  
Headworks / water source structures: A, √ B, C, D, E  
Main canals: √ A, B, C, D, E  
2ndary canals: √ A, B, C, D, E

Tertiary canals:  A, B, C, D, E

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities. Electro Mechanical components are needed to renovation. it is very very old model and installed by Jyoti Pump Ltd. Badodara , India in 1982 .Its pumping efficiency is very low.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

Survey and Planning stage (select "Yes" or "No"):  Yes, No

If "Yes", how do they participate?

They will conduct the meeting once a month and discussing about problems to make the appropriate decision for the operation and maintenance of the system.

Design stage (select "Yes" or "No"):  Yes, No

If "Yes", how do they participate?

Construction stage (select "Yes" or "No"):  Yes, No

If "Yes", how do they participate?

Follow the irrigation rule and regulation.

35. Main canal cleaning

Is it cleaned by the government or by WUA? Government

How often (frequency) is it cleaned? Once a Year

Is there maintenance (cleaning) record? (select " Yes" or "No")

Yes, No

36. 2ndary canal cleaning

Is it cleaned by the government or by WUA? WUA

How often (frequency) is it cleaned? Once a year

Is there maintenance (cleaning) record? (select " Yes" or "No")



Yes, No

37. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned? Once a year
- ✓ Is there maintenance (cleaning) record? (select "✓ Yes" or "No")

Yes, No

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?  
Bank protection works , Canal lining work , Desilting work , canal reshaping work.
- ✓ How often they are required?  
As per priorities basis ,
- ✓ Is there repair record? ✓ Yes, No

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? WUA
- ✓ What kinds of repair are usually required?  
Canal desilting and reshaping work,
- ✓ How often they are required?  
Once a Year.
- ✓ Is there repair record? ✓ Yes, No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?  
Canal desilting and reshaping works.
- ✓ How often they are required?  
Once a year.
- ✓ Is there repair record? ✓ Yes, No

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? ✓ Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
✓ Yes, No  
If "No", what are reasons?

---

2ndary canal

- ✓ Is it maintained by the government or by WUA? WUA
- ✓ Is there a maintenance plan? ✓ Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
✓ Yes, No



- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

Paddy :

Wheat :

Maize:

Maustard :

Lintel:

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice : 3.5 Mt/ha

Spring rice

Maize: 2.0 Mt/ha

Other crops (specify)

- ✓ What kinds of government supports are necessary to improve yield?
  - i) To improve yield following are main parameters to support .
  - ii) Mechanized farming is most essential,
  - iii) Improved variety of seeds should be given to the farmers,
  - iv) To manage the fertilizers , Pesticides , insecticides and herbicides.
  - v) Training should be given to WUA members / farmers for new farming technique.

- ✓ Percentage of farmers doing livestock business out of all WUA members:

Approximately 10 %

- ✓ Percentage of farmers doing orchard business out of all WUA members:

Approximately 5 %

- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:

Approximately 10 %

- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious, ✓ Serious, Not a problem
No cultivation in the dry season problem	Very Serious, ✓ Serious, Not a problem
Low yield per unit area problem	Very Serious, ✓ Serious, Not a problem
Access to market (market is far) problem	Very Serious, ✓ Serious, Not a problem
Low prices of agricultural products problem	✓ Very Serious, Serious, Not a problem

✓ What kinds of government supports are necessary to improve agricultural income?

Following are main point which the government supports to improve agriculture income

- i) To encourage the farmers to go for mechanized farming ,
- ii) Agriculture land is shrinking due to the plotting and rapid urbanization so that government should take action against haphazard's plotting.
- iii) Demarcation should be needed , between Agricultural Land and residential land .

44. Please write particular problems/challenges of the system, if any.

✓ About irrigation facilities :

- i) Electro Mechanical components are very old needs for renovation for pumps and electric motors .
- ii) Heavy siltation problems needs canal desilting and reshaping work once a year.
- iii) Lift system run only in monsoon season. River drawdown in winter season so it is not operated.
- iv) Electricity consumption is very high there is work load for the government.

✓ About water management operation and maintenance, WUAs and agriculture.

- i) Operation and maintenance is carried out by jointly, DOI and WUA.

✓ About farming

- i) paddy cultivation is done only in monsoon season.

✓ About institution and WUAs

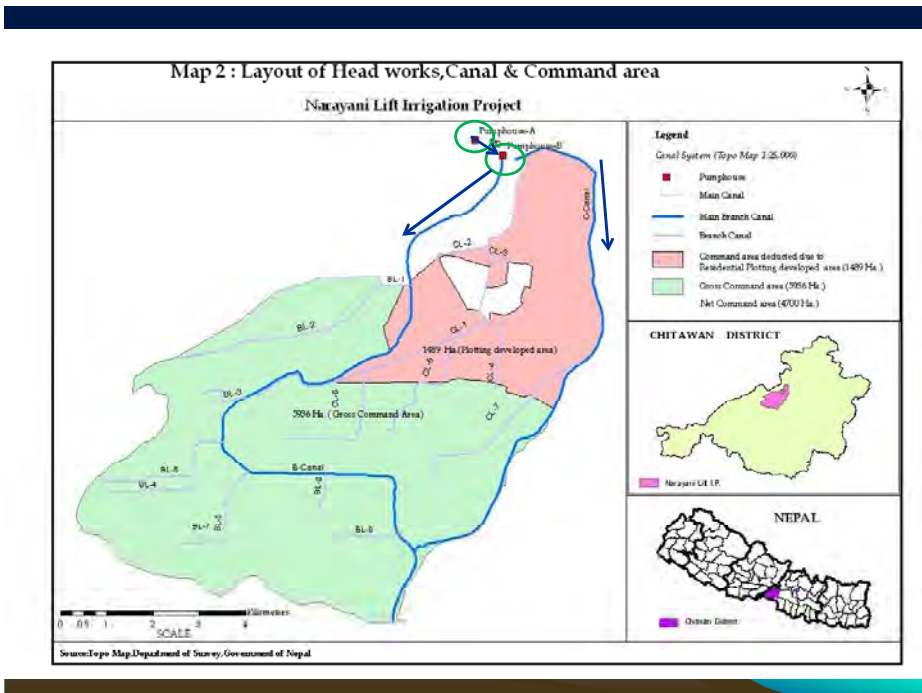
- i) General assembly is carried out once a year .
- ii) WUAs meeting is carried out once a month.

iii) Yearly audit report is submitted to the office .

✓ Others ;

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.



31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Khageri Irrigation System

2. Location of the Irrigation System

Development Region : Central

District : Chitwan

Longitude&Latitude :

Headworks: 27 °37 ' 57.67 "N, 84 ° 29' 19.99 "E

Command area: from °N to °N  
from °E to °E

Elevation : 220.00 m.

Nearest airport :Bharatpur

3. Catchment area : 118 km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: (Civil Engineers) : 3 nos. (Agri.Engineers): 1.no ( Division Chief)

(Others) : 1no. ( Mechanical Engineer)

Technicians:

Gate operators: (Headworks) x (Main canals) x (2ndary canals) x

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Khageri ), Seasonal river:(Name: x )

Groundwater (STW or DTW), Reservoir (Capacity: x m<sup>3</sup>)

Other (specify):

Spring season: (select one)

Perennial River (Name: Khageri ), Seasonal river: (Name: x )

Groundwater (STW or DTW), Reservoir (Capacity: x m<sup>3</sup>)

Other (specify: x ):

Winter season: (select one)

Perennial River (Name: Khageri ), Seasonal river: (Name: x )

Groundwater (STW or DTW), Reservoir (Capacity: x m<sup>3</sup>)

Other (specify: x ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon:  Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring :  Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter:  Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 3900 ha

Actual (net) command area by season:

Monsoon ( 3900 ha), Spring ( 500 ha), winter ( 2000 ha)

8. Canals

Main canal ( 1 nos.): Total length 27500 m (Lining : 1135 m),

2ndary canal ( 12 nos.): Total length 62300 m (Lining : 7150 m),

Tertiary canal ( 26 nos.): Total length 132500 m (Lining : 200 m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

Head works of Khageri irrigation system is Diversion Barrage type structure. Length of main canal is 27.65 km. Ideal length of main canal is 8.85 km. which is passing through the forest area i.e. called Barndabhar Jungle. It has 12nos. of branch canal and its length is 62.50 km. Most of the canal is earthen and the command area of this system is about 3900 ha. Discharge of main canal is about 7140 lts/sec ( 7.14 cumecs).Duty of 1.83 lts/sec /ha. Head works of the KIS is operated by the Dhalpas deputed by the office .There is no any permanent staffs for headwork's regulation as well canal operations.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: Barrage )				
Main canal (Capacity : 7.14 m <sup>3</sup> /s)	km	km	km	27.65 km
2ndary canal	km	km	km	62.50 km
Tertiary canal	km	km	km	200.00 km
Canal structures	nos.	nos.	nos.	81.00 nos.
Drainage canal	km	km	km	600.00 km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	5.00 km

11. Date of start of water delivery, area at that time

(Month/Year) : 2024/04/01

(Area) : 3900 ha

12. Date of start of joint management

(Month/Year): 2051/2052

(Area): 3900 ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from √A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

12.nos of Branch Canal.

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	10400 ( 65%)







Headworks / water source structures:      A,   B,   C,   D,   E  
 Main canals:      A,   B,   C,   D,   E  
 2ndary canals:     A,    B,   C,   D,   E  
 Tertiary canals:     A,   B,    C,   D,   E

Here

A = Maintenance and repair are done and functioning properly,  
 B = Warning signs are found but functioning during the next crop season,  
 C = Partly malfunctioning,  
 D = Dilapidated and malfunctioning in whole, and  
 E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

Secondary canal is somehow manageable for the water supply to monsoon as well as winter crops. Most part of the secondary canals are earthen . there is water seepage problems on unlined canal section of secondary as well as tertiary canal. Government will not see the secondary as well as tertiary canal for maintenance , our responsibility are only to manage the head works and main canal. Below secondary canal WUAs are responsible to manage the whole things.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

Survey and Planning stage (select "Yes" or "No"):    Yes,     No

If "Yes", how do they participate?

They Work together.

Design stage (select "Yes" or "No"):    Yes,     No

If "Yes", how do they participate?

They give their view.

Construction stage (select "Yes" or "No"):    Yes,     No

If "Yes", how do they participate?

There is 15% contribution done by WUAs for civil works.

35. Main canal cleaning

Is it cleaned by the government or by WUA?           WUA and Office

How often (frequency) is it cleaned?     \_\_\_\_\_Once a  
 Year\_\_\_\_\_

Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,     No

36. 2ndary canal cleaning

Is it cleaned by the government or by WUA?           WUA

- ✓ How often (frequency) is it cleaned? Once a year
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)
  - √ Yes, No

37. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned? Once a year.
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)
  - √ Yes, No

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?
  - Reshaping and canal desilting , Lined canal, Bank protection work
- ✓ How often they are required?
  - In a Priorities basis as per Budget allocation .
- ✓ Is there repair record? √ Yes, No

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? Both
  - What kinds of repair are usually required?
    - Reshaping and canal desilting , Canal improvement , Bank protection work.
- ✓ How often they are required? Once a Year
  - Is there repair record? Reshaping and canal desilting , Lined canal, Bank protection work
    - √ Yes, No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?
  - canal Desilting and Reshaping work.
- ✓ How often they are required?
  - Once a year
- Is there repair record? √ Yes, No

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? √ Yes, No
  - ✓ Is maintenance implemented properly in accordance with the plan?
    - √ Yes, No
    - If “No”, what are reasons?
- 

2ndary canal

- ✓ Is it maintained by the government or by WUA? WUA



---

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: %
- ✓ What jobs do they do for a living in addition to farming
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

Rice ( Paddy ) : Ashad to Kartik  
Wheat : Mangsir to Chaitra  
Corn : Chittra to Ashad  
Lintel : Kartik to Chaitra

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice : 3.5 Mt./Ha.

Spring rice : 2.5 Mt/ha

Maize:2.0 Mt/ha

Wheat : 2.5Mt/ha

Other crops (specify):

- ✓ What kinds of government supports are necessary to improve yield?  
Irrigation office provide water and Department of Agriculture providing the services to the farmers like how to managed the pest, required doses of fertilizers , insecticides and pest management program etc . All these knowledge will support to increase the yield. Sometimes they provide improved variety of seeds to the farmers .

- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately: 10 %

- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately 5%

- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately 15 %

- ✓ How much extent are the following problems?

Monoculture (no diversity)                      Very Serious,                      ✓ Serious,                      Not a  
problem

No cultivation in the dry season                      Very Serious,                      ✓ Serious,                      Not a problem

Low yield per unit area problem	Very Serious,	√ Serious,	Not a
Access to market (market is far)	Very Serious,	√ Serious,	Not a problem
Low prices of agricultural products	Very Serious,	√ Serious,	Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?

To improve agriculture income following are main points.

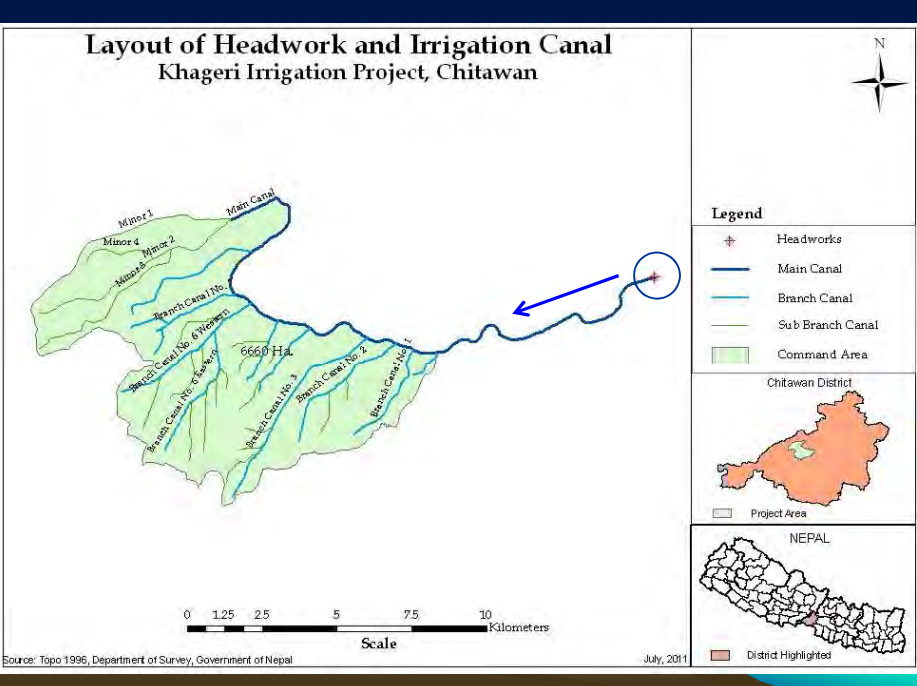
- Introducing of new farming technology.
- Crops diversification.
- Improved varieties of seeds.
- Timely given the fertilizers, pesticides and insecticides.
- System rehabilitations.

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities : Mostly the canals are unlined so the water leakage problems is high for main , distributaries and minors. we can not maintain the canal with limited budget.
- ✓ About water management operation and maintenance, WUAs and agriculture.: Wuas are managing the water distributions system.
- ✓ About farming: We are applying the same traditional methods of farming .They are lacking behind the mechanized farming. Small land holdings, Irrigation areas are decreasing due to the fast growing of urbanization. land plotting for residential area.
- ✓ About institution and WUAs: Wuas are renewed once a year . They will conduct the general assembly once a year. They will go for the annual audit . they will facilitate and go for water regulation such as monsoon, winter and spring.
- ✓ Others :

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.





31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: *Gendek irrigation system*
  
2. Location of the Irrigation System
  - Development Region: *Western*
  - District: *Nabel parasi*
  - Longitude & Latitude:
    - Headworks: ° ' "N, ° ' "E
    - Command area: from °N to °N *→ 27° 23' 8" N to 27° 25' 41" N*  
from °E to °E *→ 83° 47' 43" E to 83° 50' 55" E*
  - Elevation: *110 to 105 m*
  - Nearest airport: *Bhairahwa*
  
3. Catchment area: km<sup>2</sup> *15,000 mile<sup>2</sup>*
  
4. Number of government staff
  - Engineers/Scientists: (Civil Engineers) *1 (One)* (Agri. Engineers) *X*  
(Others)
  - Technicians: *Division chief*
  - Gate operators: (Headworks) *4* (Main canals) (2ndary canals)
  
5. Type of water source by season  
Monsoon season: (select one)
  - Perennial River (Name: *Gendek*), Seasonal river: (Name: )
  - Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)
  - Other (specify: ):

Spring season: (select one)

Perennial River (Name: Gandak), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

Winter season: (select one)

Perennial River (Name: Gandak), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW } *Side intake*  
Spring: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW }  
Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW }

7. Command area

Total command area: 10300 ha  
 Actual (net) command area by season:  
 Monsoon (9000 ha), Spring ( X ha), winter ( 500 ha)

8. Canals

Main canal ( 1 nos.): Total length 32 Km m (Lining: X m),  
 2ndary canal ( 10 nos.): Total length 465 Km m (Lining: X m),  
 Tertiary canal ( 203 nos.): Total length 390 Km m (Lining: X m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

*Intake width = 24m with 3 bay two in operation  
 Q = 8.5 cumecs.*

10. Physical facilities of the system

Details	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: )				

Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) P.Y - 2035-2036

(Area) 10300 ha

12. Date of start of joint management

(Month/Year) P.Y - 2055/56

(Area) 10300 ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

2 Block

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 - 1.0 ha	
1.0 - 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA? - 1124 including all systems

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	20	20%
2ndary-level	10	146	2.7%
Tertiary-level	162	958	33%

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	m
Vice-president	1	he
Secretary	1	m
Treasurer	1	m

19. Are the board members selected by election? (select "Yes" or "No")

Yes, **YES** No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes, No (reason: **NO, due to community awareness**)

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select "Yes" or "No")

Yes, **YES** No (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

Yes, **YES** No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

Yes, **YES** No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: **District administration office & Imp**)

25. Please explain the procedure to register WUA.

**As per irrigation policy & irrigation rule (2056)**

26. How often the WUA general assembly is held? (select "Yes" or "No")

Once a year,  Not periodical (specify: )

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)  
At the general assembly, Other (specify: )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio, By cell phone, By cell phone & verbal message,

Other (specify: *By letter* )

29. Irrigation Service Fee (ISF)

*Rs 20/catha*

✓ How much is the ISF? \_\_\_\_\_ Rupees per year, or  $\uparrow$  \_\_\_\_\_ Rupees per crop (season)

✓ When ISF is collected? *after crop harvesting*

✓ What is the ISF collection rate? *100% / higher*

✓ What is the penalty against someone who does not pay ISF?

*penalty is to rise but not implemented*

30. Sharing of collected ISF

National Treasury \_\_\_\_\_ %

WUA *10* % *of collected money*

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee *20* %

2ndary-level Committees *30* %

Tertiary-level Committees *50* %

Others if any: specify

\_\_\_\_\_ %

\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, **B**, C, D, E

Main canals: A, B, **C**, D, E

2ndary canals: A, B, **C**, D, E

Tertiary canals: A, B, C, D, **E**

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

proper repair maintenance.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"):  Yes  No

If "Yes", how do they participate?

with labour mobilization

✓ Design stage (select "Yes" or "No"): Yes,  No

If "Yes", how do they participate?

✓ Construction stage (select "Yes" or "No"): Yes  No

If "Yes", how do they participate?

with supervision committee

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? government

✓ How often (frequency) is it cleaned? Seasonal

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,  No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? By WUA & Govt.

✓ How often (frequency) is it cleaned? Seasonal

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,  No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? As per necessity

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,  No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

Canal reshaping, siphon clearance & gate repair.

✓ How often they are required?

After every crop season.

✓ Is there repair record? Yes,  No

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA? WUA

✓ What kinds of repair are usually required? canal reshaping

✓ How often they are required? After every crop season

✓ Is there repair record? Yes,  No

40. Tertiary canal repair (by WUA)

✓ What kinds of repair are usually required? canal reshaping

✓ How often they are required? After every crop season

✓ Is there repair record? Yes,  No

41. Maintenance plan

Main canal and headworks (Government)

✓ Is there a maintenance plan? Yes,  No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,  No

If "No", what are reasons?

1) NO proper co-ordination bet<sup>n</sup> Govt. & WUA

2) canal system is very old.

3) lack of budget.

✓ Is it maintained by the government or by WUA? WUA

✓ Is there a maintenance plan? Yes,  No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,  No

If "No", what are reasons?

Due to lack of awareness.

Tertiary canal (WUA)

✓ Is there a maintenance plan? Yes,  No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,  No

If "No", what are reasons?

lack of awareness.

42. Water distribution

✓ Who makes a water allocation plan?

WUA / Govt.

- ✓ Who makes a rotation/irrigation schedule?

WUA with <sup>office</sup> consultation

- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?

3 days up to 20 km  
4 days rest - 12 km

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

WUA

- ✓ Is there a written record of operation, that is, water delivery? Yes, No

If "Yes", who keeps the records?

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

- Is the record reported to WUA members? Yes, No

If "Yes", how is it reported?

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: 80 %

- ✓ What jobs do they do for a living in addition to farming?

Trading & business, Govt job

- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

paddy, wheat, sugarcane & oil seed

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice 3.2 ton/ha



Spring rice

Maize

Other crops (specify)

wheat = 2.2 ton/hae.

✓ What kinds of government supports are necessary to improve yield?

- irrigation facility
- Biological input
- mechanical input.

✓ Percentage of farmers doing livestock business out of all WUA members:

Approximately % 70/.

✓ Percentage of farmers doing orchard business out of all WUA members:

Approximately % No

✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:

Approximately % 5/.

✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious, ✓	Serious, ✓	Not a problem
No cultivation in the dry season	Very Serious, ✓	Serious, ✓	Not a problem
Low yield per unit area	Very Serious, ✓	Serious, ✓	Not a problem
Access to market (market is far)	Very Serious, ✓	Serious, ✓	Not a problem
Low prices of agricultural products	Very Serious, ✓	Serious, ✓	Not a problem

✓ What kinds of government supports are necessary to improve agricultural income?

- market
- Rate fixation by Govt.
- reduction of black marketing

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities very high siltation in canal system. poor feasibility of water regulating structure.
- ✓ About water management operation and maintenance, WUAs and agriculture. Lack of knowledge of water management to the planted crops.

- ✓ About farming

*Not advance tillage implement.*

- ✓ About institution and WUAs

*Not. Regular Co-ordination*

- ✓ Others

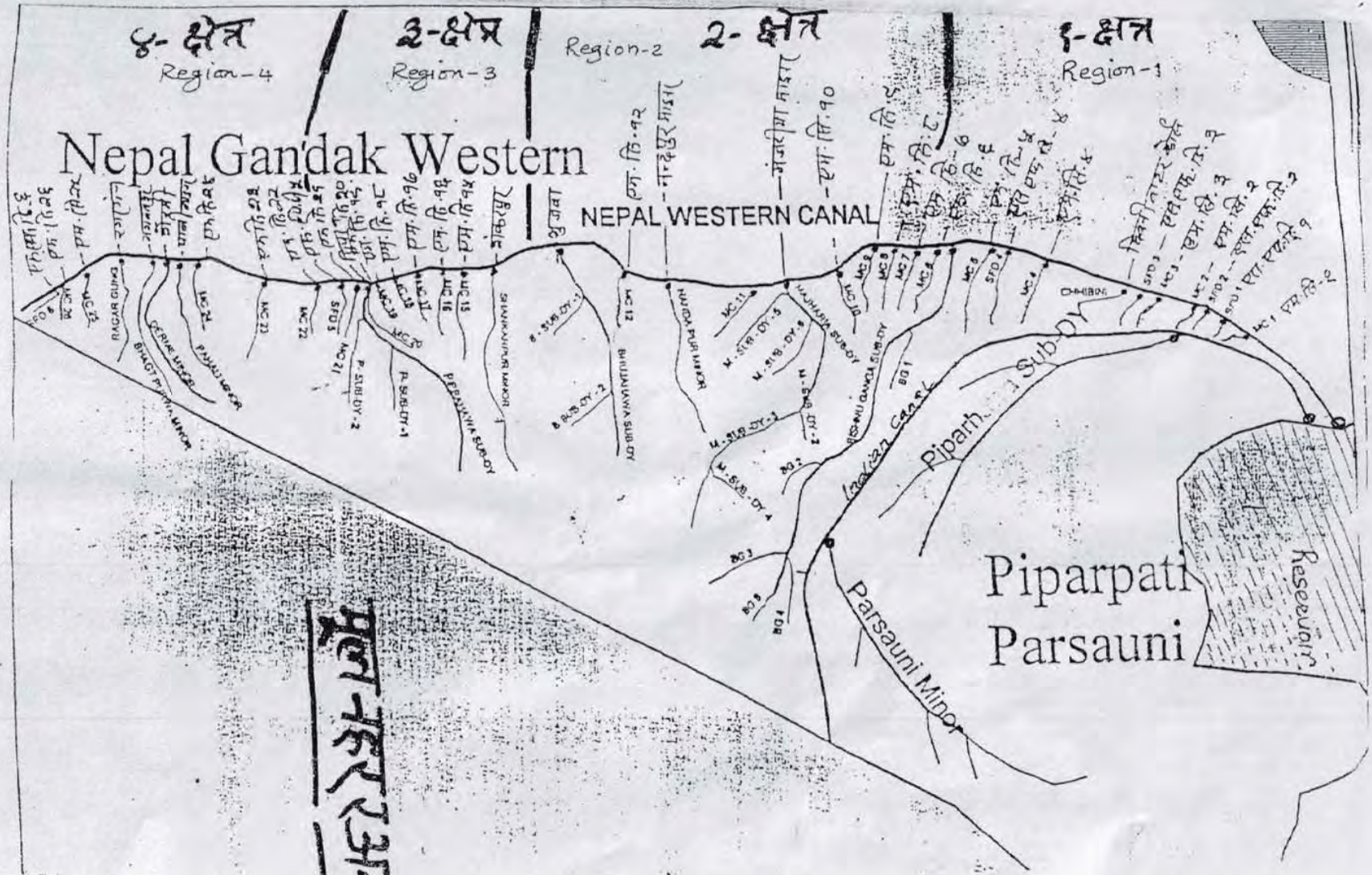
45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

4- क्षेत्र Region-4      3- क्षेत्र Region-3      Region-2      2- क्षेत्र      1- क्षेत्र Region-1

Nepal Gandak Western

NEPAL WESTERN CANAL



**मूल नहर अभ्यास**

Piparpati  
Parsauni

Reservoir

31 July 2016

To Officer in Charge



JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Bhairahawa Lumbini Groundwater Irrigation Project

2. Location of the Irrigation System

Development Region : Western Development Region

District : Rupandehi

Longitude&Latitude :

Headworks: 26°20'-26°27'N, 83°15'-83°22'E

Command area: from °N to °N

from °E to °E

Elevation : 150m. MSL

Nearest airport : Gautam Buddha Airport Bhairahawa,

3. Catchment area : km<sup>2</sup>

4. Number of government staff :- S.D.E.-1, Hydrogeologist - 1

Engineers/Scientists: (Civil Engineers) - 1, (Agri.Engineers) - 2,

√ (Others) Electrical Sub Engineer - 1, Mechanical Sub. Engineer - 1

Civil Sub Engineer - 2, Nayab Subba - 1

Accountant - 1, Kharidar - 1

Technicians:

Gate operators: (Headworks)

(Main canals)

(2ndary canals)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: )

), Seasonal river:(Name: )



नेपाल सरकार  
विचार-वाक्य  
सिंहको राज  
शान्ति-सुख-समृद्धि  
सिंहको राज

Groundwater (STW or DTW), Reservoir (Capacity) m<sup>3</sup>

√

Other (specify):

Spring season: (select one)

Perennial River (Name: ), Seasonal river: (Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

√

Other (specify: ):

Winter season: (select one)

Perennial River (Name: ), Seasonal river: (Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

√

Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

√

Spring: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

√

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

√

7. Command area

Total command area: 20309 ha

Actual (net) command area by season: 3982 ha

Monsoon (10443 ha), Spring ( 7779 ha), winter ( 3982 ha)

8. Canals

Main canal ( 64 nos.): Total length 254 km (Lining : 254 km),

Secondary canal ( nos.): Total length m (Lining : m),

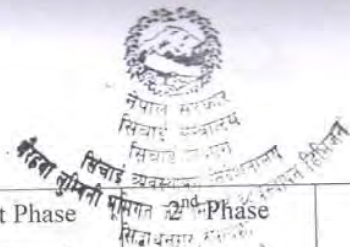
Tertiary canal ( nos.): Total length m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

√

*[Signature]*  
[Stamp]



10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: )				
Main canal (Capacity : 0.080 m <sup>3</sup> /s)	km	km	km	254 km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) July, 1978, 1<sup>st</sup> Stage

(Area) 7200 ha

12. Date of start of joint management

(Month/Year) July, 1999

(Area) 20309 ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

- A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.
- B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.
- C. Other (specify) Repair & maintenance work has been done jointly

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	

*Handwritten signature*  
**डिभिजन प्रमुख**



More than 5.0 ha	
TOTAL	

Average size of land holding: 1.50 ha,  
Maximum size of land holding: 5 ha,

16. How many members are in the WUA?

There are 11 (nos.) members in the WUA.

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	11	33%
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	1	M

19. Are the board members selected by election? (select "Yes" or "No")

Yes,  No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes,  No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select "Yes" or "No")

Yes,  No (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

Yes,  No (reasons: )



23. Is the WUA registered? (select "Yes" or "No")

Yes,  No (reasons:

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: DWRC ) District Water Resource Committee

25. Please explain the procedure to register WUA.

- (I) Formation of WUA constitution
- (II) Registration of constitution
- (III) Election of WUA committee members
- (IV) Registration of WUA

26. How often the WUA general assembly is held? (select "Yes" or "No")

Once a year,  Not periodical (specify:

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)

At the general assembly,  Other (specify:

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio, By cell phone, By cell phone & verbal message,   
Other (specify:

29. Irrigation Service Fee (ISF)

- ✓ How much is the ISF? Rupees per year, or Rupees per crop (season), as per per hour
- ✓ When ISF is collected? At the time of water delivery, Running charge.
- ✓ What is the ISF collection rate? % Rs. 160 to 220 per hour running charge
- ✓ What is the penalty against someone who does not pay ISF? 25%

30. Sharing of collected ISF

National Treasury 5 %  
WUA 95 %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee 100 %  
2ndary-level Committees%

सिंचाई विभाग





सिंचाई विभाग  
सिंचाई विभाग  
सिंचाई विभाग

Tertiary-level Committees %  
Others if any: specify \_\_\_\_\_ %  
\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, B, C, D, E

Main canals: A ✓ B, C, D, E

2ndary canals: A, B, C, D, E

Tertiary canals: A, B, C, D, E

Here

A = Maintenance and repair are done and functioning properly.

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

34. Do WUA members participate in renovating/rehabilitating ✓ /repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes ✓, No

If "Yes", how do they participate?

Yes, The Participate as kind & Labour.

✓ Design stage (select "Yes" or "No"): Yes ✓, No

If "Yes", how do they participate?

Yes, The Participate as provider base line data .

✓ Construction stage (select "Yes" or "No"): Yes ✓, No

If "Yes", how do they participate?

Yes, The Participate as kind & Labour.

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? By WUA

✓ How often (frequency) is it cleaned? It is cleaned by Removing of grass, debris .

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes ✓, No

36. 2ndary canal cleaning

*for*  
डिभिजन प्रमुख



- ✓ Is it cleaned by the government or by WUA? \_\_\_\_\_
- ✓ How often (frequency) is it cleaned? \_\_\_\_\_
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

37. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned? \_\_\_\_\_
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?  
Repairing of damaged structure.
- ✓ How often they are required?  
\_\_\_\_\_

- ✓ Is there repair record? Yes<sup>✓</sup>, No

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? \_\_\_\_\_
- ✓ What kinds of repair are usually required?  
\_\_\_\_\_
- ✓ How often they are required?  
\_\_\_\_\_
- ✓ Is there repair record? Yes, No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?  
\_\_\_\_\_
- ✓ How often they are required?  
\_\_\_\_\_
- ✓ Is there repair record? Yes, No

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? Yes<sup>✓</sup>, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes<sup>✓</sup>, No

If "No", what are reasons?  
\_\_\_\_\_

2ndary canal

  
डिभिजन प्रमुख



- ✓ Is it maintained by the government or by WUA? \_\_\_\_\_
- ✓ Is there a maintenance plan? Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No

If "No", what are reasons?  
\_\_\_\_\_

Tertiary canal (WUA)

- ✓ Is there a maintenance plan? Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No

If "No", what are reasons?  
\_\_\_\_\_

42. Water distribution

- ✓ Who makes a water allocation plan?  
WUA makes a water allocation plan.
- ✓ Who makes a rotation/irrigation schedule?  
WUA makes a rotation / irrigation schedule.
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?  
After holding a general assembly WUA approved irrigation rotation schedule.
- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
Pump operator operate sluice gate.
- ✓ Is there a written record of operation, that is, water delivery? Yes✓, No  
If "Yes", who keeps the records? Operator keeps the record.  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

Is the record reported to WUA members? Yes✓, No

If "Yes", how is it reported?

Operator provides the record to WUA.

*[Signature]*  
**डिमिजन प्रमुख**



#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members:
- ✓ What jobs do they do for a living in addition to farming?  
Someone do private job, someone do governmental job.
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

Farmer grows Rice, Paddy, Wheat, Maize & Vegetables

Paddy - Monsoon

Maize, Wheat - Spring

Vegetable - Winter

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice :- 4.54 ton/ha (Av.), Rate / Unit = Rs. 25/kg.

Spring rice

Maize :- Yield - 6.75 ton/ha (Av.), Rate / Unit = Rs. 25/kg.

Other crops (specify)

Wheat :- Yield = 2.98 ton / ha.

Rate / Unit = Rs. 25/kg.

- ✓ What kinds of government supports are necessary to improve yield?

- 1) Providing of fertilizer sufficient in time.
- 2) Providing of improved seeds in time.
- 3) Providing of soil testing program.
- 4) Providing of Agricultural training to farmer in time to time.
- 5) Management of marketing for Agricultural products.
- 6) Providing sufficient improved Agricultural tools & inputs.

- ✓ Percentage of farmers doing livestock business out of all WUA members:


Approximately 25%

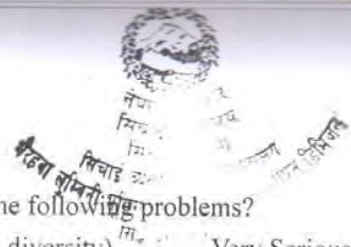
- ✓ Percentage of farmers doing orchard business out of all WUA members:

Approximately 25%

- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:

Approximately 15%

  
सिवाङ्ग



- ✓ How much extent are the following problems?

Monoculture (no diversity)	Very Serious, Serious√, Not a problem
No cultivation in the dry season	Very Serious, Serious, Not a problem√
Low yield per unit area	Very Serious, Serious, Not a problem√
Access to market (market is far)	Very Serious, Serious, Not a problem√
Low prices of agricultural products	Very Serious, Serious√, Not a problem
  
- ✓ What kinds of government supports are necessary to improve agricultural income?
  - (I) Government should purchase the agricultural product in good price rate.
  - (II) Government should supply fertilizer in time.
  - (III) Government should control the import & export of Agricultural products.
  
- 44. Please write particular problems/challenges of the system, if any.
  - ✓ About irrigation facilities
    - (I) In sufficient supply of electric in time.
    - (II) In sufficient of Budget allocation.
  
  - ✓ About water management operation and maintenance, WUAs and agriculture.
    - (I) The major problem for WUA is to collect money for contribution in Repair & maintenance work for irrigation system.
  
  - ✓ About farming :- Labor problem, Load shading problems
  
  - ✓ About institution and WUAs
  
  - ✓ Others

45. Schematic layout of the irrigation system  
Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

*[Handwritten Signature]*  
**15/03/2015**

31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Marchwar Lift Irrigation System

2. Location of the Irrigation System

Development Region : Western

District : Rupandehi

Longitude & Latitude :

Headworks: 27 ° 25' 58 "N, 83 ° 19' 31 "E

Command area: from °N to °N  
from °E to °E

Elevation : 96

Nearest airport : Bhairahawa

3. Catchment area : km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: (Civil Engineers) 2 (Agri. Engineers)  
(Others)

Technicians: (Sub-Engineer) 1

Gate operators: (Headworks) 4 (Main canals) (2ndary canals)

5. Type of water source by season Perennial

Monsoon season: (select one)

Perennial River (Name: Danau ), Seasonal river: (Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

Other (specify):

Spring season: (select one)

Perennial River (Name: Danau ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Danau ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 5600 ha

Actual (net) command area by season:

Monsoon ( 3500 ha), Spring (50 ha), winter ( 3000 ha)

8. Canals

Main canal ( 3 nos.): Total length 18 Km (Lining : 6 Km),

2ndary canal ( 3 nos.): Total length 7 Km (Lining : 2 Km),

Tertiary canal ( 15 nos.): Total length 30 Km (Lining : 3 Km),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: )				

Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery

(Month/Year) 1993

(Area) 3500 ha

12. Date of start of joint management

(Month/Year) 1993

(Area) 3500 ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational 156

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	-
Less than 0.5 ha	1500
0.5 – 1.0 ha	800
1.0 – 5.0 ha	500
More than 5.0 ha	200
TOTAL	3000

Average size of land holding: ha,

Maximum size of land holding: ha,



16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	13	
2ndary-level	3	4	
Tertiary-level	156	5	

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	1	M

19. Are the board members selected by election? (select “Yes” or “No”)

Yes,  No (specify: \_\_\_\_\_ )

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes,  No (reason: \_\_\_\_\_ )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select “Yes” or “No”)

Yes,  No (reason: \_\_\_\_\_ )

22. Is there WUA constitution? (select “Yes” or “No”)

Yes,  No (reasons: \_\_\_\_\_ )

23. Is the WUA registered? (select “Yes” or “No”)

Yes,  No (reasons: \_\_\_\_\_ )

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IDDO,  IMD,  Other (specify: DDC \_\_\_\_\_ )

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year,  Not periodical (specify:  Every 3 Year \_\_\_\_\_ )

27. How the financial situation(income and expenditure) is reported to WUA members? (select one)  
√At the general assembly, Other (specify: )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
By FM radio, By cell phone, √By cell phone & verbal message,  
Other (specify: )

29. Irrigation Service Fee (ISF)

- ✓ How much is the ISF? Rupees per year, or Rupees per crop (season)
- ✓ When ISF is collected?
- ✓ What is the ISF collection rate? %
- ✓ What is the penalty against someone who does not pay ISF?  
\_\_\_\_\_500/Bigha\_\_\_\_\_

30. Sharing of collected ISF

National Treasury %  
WUA 100 %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee %  
2ndary-level Committees%  
Tertiary-level Committees %  
Others if any: specify  
\_\_\_\_\_ %  
\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, B, C, D, E  
Main canals: A, B, C, D, E  
2ndary canals: A, B, C, D, E  
Tertiary canals: A, B, C, D, E

Here

A = Maintenance and repair are done and functioning properly,  
B = Warning signs are found but functioning during the next crop season,  
C = Partly malfunctioning,  
D = Dilapidated and malfunctioning in whole, and  
E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

\_\_\_\_\_ Yes \_\_\_\_\_

✓ Design stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

\_\_\_\_\_ Yes \_\_\_\_\_

✓ Construction stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

\_\_\_\_\_ Yes \_\_\_\_\_

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_\_\_\_ WUA \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_ 1 time \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, ✓ No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_\_\_\_ WUA \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_ 1 Time \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

✓ Yes, No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? \_\_\_\_\_ 1

Time \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

\_\_\_\_\_ Linimg, \_Repairing of Existing

Structure \_\_\_\_\_

✓ How often they are required?

\_\_\_\_\_

✓ Is there repair record?    ✓Yes,        No

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA?    \_\_\_Giverment\_\_\_

✓ What kinds of repair are usually required?

\_\_\_\_\_Linimg, \_Reparing of Existing  
structure,\_\_\_\_\_

✓ How often they are required?

\_\_\_\_\_

✓ Is there repair record?    Yes,        ✓ No

40. Tertiary canal repair (by WUA)

✓ What kinds of repair are usually required?

\_\_\_\_\_ cleaning \_\_Canal\_\_\_\_\_

✓ How often they are required?

\_\_\_\_\_

✓ Is there repair record?    Yes,        ?    ✓ No

41. Maintenance plan

Main canal and headworks (Government)

✓ Is there a maintenance plan?        Yes,        ✓ No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,        ✓No

If “No”, what are reasons?

\_\_\_\_\_

2ndary canal

✓ Is it maintained by the government or by WUA?    \_\_\_WUA\_\_\_

✓ Is there a maintenance plan?        Yes,        ✓ No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,        ✓No

If “No”, what are reasons?

\_\_\_\_\_

Tertiary canal (WUA)

✓ Is there a maintenance plan?        Yes,        ✓ No

✓ Is maintenance implemented properly in accordance with the plan?

Yes,        ✓No

If “No”, what are reasons?

---

42. Water distribution

- ✓ Who makes a water allocation plan?  
    \_\_\_WUA\_\_\_\_\_
- ✓ Who makes a rotation/irrigation schedule?  
    \_\_\_\_\_WUA\_\_\_\_\_
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?
  
- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
    \_\_\_\_\_WUA\_\_\_\_\_
- ✓ Is there a written record of operation, that is, water delivery?      Yes,      √ No  
  
    If “Yes”, who keepsthe records?  
    E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level  
  
    \_\_\_\_\_
- Is the record reported to WUA members?      Yes,      No  
    If “Yes”, how is it reported?  
  
    \_\_\_\_\_

43. Farming

- ✓ Percentage of part-time farmers out of all WUA members:      %
- ✓ What jobs do they do for a living in addition to farming?
  
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice	4.40 mt/he.
Spring rice	
Maize	3.50 mt/he.
Potato	16.00 mt/he.
Vegetable	17.00 mt/he.

- ✓ What kinds of government supports are necessary to improve yield?

- Year round Irrigation facility
- Providing better seeds
- Training for water Distribution

- ✓ Percentage of farmers doing livestock business out of all WUA members:

Approximately 15 %

- ✓ Percentage of farmers doing orchard business out of all WUA members:

Approximately 5 %

- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:

Approximately 10 %

- ✓ How much extent are the following problems?

Monoculture (no diversity)	√ Very Serious, Serious, Not a problem
No cultivation in the dry season	Very Serious, Serious, Not a problem
Low yield per unit area problem	√ Very Serious, Serious, Not a problem
Access to market (market is far) problem	√ Very Serious, Serious, Not a problem
Low prices of agricultural products problem	√ Very Serious, Serious, Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
  
- ✓ About water management operation and maintenance, WUAs and agriculture.
  
- ✓ About farming
  
- ✓ About institution and WUAs
  
- ✓ Others

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Banganga Irrigation System

2. Location of the Irrigation System

Development Region: Western

District: Kapilvastu

Longitude Latitude:

Headworks: 27.66° "N, 83.11 °E

Command area: from 27.64°N to 27.46°N  
from 83.09 °E to 83 °E

Elevation : 105 m

Nearest airport : Bhairahawa (40 Km)

3. Catchment area : 340 km<sup>2</sup>

4. Number of government staff-10

Engineers/Scientists: (Civil Engineers)-1 (Agri.Engineers)-3  
(Others)

Technicians: 3

Gate operators: (Headworks)-4 (Main canals)-5 (2ndary canals)-4

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Banganga ), Seasonal river:(Name: Kaila )

Groundwater (STW or DTW), Reservoir (Capacity: 4.75 Million m<sup>3</sup>)

Other (specify):



Spring season: (select one)

Perennial River (Name:                   ), Seasonal river: (Name:                   )  
Groundwater (STW or DTW), Reservoir (Capacity:                    m<sup>3</sup>)  
Other (specify:                   ):

Winter season: (select one)

Perennial River (Name:                   ), Seasonal river: (Name:                   )  
Groundwater (STW or DTW), Reservoir (Capacity:                    m<sup>3</sup>)  
Other (specify:                   ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Storage dam/reservoir

Spring : Storage dam/reservoir

Winter: Storage dam/reservoir

7. Command area

Total command area: 6350 ha

Actual (net) command area by season:

Monsoon ( 6000 ha), spring (2000 ha), winter (4000 ha)

8. Canals

Main canal (1 nos.): Total length 20.75 Km (Lining: 300 m) and Feeder canal 4.75 Km

2ndary canal (12 nos.): Total length 42 Km (Lining: 3000 m approx.),

Tertiary canal (51nos.): Total length 130Km approx. (Lining: 3000 m),

9. Headworks / water source structures

Headwork of Banganga Irrigation System is situated at Laxmanghat, which lies south of East-West highway. The headwork consists of diversion weir of 200 m in length and four sluice gates. The head regulator consists of four gates at the left side of Banganga River.

The portion between the headwork and reservoir is said to be the feeder canal. The length of feeder canal is 4.75 Km with a designed slope of 0.03 percent. The discharge carrying capacity of the feeder canal is 8500 lps. All three minors (Kusma, Harnampur and Jahadi) are distributed from the feeder canal towards the left and right side to irrigate the command area of BIS.

One of the important features of the Banganga Irrigation System (BIS) is the storage type of the reservoir which is not only for irrigation point of view; it also has an important role to promote tourism for the economic development of the society. The reservoir is located in Jagadispur area and named as *Jagadispur Tal or Jakhira*. Initially, the area of the reservoir was 90 ha; moreover, the area of the reservoir has extended to 157 ha during CADP. The reservoir has capacity of 4.75 MCM with a perimeter of about 5 Km comprising two escape regulators

10. Physical facilities of the system

Details	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: weir )				
Main canal (Capacity : 5.6 m <sup>3</sup> /s)	km	km	km	20.75 km
2ndary canal	km	km	km	42.0 km
Tertiary canal	km	km	km	130.0 km
Canal structures	nos.	nos.	nos.	120 nos.
Drainage canal	km	km	km	35.0 km
Farm road	km	km	km	20.0 km
Farm-to-market road	km	km	km	5.0 km

11. Date of start of water delivery, area at that time

(June/1988)

(Area) 3500 ha

12. Date of start of joint management

(July/2000)

(Area) 6350 ha

13. As for joint management, where is the interface of system operation between the government and WUA?

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

14. Number of irrigation blocks at present, if irrigation is rotational

NA

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs (approx.)
Landless	50
Less than 0.5 ha	1000.0
0.5 – 1.0 ha	1900.0
1.0 – 5.0 ha	3000.0
More than 5.0 ha	4000.0
TOTAL	10000.0

Average size of land holding: 2.0 ha,

Maximum size of land holding: 5 ha,

16. How many members are in the WUA? 2

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	26	25
2ndary-level	16	7-9 in each	25
Tertiary-level	51	5-7	25

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	1	M

19. Are the board members selected by election? (select “Yes” or “No”)

Yes

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

No (Bylaw has to be amended from 25 to 33%)

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

Yes, there is reservation

22. Is there WUA constitution? (select “Yes” or “No”)

Yes,

23. Is the WUA registered? (select “Yes” or “No”)

Yes,

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

In District Administration Office and yearly renewable at District Irrigation Office

25. Please explain the procedure to register WUA.

In each year, WUA audit financial works then they write application to irrigation Office and then after submitting the required document to office, it is renew.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year, but for last three year general assembly has not held.

27. How the financial situation (income and expenditure) is reported to WUA members? (select one)

At the general assembly

28. How information such as date, time & venue of the general assembly is transferred to WUA members?

By cell phone and Dispatching letter

29. Irrigation Service Fee (ISF)

- ✓ How much is the ISF? 5.0 Rupees per crop (season) per 338 sqm ( 1 Khatta in local) for 2 season only
- ✓ When ISF is collected? Just after winter and summer crop harvesting time
- ✓ What is the ISF collection rate? 6-8 % yearly
- ✓ What is the penalty against someone who does not pay ISF? They will not be participated in election.

30. Sharing of collected ISF

National Treasury: 10 %

WUA: 90 %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee 100 %

2ndary-level Committees%

Tertiary-level Committees %

Others if any: specify

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: B

Main canals: C

2ndary canals: C

Tertiary canals: C

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

Headworks: Flood in 25 July, 2016 has damaged divide wall, embankment and guide bund

Main canal: There is high amount of silt deposition in main canal, Bank are breached, Lining are damaged in main canal, some structures are old that needs to be replaced.

Secondary canal: same as in main canal

Tertiary canal: lining in main canal were damaged

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

- ✓ Survey and Planning stage (select "Yes" or "No"): Yes  
If "Yes", how do they participate? People mostly contribute in tertiary canal. Desilting works is done twice the year.
- ✓ Design stage (select "Yes" or "No"): No
- ✓ Construction stage (select "Yes" or "No"): No

35. Main canal cleaning

- ✓ Is it cleaned by the government or by WUA? Government
- ✓ How often (frequency) is it cleaned? It has not cleaned for 10 years
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes but in small quantities

36. 2ndary canal cleaning

- ✓ Is it cleaned by the government or by WUA? Government
- ✓ How often (frequency) is it cleaned? Not cleaned for 5-7 years
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes but little bit

37. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned? Twice the year if WUA are active
- ✓ Is there maintenance (cleaning) record? (select "Yes" or "No")  
Yes,

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?  
Desilting works, Lining etc
- ✓ How often they are required?  
Yearly
- ✓ Is there repair record? Yes : This year 150 meter lining works and bank protection was done

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA?    yes
- ✓ What kinds of repair are usually required?  
Desilting, lining, Bank repair etc
- ✓ How often they are required?  
yearly
- ✓ Is there repair record?    No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?  
Desilting
- ✓ How often they are required?  
Twice the year
- ✓ Is there repair record?    Yes

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan?    No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes,        No  
If “No”, what are reasons?  
The plan was made but due to low budget it could not be implemented

2ndary canal

- ✓ Is it maintained by the government or by WUA?    Yes
- ✓ Is there a maintenance plan?        Yes,
- ✓ Is maintenance implemented properly in accordance with the plan?  
No  
If “No”, what are reasons?  
The plan was made but due to low budget it could not be implemented

Tertiary canal (WUA)

- ✓ Is there a maintenance plan?        No
- ✓ Is maintenance implemented properly in accordance with the plan?

42. Water distribution

- ✓ Who makes a water allocation plan?  
Irrigation Office
- ✓ Who makes a rotation/irrigation schedule?  
Irrigation Office
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA

members?

This will be distributed to WUA in meeting

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

Gate operator and Dhalpa. Some training on water management has given to WUA.

- ✓ Is there a written record of operation, that is, water delivery? Yes

If “Yes”, who keeps the records?

In Banganga Irrigation System, Daily record of water level in Reservoir and Main canal was kept by Dhalpa (irrigation workers)

Is the record reported to WUA members? Yes

If “Yes”, how is it reported?

Four monthly

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: 50 %

- ✓ What jobs do they do for a living in addition to farming?

Labour in factory, unskilled labour in construction works, some of them go to India for 3-4 months

- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

Paddy and Wheat mostly but some farmers grows Maize, vegetable and Sunflower

Paddy-Wheat- Vegetable

Paddy-Wheat- Maize

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice : 3.6 tons/ha

Spring rice : Not Practiced

Maize : 2.0 tons/ha

Wheat : 2.8 tons/ha

- ✓ What kinds of government supports are necessary to improve yield?

Timely availability of fertilizers with subsidized rate, good quality of seeds, availability of irrigation water in right time, and some knowledge on improved agriculture practices etc.

- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately 50 %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately 5 %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately 20 %
- ✓ How much extent are the following problems?
 

Monoculture (no diversity)	Serious,
No cultivation in the dry season	Serious,
Low yield per unit area	Serious,
Access to market (market is far)	Not a problem
Low prices of agricultural products	Serious
- ✓ What kinds of government supports are necessary to improve agricultural income?  
Training in agriculture, increasing water availability in spring season also, availability of fertilizers in time etc.

44. Please write particular problems/challenges of the system, if any.

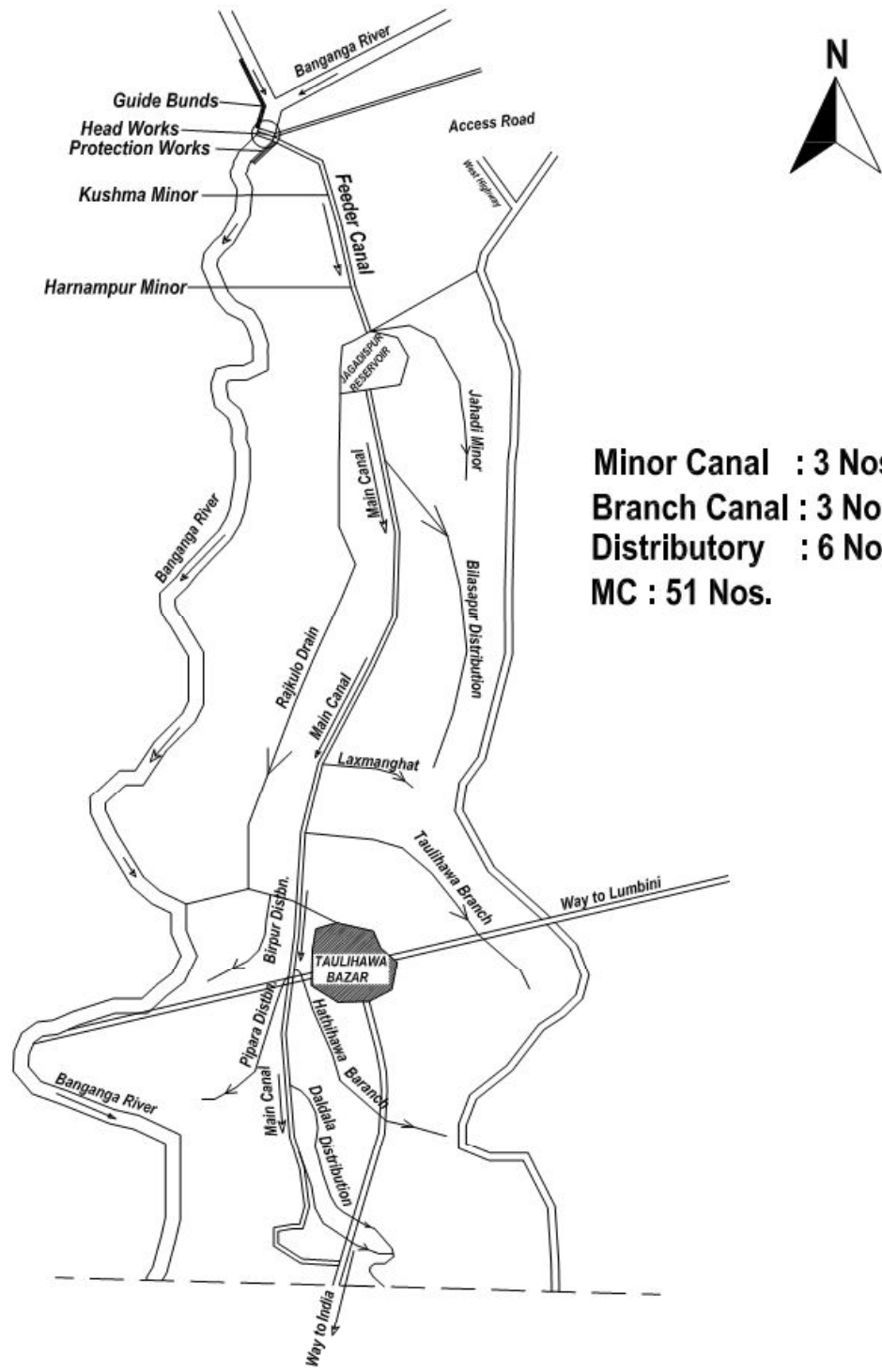
- ✓ About irrigation facilities: water is available only for summer and winter due to decreasing capacity of reservoir and poor maintenance of canal system.
- ✓ About water management operation and maintenance, WUAs and agriculture.  
Government does operation and Maintenance, WUA has little (or no) responsibility in O & M.
- ✓ About farming : Farming Practices is traditional which is tiredness and time consumption.
- ✓ About institution and WUAs : WUA has established legally but not functioning well.

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.



# SCHEMATIC PLAN OF BANGANGA IRRIGATION SYSTEM



**Minor Canal : 3 Nos.**  
**Branch Canal : 3 Nos.**  
**Distributory : 6 Nos.**  
**MC : 51 Nos.**

**Note : Not to Scale**

*Smp*

31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

Name of the Irrigation System: Praganna Kulo Irrigation Project

#### 1. Location of the Irrigation System

Development Region : Mid Western

District : Dang

Longitude&Latitude :

Headworks: 82° 32' 00" to 82° 47' 00" E  
27° 48' 00" to 27° 50' 00"N

Command area: Same

Elevation : 300m

Nearest airport : Bhairahwa/Nepalganj

#### 2. Catchment area : km<sup>2</sup>

#### 3. Number of government staff

Engineers/Scientists: (Civil Engineers) -1 (Agri.Engineers)-Number of post-2,  
but till date vacant

(Others)

Technicians: Sub Engineer post-2( 1vacant)

: Associatoin organizer-1(vacant)

Gate operators: None (Main canals) (2ndary canals)

#### 4. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Rapti ), Seasonal river:(Name: )

Groundwater (STW or DTW), Reservoir (Capacity: 2885 cumecs)  
Other (specify:): Dolai river, 180 cumecs. ( Seasonal)

Spring season: (select one)

Perennial River (Name: Rapti ), Seasonal river: (Name: Dolai and Singiye )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Rapti ), Seasonal river: (Name: Dolai and Singiye )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

5. Headworks/water source structures (select one for respective seasons)

Monsoon: Rapti river Side Intake/ Dolai and Singiye river Weir structure

Spring : Rapti river Side Intake/ Dolai and Singiye river Weir structure

Winter: Rapti river Side Intake/ Dolai and Singiye river Weir structure

Command area

Total command area: 6684 ha

Actual (net) command area by season: 5800 ha.

Monsoon ( 5800 ha),Spring (3500 ha), winter (3500 ha)

6. Canals

Main canal ( 5 nos. Praganna kulo main canal-18 cumecs, Barakhutti Main system 1.645 cumecs, Bhanpur Majhmeriya main system -4.75 cumecs, Dolai Khola System 3.90 cumecs): Total length 56 km (Lining : 3700 m),

2ndary canal ( nos.): Total length 150 k m (Lining : m),

Tertiary canal ( nos.): Total length 71 k m (Lining : m),

7. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

Side Intake – 3 nos.

Weir structure-2 nos.

8. Physical facilities of the system

Details	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: Side Intake )				Rapti river-3nos. side intake/ Dolai & singiye river-2 nos. of Weir str.
Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	56 km
2ndary canal	km	km	km	150 km
Tertiary canal	km	km	km	71 km
Canal structures	nos.	nos.	nos.	85 nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

9. Date of start of water delivery

(Month/Year) 2062 B.S.(2005)

(Area) 5800 ha

10. Date of start of joint management

(Month/Year) 2005

(Area) 5800 ha

11. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C) : A

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

12. Number of irrigation blocks at present, if irrigation is rotational

13. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs-6360
-------------------	------------------

Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: 1.50 ha,  
Maximum size of land holding: 20.00 ha,

14. How many members are in the WUA?

15. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	4	44	35
2ndary-level			
Tertiary-level			

16. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	1	F

17. Are the board members selected by election? (select “Yes” or “No”)

Yes

18. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes,

19. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?  
(select “Yes” or “No”)

Yes,

20. Is there WUA constitution? (select “Yes” or “No”)

Yes,

21. Is the WUA registered? (select “Yes” or “No”)

Yes,

22. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IMD,

23. Please explain the procedure to register WUA.

- They request to IMD with their prepared rules and regulation approved by their general assembly.

24. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year,

25. How the financial situation(income and expenditure) is reported to WUA members? (select one)

At the general assembly,

26. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By cell phone & verbal message,

27. Irrigation Service Fee (ISF)

- ✓ How much is the ISF? Rupees 20/kattha per year, or Rupees per crop (season)
  - ✓ When ISF is collected? - At the end of crop season.
  - ✓ What is the ISF collection rate? %
  - ✓ What is the penalty against someone who does not pay ISF?- The water supply will be stopped to the field of the farmer who doesn't pay ISF.
- 

28. Sharing of collected ISF

National Treasury %

WUA 100 %

Note: Total should be 100%.

29. Sharing of collected ISF within WUA

Main Committee 20 %

2ndary-level Committees 60 %

Tertiary-level Committees 20 %

Others if any: specify

\_\_\_\_\_ %

\_\_\_\_\_ %

Note: Total should be 100%.

30. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, B, C, D, E

Main canals: B,

2ndary canals: B

Tertiary canals: B

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

31. If you answered B, C, D or E in the above 30, please specify possible causes of malfunctioning of respective facilities.

- Difficult to operate intake in rainy season.

32. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes,  
If "Yes", how do they participate?

\_\_\_\_\_

✓ Design stage (select "Yes" or "No"): No  
If "Yes", how do they participate?

\_\_\_\_\_

✓ Construction stage (select "Yes" or "No"): Yes,  
If "Yes", how do they participate?

- They contribute as per government irrigation policy.

\_\_\_\_\_

33. Main canal cleaning

✓ Is it cleaned by the government or by WUA? \_GoN/WUA

✓ How often (frequency) is it cleaned? \_\_\_\_\_ Twice a year

✓ there maintenance (cleaning) record? (select "Yes" or "No")

No

34. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? \_WUA\_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_ Twice a year\_\_\_\_\_

- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)

No

35. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned?     \_\_WUA\_\_\_\_\_

- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)

No

36. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?

Major works \_\_\_\_\_

- ✓ How often they are required?

Twice a year \_\_\_\_\_

- ✓ Is there repair record?                    No

37. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA?    WUA\_\_\_\_\_

- ✓ What kinds of repair are usually required?

Canal maintenance works \_\_\_\_\_

- ✓ How often they are required?

Twice a year \_\_\_\_\_

- ✓ Is there repair record?                    No

38. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?

Canal desilting and bank maintenance works. \_\_\_\_\_

- ✓ How often they are required?

Twice a year. \_\_\_\_\_

- ✓ Is there repair record?                    No

39. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan?                Yes,

- ✓ Is maintenance implemented properly in accordance with the plan?

Yes,

If “No”, what are reasons?

\_\_\_\_\_

2ndary canal

- ✓ Is it maintained by the government or by WUA?    WUA\_\_\_\_\_

- ✓ Is there a maintenance plan?                        No

- ✓ Is maintenance implemented properly in accordance with the plan?



No

If "No", what are reasons?

No provision of budget \_\_\_\_\_

Tertiary canal (WUA)

✓ Is there a maintenance plan? No

✓ Is maintenance implemented properly in accordance with the plan?

No

If "No", what are reasons?

No provision of budgets. \_\_\_\_\_

40. Water distribution

✓ Who makes a water allocation plan?

IMD & WUA \_\_\_\_\_

✓ Who makes a rotation/irrigation schedule?

IMD/WUA \_\_\_\_\_

✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?

-WUA committee members discuss and implement.

✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

WUA members( no particular training) \_\_\_\_\_

✓ Is there a written record of operation, that is, water delivery? No

If "Yes", who keepsthe records?

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

\_\_\_\_\_

Is the record reported to WUA members? No

If "Yes", how is it reported?

\_\_\_\_\_

41. Farming

✓ Percentage of part-time farmers out of all WUA members: 100 %

- ✓ What jobs do they do for a living in addition to farming?
  - Only farming.
  
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.
  - Paddy, Wheat, Maize, Pulses, Oilseeds and vegetables
  
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?
  - Monsoon Rice-3.40 t/ha
  - Spring rice-2.40 t/ha
  - Maize-2.20 t/ha
  - Wheat-3.00 t/ha
  - Pulses-1.10 t/ha
  - Oilseeds-1.00 t/ha
  - Vegetables-12.00 t/ha
  - Other crops (specify)
  
- ✓ What kinds of government supports are necessary to improve yield?
  - System renovation is required.
  
- ✓ Percentage of farmers doing livestock business out of all WUA members:
  - Approximately 20%
- ✓ Percentage of farmers doing orchard business out of all WUA members:
  - Approximately 10%
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:
  - Approximately 30%
- ✓ How much extent are the following problems?
  - Monoculture (no diversity)                      Not a problem

No cultivation in the dry season	Not a problem
Low yield per unit area	Not a problem
Access to market (market is far)	Not a problem
Low prices of agricultural products	Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?
  - Introduce of improved variety and cash crops.

42. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities-All systems should be renovated.
- ✓ About water management operation and maintenance, WUAs and agriculture.
  - Package programme about water management, operation and maintenance and agriculture to the WUA to increase crop production and productivity.
- ✓ About farming- To avoid traditional farmaing and facilitate new farming technique.
- ✓ About institution and WUAs- Training about Institutional development activities( Water management, agriculture management etc.)
- ✓ Others

43. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: **Babai Irrigation System**

2. Location of the Irrigation System

Development Region : **Mid-Western**

District : **Bardiya**

Longitude&Latitude :

Headworks: **28° 25' 29" N, 81° 22' 48" E**

Command area: from 28°4'530" N to 28°29'40" N  
from 81° 13' E to 81° 40 E

Elevation : 142m to 184m

Nearest airport : Nepalgunj

3. Catchment area : 3500 km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: (Civil Engineers) : 12 (Agri.Engineers) : 2

(Others) :29

Technicians:

Gate operators: (Headworks) :5 (Main canals) :17 (2ndary canals) : 10

5. Type of water source by season

Monsoon season:(select one)

**Perennial River (Name: Babai )**, Seasonal river:(Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

Other (specify):

Spring season: (select one)

**Perennial River (Name: Babai** ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

Winter season: (select one)

**Perennial River (Name: Babai** ), Seasonal river: (Name: )  
 Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
 Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

**Monsoon: Diversion weir**, Storage dam/reservoir, Pumping station, DTW, STW  
**Spring : Diversion weir**, Storage dam/reservoir, Pumping station, DTW, STW  
**Winter: Diversion weir**, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area:

S. No	Part of Project Area	Total Command Area (ha)	Irrigated Area (ha)	Partially Irrigated Area (ha)	Un-Irrigated (rainfed) area (ha)
1	Part-I (Babai East by ongoing works)	21,000	9,000	4,500	7,500
2	Part-II (Babai West by ongoing works)	15,000	7,800	700	6,500
3	Part-III (Babai East, new canal)	6,000		600	5,400
4	Part-IV (Augment to Sikta IP by new canal)	9,000			9,000
	<b>Total Area</b>	<b>51,000</b>	<b>16,800</b>	<b>5,800</b>	<b>28,400</b>

Actual (net) command area by season:

Monsoon ( 27,000 ha), Spring ( 5,000 ha), winter ( 20,000 ha)

8. Canals

A. Eastern Canal (Part I)

Main canal ( 1 nos.): Total length 35 Km (Lining : 20 Km),  
 2ndary canal ( 22 nos.) 4 Major and 18 others: Total length 200 Km  
 (Lining : m),  
 Tertiary canal ( nos.): Total length m (Lining : m),

B. Western Canal (Part II)

Main canal ( 1 nos.): Total length 43 Km (Lining : 8 Km),

2ndary canal ( 15 nos.) 1 Major and 14 others: Total length 200 Km  
(Lining : m),

Tertiary canal ( nos.): Total length m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

Weir Cum Bridge (East-West Highway, 315 m)
Head regulator (63.00 Cumecs)
Settling Basin (980 m)
Silt Excluder (10 Cumecs)

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: Permanent )				
Main canal East (Capacity : 23 m <sup>3</sup> /s) West (Capacity : 30 m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

.../1992 (Month/Year)

(Area) 4000 ha

12. Date of start of joint management

(Month/Year) Formally not yet, hope to formalize from Japan's cooperation

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Part of Project area	Large Farm	Medium Farm	Small Farm	Marginal Farm	Landless
Part-I	1.2%	33.6%	13.4%	50%	1.8%
Part-II	2.7%	36.2%	11%	50.1%	-
Part-III	-	16.4%	14.1%	69.5%	-
Part-IV	1.1%	27.4%	13.5%	57.5%	0.5%
Total	1.4%	30.6%	13%	54.8%	0.2%
Land holding size		Nos. of HHs			
Landless					
Less than 0.5 ha					
0.5 – 1.0 ha					
1.0 – 5.0 ha					
More than 5.0 ha					
TOTAL					

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA? There are 3 WUAs one in the eastern system and 2 in the western system. There are two WUAs because they independently exists before government intervention.

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	3		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select “Yes” or “No”)

Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes, No (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA? (select “Yes” or “No”)

Yes, No (reason: )

22. Is there WUA constitution? (select “Yes” or “No”)

Yes, No (reasons: )

23. Is the WUA registered? (select “Yes” or “No”)

Yes, No (reasons: )

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IDDO, IMD, Other (specify: **DWRC** )

25. Please explain the procedure to register WUA.

Please refer Water resource regulation and Irrigation regulation

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year, Not periodical (specify: )



27. How the financial situation(income and expenditure) is reported to WUA members? (select one)  
**At the general assembly,**                      Other (specify: \_\_\_\_\_ )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
By FM radio,      By cell phone,      **By cell phone & verbal message,**  
Other (specify: \_\_\_\_\_ )

29. Irrigation Service Fee (ISF)  
✓ How much is the ISF?      Rupees per year, or      Rupees per crop (season)  
✓ When ISF is collected?  
✓ What is the ISF collection rate?                      %  
✓ What is the penalty against someone who does not pay ISF?

---

30. Sharing of collected ISF  
National Treasury                      %  
WUA                      %  
Note: Total should be 100%.

31. Sharing of collected ISF within WUA  
Main Committee                      %  
2ndary-level Committees%  
Tertiary-level Committees                      %  
Others if any: specify  
\_\_\_\_\_ %  
\_\_\_\_\_ %  
Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)  
Headworks / water source structures:      **A, B, C, D, E**  
Main canals:      **A, B, C, D, E**  
2ndary canals:      **A, B, C, D, E**  
Tertiary canals:      **A, B, C, D, E**

Here

- A = Maintenance and repair are done and functioning properly,
- B = Warning signs are found but functioning during the next crop season,
- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): **Yes,** No

If "Yes", how do they participate?

\_\_\_On the basis of land holding\_\_\_\_\_

✓ Design stage (select "Yes" or "No"): **Yes,** No

If "Yes", how do they participate?

\_\_\_Discussion, provide information and demand for requirement\_\_\_\_\_

✓ Construction stage (select "Yes" or "No"): **Yes,** No

If "Yes", how do they participate?

\_\_\_Demand to fulfill their requirements \_\_\_

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? **Both** \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_ annual basis in settling basin, at intervals in others\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No") if government **Yes**

**Yes,** No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? **Both** \_\_\_\_\_

✓ How often (frequency) is it cleaned? **Whenever required**\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No"), if government **Yes**

**Yes,** No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? **Annual**\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

**Yes,** **No**

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

\_Water control structures, canal breach, damage to lining, silt removal\_\_\_\_\_

✓ How often they are required?

\_\_\_\_\_ annual \_\_\_\_\_

✓ Is there repair record? **Yes,** No

39. 2ndary canal repair

✓ Is it repaired by the government or by WUA? Both \_\_\_\_\_

✓ What kinds of repair are usually required?

\_\_\_\_\_ Water control structures, canal breach, damage to lining silt removal \_\_\_\_\_

✓ How often they are required?

\_\_\_\_\_ annual \_\_\_\_\_

✓ Is there repair record? Yes, No, if government Yes

40. Tertiary canal repair (by WUA)

✓ What kinds of repair are usually required?

\_\_\_\_\_ silt removal, canal breach \_\_\_\_\_

✓ How often they are required?

\_\_\_\_\_ annual \_\_\_\_\_

✓ Is there repair record? Yes, No WUA keeps the record

41. Maintenance plan

Main canal and headworks (Government)

✓ Is there a maintenance plan? Yes, **No**

✓ Is maintenance implemented properly in accordance with the plan?

Yes, No

If "No", what are reasons?

\_\_\_\_\_

2ndary canal

✓ Is it maintained by the government or by WUA? \_\_\_\_\_

✓ Is there a maintenance plan? Yes, No

✓ Is maintenance implemented properly in accordance with the plan?

Yes, No

If "No", what are reasons?

\_\_\_\_\_

Tertiary canal (WUA)

✓ Is there a maintenance plan? Yes, No

✓ Is maintenance implemented properly in accordance with the plan?

Yes, No

If "No", what are reasons?

\_\_\_\_\_

42. Water distribution

- ✓ Who makes a water allocation plan?  
\_\_\_\_\_
- ✓ Who makes a rotation/irrigation schedule?  
\_\_\_\_\_
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?
  
- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
\_\_\_\_\_
- ✓ Is there a written record of operation, that is, water delivery?      Yes,      No  
  
If “Yes”, who keep the records?  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level  
\_\_\_\_\_
- Is the record reported to WUA members?      Yes,      No  
If “Yes”, how is it reported?  
\_\_\_\_\_

43. Farming

- ✓ Percentage of part-time farmers out of all WUA members:      %
- ✓ What jobs do they do for a living in addition to farming?
  
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.  
Main Paddy from June-July to Nov, Wheat from Nov to March,
  
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above

cropping calendar?

Monsoon Rice

Spring rice

Maize

Other crops (specify)

- ✓ What kinds of government supports are necessary to improve yield?

- ✓ Percentage of farmers doing livestock business out of all WUA members:

Approximately %

- ✓ Percentage of farmers doing orchard business out of all WUA members:

Approximately %

- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:

Approximately %

- ✓ How much extent are the following problems?

Monoculture (no diversity) Very Serious, Serious, Not a problem

No cultivation in the dry season Very Serious, Serious, Not a problem

Low yield per unit area Very Serious, Serious, Not a problem

Access to market (market is far) Very Serious, Serious, Not a problem

Low prices of agricultural products Very Serious, Serious, Not a problem

- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities

- ✓ About water management operation and maintenance, WUAs and agriculture.

- ✓ About farming

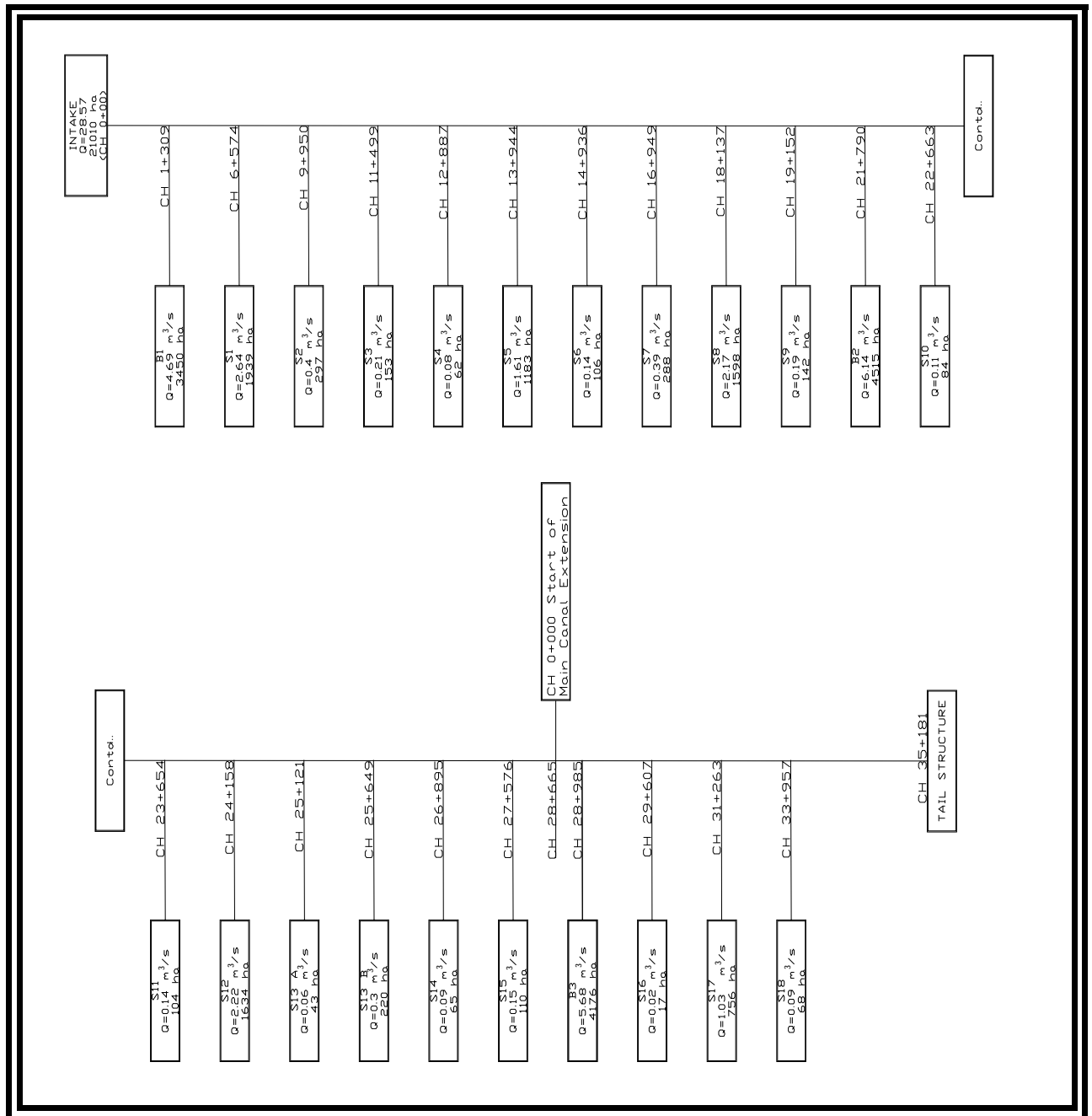
✓ About institution and WUAs

✓ Others

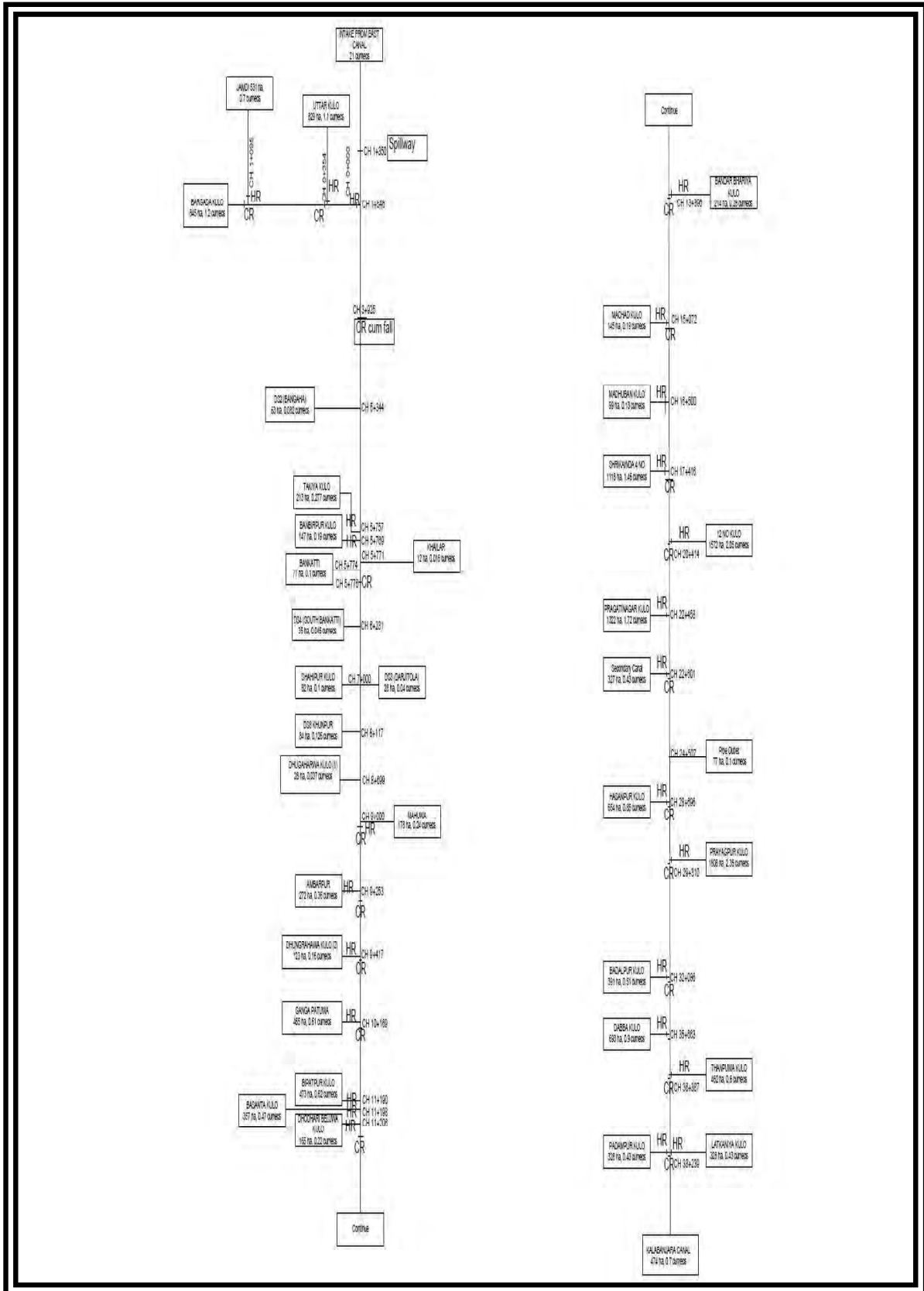
45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

Eastern system



Western system



31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: **Rajapur Irrigation System**

2. Location of the Irrigation System

Development Region : Mid Western

District : Bardiya

Longitude&Latitude :

Headworks: 28° 35' 18" N, 81° 14'55" E

Command area: from 28° 22' 5" N to 28° 34'30" N

from 81°4'20" E to 81°14'50"E

Elevation : 140 m to 182 m

Nearest airport : Nepalgunj

3. Catchment area : 45,400 km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: (Civil Engineers) :3 (Agri.Engineers): 2

(Others) 2

Technicians:

Gate operators: (Headworks) :1 (Main canals): 3 (2ndary canals)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Karnali ), Seasonal river:(Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

Other (specify):



Spring season: (select one)

Perennial River (Name: Karnali ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Karnali ), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

*Approach channel of 1 km toward the bifurcation of Karnali river and intake to main Budhi canal, 7 diversion weirs in Main Budhi canal. Other three independent side intake structures from karnali.*

7. Command area

Total command area: 14870 ha

Actual (net) command area by season:

Monsoon ( 13200 ha), Spring ( 13200 ha), winter ( 13200 ha)

8. Canals

Main canal ( nos.): Total length m (Lining : m),

2ndary canal ( nos.): Total length m (Lining : m),

Tertiary canal ( nos.): Total length m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase	2 <sup>nd</sup> Phase	3 <sup>rd</sup> Phase	Total
----------	-----------	-----------------------	-----------------------	-------

	(year )	(year )	(year )	
Headworks (Type: )				
Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time  
(Month/Year) system is rehabilitation  
(Area) ha
12. Date of start of joint management  
(Month/Year) 2001  
(Area) 13200 ha
13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)
- A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.
  - B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.
  - C. Other (specify )
14. Number of irrigation blocks at present, if irrigation is rotational
15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select "Yes" or "No")

Yes, No (specify: )

20. Is the WUA composed of women representation at least 33%? (select "Yes" or "No")

Yes, **No** (reason: )

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select "Yes" or "No")

Yes, **No** (reason: )

22. Is there WUA constitution? (select "Yes" or "No")

**Yes**, No (reasons: )

23. Is the WUA registered? (select "Yes" or "No")

**Yes**, No (reasons: )

24. If "Yes", where is the WUA registered? (select "Yes" or "No")

IDDO, IMD, Other (specify: )

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

**Once a year,** Not periodical (specify: )

27. How the financial situation(income and expenditure) is reported to WUA members? (select one)

At the general assembly, Other (specify: )

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio, By cell phone, **By cell phone & verbal message,**  
Other (specify: )

29. Irrigation Service Fee (ISF)

- ✓ How much is the ISF? Rupees per year, or Rupees per crop (season)
  - ✓ When ISF is collected?
  - ✓ What is the ISF collection rate? %
  - ✓ What is the penalty against someone who does not pay ISF?
- 

30. Sharing of collected ISF

National Treasury %  
WUA %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee %  
2ndary-level Committees %  
Tertiary-level Committees %  
Others if any: specify  
\_\_\_\_\_ %  
\_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, B, C, D, E  
Main canals: A, B, C, D, E  
2ndary canals: A, B, C, D, E  
Tertiary canals: A, B, C, D, E

Here

A = Maintenance and repair are done and functioning properly,  
B = Warning signs are found but functioning during the next crop season,  
C = Partly malfunctioning,  
D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): **Yes,** No  
If "Yes", how do they participate?

\_\_\_\_\_

✓ Design stage (select "Yes" or "No"): **Yes,** No  
If "Yes", how do they participate?

\_\_\_\_\_

✓ Construction stage (select "Yes" or "No"): **Yes,** No  
If "Yes", how do they participate?

\_\_\_\_\_

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? WUA \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_ annual \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No") WUA keeps the record  
Yes, No

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? WUA \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_ Annual \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No") WUA keeps the record  
Yes, No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? \_\_\_\_\_ annual \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No") WUA keeps the record  
Yes, No

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

\_\_\_\_\_ Escape construction, gate construction and maintenance, canal lining, protection of

canal and command area \_\_\_\_\_

- ✓ How often they are required?

\_\_\_\_\_ annual \_\_\_\_\_

- ✓ Is there repair record? **Yes,** No

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? Both \_\_\_\_\_

- ✓ What kinds of repair are usually required?

\_\_\_\_\_ Escape construction, gate construction and maintenance, canal lining \_\_\_\_\_

- ✓ How often they are required?

\_\_\_\_\_ annual \_\_\_\_\_

- ✓ Is there repair record? **Yes,** No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?

\_\_\_\_\_ Escape construction, drainage construction, canal lining \_\_\_\_\_

- ✓ How often they are required?

\_\_\_\_\_ abbuual \_\_\_\_\_

- ✓ Is there repair record? **Yes,** No

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? **Yes,** No

- ✓ Is maintenance implemented properly in accordance with the plan?

**Yes,** **No**

If "No", what are reasons?

\_\_\_Funding stopped due to insurgency in the past \_\_\_\_\_

2ndary canal

- ✓ Is it maintained by the government or by WUA? Both \_\_\_\_\_

- ✓ Is there a maintenance plan? **Yes,** No

- ✓ Is maintenance implemented properly in accordance with the plan?

**Yes,** **No**

If "No", what are reasons?

\_\_\_\_\_

Tertiary canal (WUA)

- ✓ Is there a maintenance plan? **Yes,** No

- ✓ Is maintenance implemented properly in accordance with the plan?

**Yes,** **No**

If "No", what are reasons?

---

42. Water distribution

- ✓ Who makes a water allocation plan?  
\_WUA\_\_\_\_\_
- ✓ Who makes a rotation/irrigation schedule?  
\_\_\_Sufficient water\_\_\_\_\_
- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?
  
- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
WUA, Needs refresher training \_\_\_\_\_
- ✓ Is there a written record of operation, that is, water delivery?            Yes,            No  
  
If “Yes”, who keepsthe records?  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level  
  
\_\_\_\_\_
- Is the record reported to WUA members?            Yes,            No  
If “Yes”, how is it reported?  
  
\_\_\_\_\_

43. Farming

- ✓ Percentage of part-time farmers out of all WUA members:            %
- ✓ What jobs do they do for a living in addition to farming?
  
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

Main Paddy from June-July to Nov, Wheat from Nov to March, Spring paddy from March to June  
Spring paddy in about 30% land

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?
  - Monsoon Rice
  - Spring rice
  - Maize
  - Other crops (specify)
  
- ✓ What kinds of government supports are necessary to improve yield?
  
- ✓ Percentage of farmers doing livestock business out of all WUA members:
  - Approximately %
- ✓ Percentage of farmers doing orchard business out of all WUA members:
  - Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:
  - Approximately %
- ✓ How much extent are the following problems?
 

Monoculture (no diversity)	Very Serious, Serious, Not a problem
No cultivation in the dry season	Very Serious, Serious, Not a problem
Low yield per unit area	Very Serious, Serious, Not a problem
Access to market (market is far)	Very Serious, Serious, Not a problem
Low prices of agricultural products	Very Serious, Serious, Not a problem
- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
 

Siltation is high. Difficult in diversion as there is no permanent weir. the approach channel is damaged each year. At present it is damaged seriously and cannot serve the lean flow season, if not maintained.
- ✓ About water management operation and maintenance, WUAs and agriculture.
 

Skill and knowledge of maintenance of metal works. Masson training etc needed
- ✓ About farming

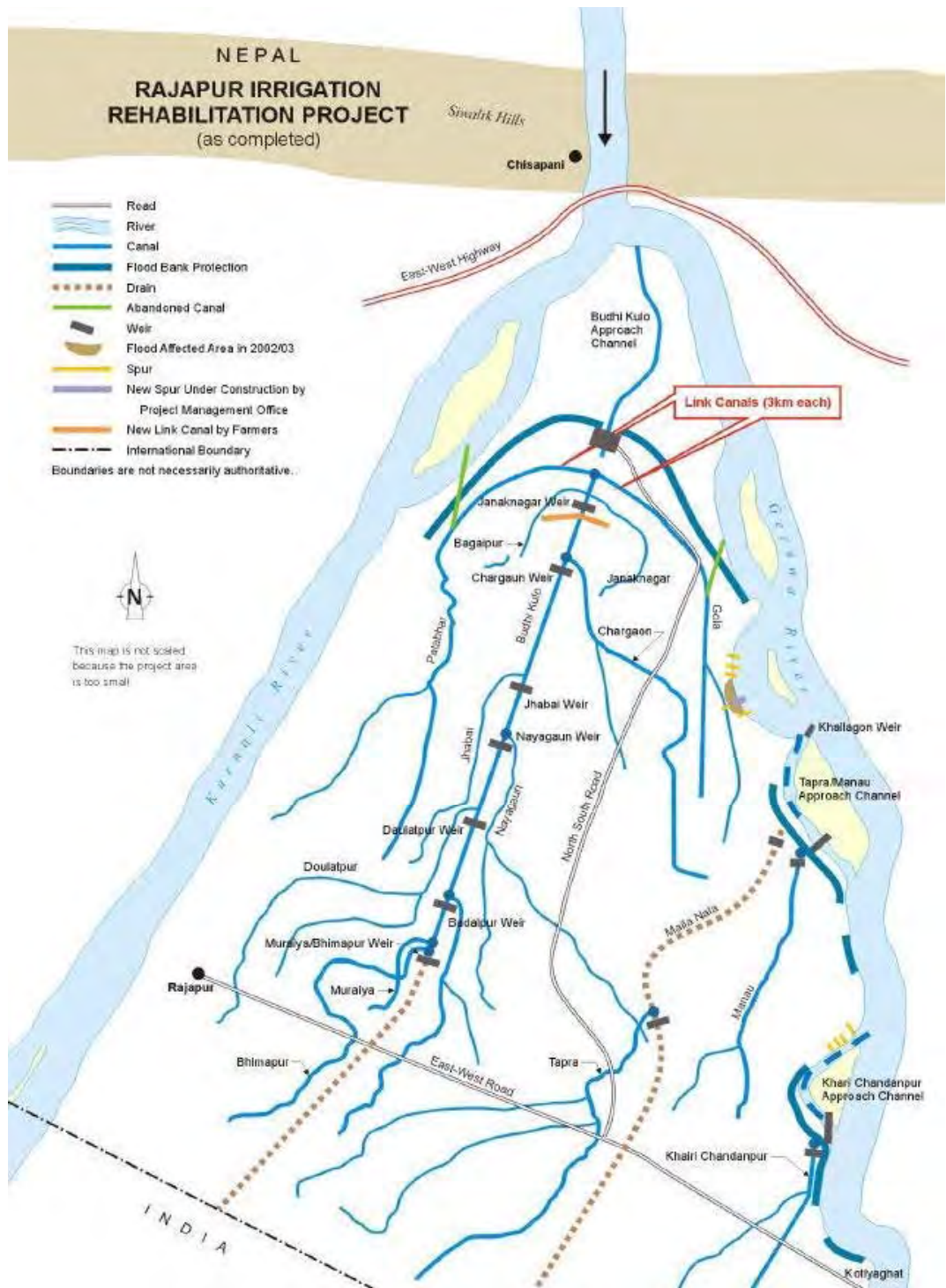


WUA needs training for high yield and high value crops. They need to make professional in agriculture. cooperative farming, production increment in absent farm holders

- ✓ About institution and WUAs  
Capacity building of WUAs
- ✓ Others

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.



31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Patharaiya Irrigation System

2. Location of the Irrigation System

Development Region : Far Western Development Region

District : Kailali

Longitude&Latitude :

Headworks: ° 'N, ° 'E

Command area: from °N to °N  
from °E to °E

Elevation :

Nearest airport : Tikapur Airport but in Service, Dhangadhi Airport

3. Catchment area : 81 km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: 2 (Civil Engineers) 1 (Agri.Engineers)

1 Association Organizer(Others)

Technicians:

Gate operators: 1 (Headworks) (Main canals) (2ndary canals)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Patharaiya River), Seasonal river:(Name: )

Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)

Other (specify):

Spring season: (select one)

Perennial River (Name: Patharaiya River), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

Winter season: (select one)

Perennial River (Name: Patharaiya River), Seasonal river: (Name: )  
Groundwater (STW or DTW), Reservoir (Capacity: m<sup>3</sup>)  
Other (specify: ):

6. Headworks/water source structures (select one for respective seasons)

Monsoon: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Spring : Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

Winter: Diversion dam, Storage dam/reservoir, Pumping station, DTW, STW

7. Command area

Total command area: 2000 ha

Actual (net) command area by season:

Monsoon ( ha), Spring ( ha), winter ( ha)

8. Canals

Main canal ( nos.): Total length 687m (Lining : m),

2ndary canal ( nos.): Total length 18030 m (Lining : m),

Distributaries canal ( nos.): Total length 11185m (Lining : m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type: )				

Main canal (Capacity : m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year) 2056/057

(Area) 2000 ha

12. Date of start of joint management

(Month/Year)

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select “Yes” or “No”)

Yes,

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes,

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?  
(select “Yes” or “No”)

Yes,

22. Is there WUA constitution? (select “Yes” or “No”)

Yes,

No (reasons: )

23. Is the WUA registered? (select “Yes” or “No”)

Yes,

IMD,

24. Please explain the procedure to register WUA.

25. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year,

26. How the financial situation (income and expenditure) is reported to WUA members? (select one)  
At the general assembly,          Other (specify: \_\_\_\_\_ )

27. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)  
By FM radio,    By cell phone,    By cell phone & verbal message,  
Other (specify: \_\_\_\_\_ )

28. Irrigation Service Fee (ISF)  
✓ How much is the ISF?    Rupees per year, or    Rupees per crop (season)  
✓ When ISF is collected?  
✓ What is the ISF collection rate?          %  
✓ What is the penalty against someone who does not pay ISF?

29. Sharing of collected ISF  
National Treasury          %  
WUA          %

Note: Total should be 100%.

30. Sharing of collected ISF within WUA  
Main Committee          %  
2ndary-level Committees %  
Tertiary-level Committees          %  
Others if any: specify  
\_\_\_\_\_ %  
\_\_\_\_\_ %

Note: Total should be 100%.

31. Overall condition of irrigation facilities (select one from A, B, C, D, E)  
Headworks / water source structures:    A,    B,    C,    D,    E  
Main canals:    A,    B,    C,    D,    E  
2ndary canals:    A,    B,    C,    D,    E  
Tertiary canals:    A,    B,    C,    D,    E

Here

- A = Maintenance and repair are done and functioning properly,
- B = Warning signs are found but functioning during the next crop season,
- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

32. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of

respective facilities.

33. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

---

✓ Design stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

---

✓ Construction stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

---

34. Main canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

35. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

36. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? \_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes, No

37. Main canal repair (by the government)

✓ What kinds of repair are usually required?

---

✓ How often they are required?

---



- ✓ Is there repair record? Yes, No

38. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? \_\_\_\_\_
- ✓ What kinds of repair are usually required?

- 
- ✓ How often they are required?

- 
- ✓ Is there repair record? Yes, No

39. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?

- 
- ✓ How often they are required?

- 
- ✓ Is there repair record? Yes, No

40. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No  
If “No”, what are reasons?

2ndary canal

- ✓ Is it maintained by the government or by WUA? \_\_\_\_\_
- ✓ Is there a maintenance plan? Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No  
If “No”, what are reasons?

Tertiary canal (WUA)

- ✓ Is there a maintenance plan? Yes, No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No  
If “No”, what are reasons?

41. Water distribution

- ✓ Who makes a water allocation plan?

- \_\_\_\_\_
- ✓ Who makes a rotation/irrigation schedule?  
\_\_\_\_\_
  - ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?
  - ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
\_\_\_\_\_
  - ✓ Is there a written record of operation, that is, water delivery?      Yes,      No  
 If “Yes”, who keepsthe records?  
 E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level  
 \_\_\_\_\_
  - Is the record reported to WUA members?      Yes,      No  
 If “Yes”, how is it reported?  
 \_\_\_\_\_

42. Farming

- ✓ Percentage of part-time farmers out of all WUA members:      %
- ✓ What jobs do they do for a living in addition to farming?
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?  
 Monsoon Rice

Spring rice  
 Maize  
 Other crops (specify)

- ✓ What kinds of government supports are necessary to improve yield?
  
- ✓ Percentage of farmers doing livestock business out of all WUA members:  
 Approximately %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
 Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
 Approximately %
- ✓ How much extent are the following problems?
 

Monoculture (no diversity)	Very Serious,	Serious,	Not a problem
No cultivation in the dry season	Very Serious,	Serious,	Not a problem
Low yield per unit area	Very Serious,	Serious,	Not a problem
Access to market (market is far)	Very Serious,	Serious,	Not a problem
Low prices of agricultural products	Very Serious,	Serious,	Not a problem
- ✓ What kinds of government supports are necessary to improve agricultural income?

43. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
  
- ✓ About water management operation and maintenance, WUAs and agriculture.

- ✓ About farming
  
- ✓ About institution and WUAs
  
- ✓ Others

44. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.



Perennial River (Name: Machheli River),

Winter season: (select one)

Perennial River (Name: Machheli River),

6. Headworks/water source structures (select one for respective seasons)

Monsoon: DTW, STW

Spring : DTW, STW

Winter: DTW, STW

7. Command area

Total command area: 2000 ha

Actual (net) command area by season:

Monsoon (      ha), Spring (      ha), winter (      ha)

8. Canals

Main canal (      nos.): Total length      m (Lining :      m),

2ndary canal (      nos.): Total length      m (Lining :      m),

Tertiary canal (      nos.): Total length      m (Lining :      m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year )	2 <sup>nd</sup> Phase (year )	3 <sup>rd</sup> Phase (year )	Total
Headworks (Type:      )				
Main canal (Capacity :      m <sup>3</sup> /s)	km	km	km	km
2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year)

(Area) ha

12. Date of start of joint management

(Month/Year)

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

B. The government operates the 2ndry canals and above, and WUA operates tertiary canals and lower; the interface is off-take gates from 2ndary to tertiary canals.

C. Other (specify )

14. Number of irrigation blocks at present, if irrigation is rotational

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1		
2ndary-level			
Tertiary-level			

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	
Vice-president		
Secretary		
Treasurer		

19. Are the board members selected by election? (select “Yes” or “No”)

Yes,

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes,

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select “Yes” or “No”)

Yes,

22. Is there WUA constitution? (select “Yes” or “No”)

Yes,

23. Is the WUA registered? (select “Yes” or “No”)

Yes,

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IMD,

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year,

27. How the financial situation(income and expenditure) is reported to WUA members? (select one)

At the general assembly,

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio, By cell phone, By cell phone & verbal message,

29. Irrigation Service Fee (ISF)

✓ How much is the ISF? Rupees per year, or Rupees per crop (season)

✓ When ISF is collected?



- ✓ What is the ISF collection rate? %
  - ✓ What is the penalty against someone who does not pay ISF?
- 

30. Sharing of collected ISF

National Treasury %  
 WUA %

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

Main Committee %  
 2ndary-level Committees %  
 Tertiary-level Committees %  
 Others if any: specify  
 \_\_\_\_\_ %  
 \_\_\_\_\_ %

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: A, B, C, D, E  
 Main canals: A, B, C, D, E  
 2ndary canals: A, B, C, D, E  
 Tertiary canals: A, B, C, D, E

Here

- A = Maintenance and repair are done and functioning properly,
- B = Warning signs are found but functioning during the next crop season,
- C = Partly malfunctioning,
- D = Dilapidated and malfunctioning in whole, and
- E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

- ✓ Survey and Planning stage (select "Yes" or "No"): Yes, No  
 If "Yes", how do they participate?

- 
- ✓ Design stage (select “Yes” or ”No”): Yes, No  
If “Yes”, how do they participate?
- 

- ✓ Construction stage (select “Yes” or ”No”): Yes, No  
If “Yes”, how do they participate?
- 

35. Main canal cleaning

- ✓ Is it cleaned by the government or by WUA? \_\_\_\_\_
- ✓ How often (frequency) is it cleaned? \_\_\_\_\_
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)  
Yes, No

36. 2ndary canal cleaning

- ✓ Is it cleaned by the government or by WUA? \_\_\_\_\_
- ✓ How often (frequency) is it cleaned? \_\_\_\_\_
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)  
Yes, No

37. Tertiary canal cleaning (by WUA)

- ✓ How often (frequency) is it cleaned? \_\_\_\_\_
- ✓ Is there maintenance (cleaning) record? (select “Yes” or ”No”)  
Yes, No

38. Main canal repair (by the government)

- ✓ What kinds of repair are usually required?  
\_\_\_\_\_
- ✓ How often they are required?  
\_\_\_\_\_
- ✓ Is there repair record? Yes, No

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? \_\_\_\_\_
- ✓ What kinds of repair are usually required?  
\_\_\_\_\_
- ✓ How often they are required?  
\_\_\_\_\_
- ✓ Is there repair record? Yes, No

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?

\_\_\_\_\_

- ✓ How often they are required?

\_\_\_\_\_

- ✓ Is there repair record?      Yes,              No

#### 41. Maintenance plan

##### Main canal and headworks (Government)

- ✓ Is there a maintenance plan?              Yes,              No

- ✓ Is maintenance implemented properly in accordance with the plan?

Yes,              No

If “No”, what are reasons?

\_\_\_\_\_

##### 2ndary canal

- ✓ Is it maintained by the government or by WUA?      \_\_\_\_\_

- ✓ Is there a maintenance plan?              Yes,              No

- ✓ Is maintenance implemented properly in accordance with the plan?

Yes,              No

If “No”, what are reasons?

\_\_\_\_\_

##### Tertiary canal (WUA)

- ✓ Is there a maintenance plan?              Yes,              No

- ✓ Is maintenance implemented properly in accordance with the plan?

Yes,              No

If “No”, what are reasons?

\_\_\_\_\_

#### 42. Water distribution

- ✓ Who makes a water allocation plan?

\_\_\_\_\_

- ✓ Who makes a rotation/irrigation schedule?

\_\_\_\_\_

- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?  
\_\_\_\_\_

- ✓ Is there a written record of operation, that is, water delivery? Yes, No  
If “Yes”, who keepsthe records?  
E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level  
\_\_\_\_\_

Is the record reported to WUA members? Yes, No  
If “Yes”, how is it reported?  
\_\_\_\_\_

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: %
- ✓ What jobs do they do for a living in addition to farming?
  
- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.
  
- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?
  - Monsoon Rice
  - Spring rice
  - Maize
  - Other crops (specify)
  
- ✓ What kinds of government supports are necessary to improve yield?

- ✓ Percentage of farmers doing livestock business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
Approximately %
- ✓ How much extent are the following problems?
 

Monoculture (no diversity)	Very Serious,	Serious,	Not a problem
No cultivation in the dry season	Very Serious,	Serious,	Not a problem
Low yield per unit area	Very Serious,	Serious,	Not a problem
Access to market (market is far)	Very Serious,	Serious,	Not a problem
Low prices of agricultural products	Very Serious,	Serious,	Not a problem
- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
- ✓ About water management operation and maintenance, WUAs and agriculture.
- ✓ About farming
- ✓ About institution and WUAs
- ✓ Others

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.

31 July 2016

To Officer in Charge

JICA Expert, Irrigation

### Questionnaire

The purpose of this questionnaire is to collect information of the 35 main irrigation systems under Irrigation Management Division, DOI. That is because Japan International Cooperation Agency (JICA) is going to formulate a technical cooperation project on operation and maintenance of irrigation. Please answer as many questions as possible. JICA will appreciate your answering this questionnaire very much.

1. Name of the Irrigation System: Mahakali Irrigation System

2. Location of the Irrigation System

Development Region : Far Western Development Region

District : Kanchanpur

Longitude&Latitude :

Headworks: 28°59'45.45"N, 80°06'35.61"E

Command area: from 28°42'05"N to 28°59'45.45"N  
from 80°21'12"E to 80°06'35.61"E

Elevation : 742 ft

Nearest airport : Dhangadhi Airport

3. Catchment area : km<sup>2</sup>

4. Number of government staff

Engineers/Scientists: 2 (Civil Engineers)

1. (Agri.Engineers)

1. Association Organizer (Others)

Technicians:

Gate operators: (Headworks)

(Main canals)

(2ndary canals)

5. Type of water source by season

Monsoon season:(select one)

Perennial River (Name: Mahakali River),

Spring season: (select one)

Perennial River (Name: Mahakali River),

Winter season: (select one)

Perennial River (Name: Mahakali River),

6. Headworks/water source structures (select one for respective seasons)

Monsoon: reservoir, Barrage

Spring : reservoir, Barrage

Winter: reservoir, Barrage

7. Command area

Total command area: 11,600 ha

Actual (net) command area by season:

Monsoon (      ha), Spring (      ha), winter (      ha)

8. Canals

Main canal ( 4 nos.): Total length 67    m (Lining : 150 m),

2ndary canal (      nos.): Total length            m (Lining :      m),

Tertiary canal (      nos.): Total length            m (Lining :      m),

9. Headworks / water source structures

Please specify nos, dimensions, capacities, etc. of water source structures such as diversion dam, Storage dam/reservoir, Pumping station, DTW, STW.

10. Physical facilities of the system

Detailis	1st Phase (year    )	2 <sup>nd</sup> Phase (year    )	3 <sup>rd</sup> Phase (year    )	Total
Headworks (Type:            )				
Main canal (Capacity :      m <sup>3</sup> /s)	km	km	km	km



2ndary canal	km	km	km	km
Tertiary canal	km	km	km	km
Canal structures	nos.	nos.	nos.	nos.
Drainage canal	km	km	km	km
Farm road	km	km	km	km
Farm-to-market road	km	km	km	km

11. Date of start of water delivery, area at that time

(Month/Year)

(Area) ha

12. Date of start of joint management

(Month/Year)

(Area) ha

13. As for joint management, where is the interface of system operation between the government and WUA? (Select one from A, B or C)

A. The government operates the main canal(s) and above, and WUA operates 2ndry canals and lower; the interface is off-take gates from the main to 2ndary canals.

14. Number of irrigation blocks at present, if irrigation is rotational

MIS-I has 5 Blocks viz. A,B,C, D and E and MIS-II has 4 Blocks 5,6,7,8

15. Land holding size and number of households (HHs)

Land holding size	Nos. of HHs
Landless	
Less than 0.5 ha	
0.5 – 1.0 ha	
1.0 – 5.0 ha	
More than 5.0 ha	
TOTAL	

Average size of land holding: ha,

Maximum size of land holding: ha,

16. How many members are in the WUA?

17. Committee

Committee(s)	Nos.	Nos. of committee members in total	Percentage of women (%)
Main	1	11	33
2ndary-level	2	11	33
Tertiary-level	475	3	35

18. Board members of the main committee

Board members	Nos.	Sex (M or F)
President	1	M
Vice-president	1	M
Secretary	1	M
Treasurer	1	M

19. Are the board members selected by election? (select “Yes” or “No”)

Yes,

20. Is the WUA composed of women representation at least 33%? (select “Yes” or “No”)

Yes,

21. Is there proper representation of Dalit, Downtrodden, and Backward ethnic communities in WUA?

(select “Yes” or “No”)

Yes,

22. Is there WUA constitution? (select “Yes” or “No”)

Yes,

23. Is the WUA registered? (select “Yes” or “No”)

Yes,

24. If “Yes”, where is the WUA registered? (select “Yes” or “No”)

IMD,

25. Please explain the procedure to register WUA.

26. How often the WUA general assembly is held? (select “Yes” or “No”)

Once a year,

27. How the financial situation(income and expenditure) is reported to WUA members? (select one)

At the general assembly,

28. How information such as date, time & venue of the general assembly is transferred to WUA members? (select one)

By FM radio, By cell phone, By cell phone & verbal message,

29. Irrigation Service Fee (ISF)

- ✓ How much is the ISF? Rupees per year, or Rupees per crop (season)
  - ✓ When ISF is collected?
  - ✓ What is the ISF collection rate? %
  - ✓ What is the penalty against someone who does not pay ISF?
- 

30. Sharing of collected ISF

National Treasury 10 %

WUA 90%

Note: Total should be 100%.

31. Sharing of collected ISF within WUA

National Treasury 10%

Main Committee 5%

2ndary-level Committees 10 %

Block-level Committees 40%

Tertiary-level Committees 25%

Maintenance Work 10%

Note: Total should be 100%.

32. Overall condition of irrigation facilities (select one from A, B, C, D, E)

Headworks / water source structures: B,

Main canals: B,

2ndary canals: C,

Tertiary canals: C,

Here

A = Maintenance and repair are done and functioning properly,

B = Warning signs are found but functioning during the next crop season,

C = Partly malfunctioning,

D = Dilapidated and malfunctioning in whole, and

E = Partly disabled.

33. If you answered B, C, D or E in the above 26., please specify possible causes of malfunctioning of respective facilities.

34. Do WUA members participate in renovating/rehabilitating/repairing irrigation facilities?

✓ Survey and Planning stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

\_\_\_\_\_

✓ Design stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

\_\_\_\_\_

✓ Construction stage (select "Yes" or "No"): Yes, No

If "Yes", how do they participate?

\_\_\_\_\_

35. Main canal cleaning

✓ Is it cleaned by the government or by WUA? \_\_Government

✓ How often (frequency) is it cleaned? Once in many years, recently M1 canal in 2073, Baishak

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,

36. 2ndary canal cleaning

✓ Is it cleaned by the government or by WUA? WUA\_\_\_\_\_

✓ How often (frequency) is it cleaned? \_\_\_\_\_Not Gegerally\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

No

37. Tertiary canal cleaning (by WUA)

✓ How often (frequency) is it cleaned? \_\_\_\_\_Yearly but not all tertiary\_\_\_\_\_

✓ Is there maintenance (cleaning) record? (select "Yes" or "No")

Yes,

38. Main canal repair (by the government)

✓ What kinds of repair are usually required?

\_Drain Cleaning, Erosion Control by Gabions, Retaining Walls, \_\_\_\_\_

✓ How often they are required?

\_Yearly\_\_\_\_\_

- ✓ Is there repair record? Yes,

39. 2ndary canal repair

- ✓ Is it repaired by the government or by WUA? WUA\_\_\_\_\_
- ✓ What kinds of repair are usually required?  
\_Silt Removal, Erosion Control\_\_\_\_\_
- ✓ How often they are required?  
\_Yearly\_\_\_\_\_
- ✓ Is there repair record? Yes,

40. Tertiary canal repair (by WUA)

- ✓ What kinds of repair are usually required?  
\_Silt Removal, Erosion Control and seepage Control\_\_\_\_\_
- ✓ How often they are required?  
Yearly\_\_\_\_\_
- ✓ Is there repair record? Yes,

41. Maintenance plan

Main canal and headworks (Government)

- ✓ Is there a maintenance plan? Yes,
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes,  
If “No”, what are reasons?  
\_\_\_\_\_

2ndary canal

- ✓ Is it maintained by the government or by WUA? \_WUA\_\_\_\_\_
- ✓ Is there a maintenance plan? No
- ✓ Is maintenance implemented properly in accordance with the plan?  
No  
If “No”, what are reasons?  
There is no such maintenance in Secondary canal by WUA\_\_\_\_\_

Tertiary canal (WUA)

- ✓ Is there a maintenance plan? No
- ✓ Is maintenance implemented properly in accordance with the plan?  
Yes, No  
If “No”, what are reasons?  
\_Because, there is no maintenance plan\_\_\_\_\_

42. Water distribution

- ✓ Who makes a water allocation plan?

\_Office\_\_\_\_\_

- ✓ Who makes a rotation/irrigation schedule?

\_Office Gate Staffs\_\_\_\_\_

- ✓ How are the water allocation plan and rotation/irrigation schedule approved by WUA members?

- ✓ Who operate sluice gates for water delivery at the on-farm level? WUA members who got particular training?

\_\_\_\_\_

- ✓ Is there a written record of operation, that is, water delivery? Yes,

If “Yes”, who keeps the records?

Gate Staffs

E.g. reading of Partial flume calibrations, gate opening calibrations, canal water level

\_\_\_\_\_ Canal water level \_\_\_\_\_

Is the record reported to WUA members? No

If “Yes”, how is it reported?

\_\_\_\_\_

#### 43. Farming

- ✓ Percentage of part-time farmers out of all WUA members: %
- ✓ What jobs do they do for a living in addition to farming?

- ✓ What crops do farmers grow? When are those crop seasons? Please write/draw a typical cropping calendar below.

- ✓ What are yield per unit area (tons/ha) and unit price (Rupees/kg) of crops in the above cropping calendar?

Monsoon Rice  
 Spring rice  
 Maize  
 Other crops (specify)

- ✓ What kinds of government supports are necessary to improve yield?
  
- ✓ Percentage of farmers doing livestock business out of all WUA members:  
 Approximately %
- ✓ Percentage of farmers doing orchard business out of all WUA members:  
 Approximately %
- ✓ Percentage of farmers doing vegetable cultivation for business purpose out of all WUA members:  
 Approximately %
- ✓ How much extent are the following problems?
 

Monoculture (no diversity)	Very Serious,	Serious,	Not a problem
No cultivation in the dry season	Very Serious,	Serious,	Not a problem
Low yield per unit area	Very Serious,	Serious,	Not a problem
Access to market (market is far)	Very Serious,	Serious,	Not a problem
Low prices of agricultural products	Very Serious,	Serious,	Not a problem
- ✓ What kinds of government supports are necessary to improve agricultural income?

44. Please write particular problems/challenges of the system, if any.

- ✓ About irrigation facilities
  
- ✓ About water management operation and maintenance, WUAs and agriculture.

- ✓ About farming
  
- ✓ About institution and WUAs
  
- ✓ Others

45. Schematic layout of the irrigation system

Please attach an electronic file (PDF, JPG) of the schematic layout, or similar drawings, of the irrigation system, when you send back this questionnaire after answering.