Non-conventional method of irrigation for Livelihood enhancement (A case study of Micro-Irrigation Piloting in Ripin Dhotar Irrigation System)

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General Objective of irrigated Agriculture

..... transforming the current subsistence oriented farming system into a commercial and competitive farming system..... (phrase : Vision National Agricultural Policy, 2004)

Year round Irrigation to all agricultural land of Nepal is the vision of irrigation policy, 2013

- **Providing year round irrigation with high efficiency and reliable supply of irrigation water without damaging physical environment**
- **Improving crop production and productivity, diversification, intensification/ commercialization/ modernization**
- **Effective Water management, institutional development**

Some issues of the Small FMIS (Surface Canal Systems)

- **Due to low flow in the source during winter and spring seasons, irrigated area is much less than expected/ designed.**

- **On farm water application method is not efficient (surface) and often it causes soil erosion.**

- **Water user associations (WUA) lack adequate skill and knowledge on the improved irrigated agriculture and management of the institution.**

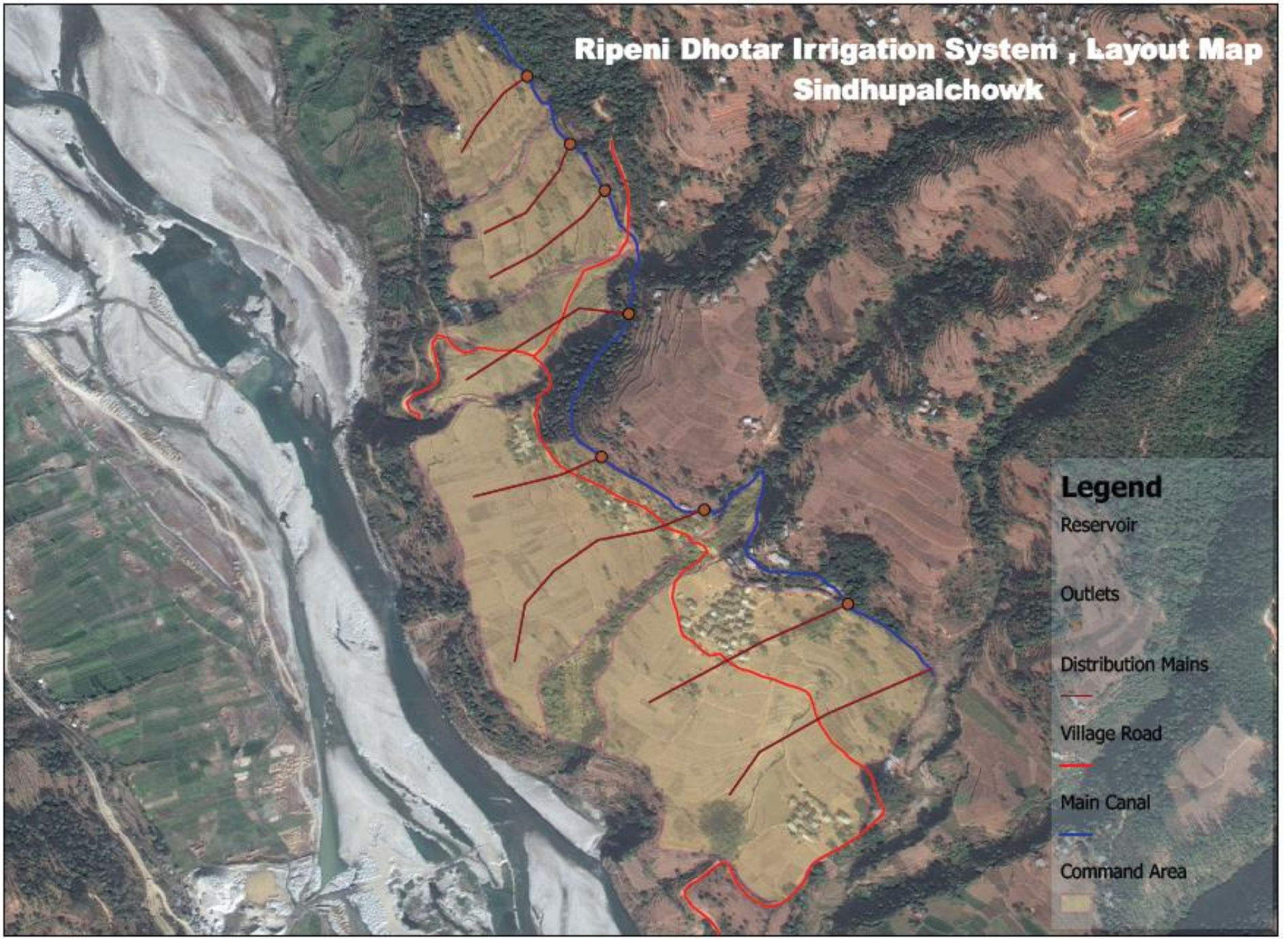
"Ripeni Dhotar Irrigation System is one typical example of these features"

Project Description

- **Sub-Project: Ripin-Dhodar ISP**
- **Location: Bhimtar-3, Sindhupalchowk**
- **Village / Clusters: Bhimtar, 5 small clusters (Banjhobari, Deehi Chaur, Bahun Tole, Wallo Dhotar and Pallo Dhotar)**
- **Accessibility: 38 km North-east from Dhulikhel, on the left bank of the Indrawati River**
- **Household (Population): 120 (730)**
- **Caste /Ethnicity: Large majority Majhis (82 HH Majhis, 38 HH Others)**

Nepal on World Map

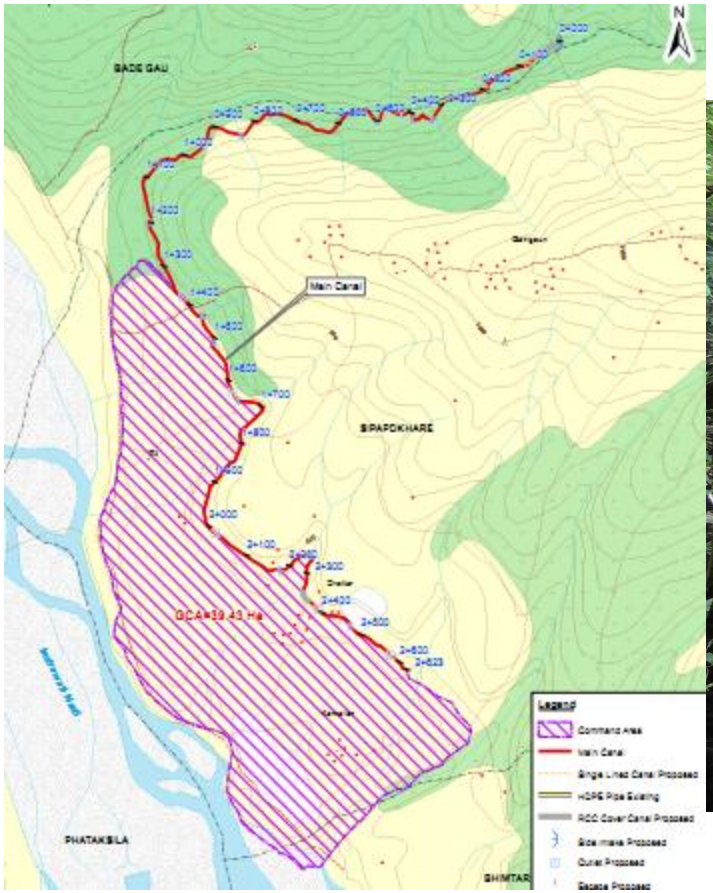
Location of Project Site


Ripeni Dhotar Irrigation System , Layout Map
Sindhupalchowk
Legend
Reservoir
Outlets
Distribution Mains
Village Road
Main Canal
Command Area

The command area

Salient feature of the Ripeni-Dhotar ISP

- **Water Source: Ripeni Khola**
- **Total canal length: 2623 m**
- **Command Area (Net): 32 ha**
  (Existing ca = 26 ha, Extension : 6 ha)
- **Canal Discharge: 55 lps**
- **Physical components:**
  Headwork: 1, Aqua duct: 1, Truss Bridge: 1,
  Superpassage: 6, Foot Bridge: 3, HDPE Piping: 145 m
- **Estimated Cost: Rs. 1,24,30,000.00**


N
BADE GAU
Main Canal
SIPAPOKHARE
GCA=39.43 Ha
PHATAKSILA
GHIMTAR
Command Area
Main Canal
Single Lined Canal Proposed
HDPE Pipe Existing
RCC Cover Canal Proposed
Side Intake Proposed
Outlet Proposed

General Socio-economic situation

- **Food Sufficiency : 20% less than 3 month, 75 % 3-6 month, 5% throughout the year**
- **Landholding : Majority Small landholders (65% less than 3 Ropani)**
- **Occupation: Mostly wage labor in agriculture and construction, 20 HH fishing, 30 HH : someone working in India and 5 HH in Gulf countries.**

- **Source of Income: Labor Wage, remittance, sales of livestock /products (chicken, goat, pig, fish, milk)**
- **Average annual family expenditure: Rs. 126000**

Annual Income Expenses of the Household

Income			Expenses		
S No	Description	Amount (Rs)	S No	Description	Amount Rs)
1	Wage labour	40000	1	Purchase of cereals	24000
2	Sales of small animals	15000	2	Oil / Spices/ Sugar	15000
3	Sales of Chicken	5000	3	Clothing	12000
4	Remittance	50000	4	Health	9000
5	Others(sales of fish)	12000	5	Education	15000
6	Sales of Milk	4000	6	Celebraties	20000
			7	Mobile	7000
			8	Travel	15000
			9	Others	9000
	Total	126000			126000

Cropping Pattern

Upland:

(maize-millet black-gram intercropped)

- April /May- August : Maize
- July - November: millet

Low land

(Paddy- Wheat/potato/ mustard

July- November: Paddy

November-March: Wheat/potato/ mustard

Present Cropping Intensity

Table 2: Present cropping pattern before the irrigation system

Month	Area (Ropani)	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Maize	550												
Millet	550												
Paddy	50												
Wheat	10												
Total	1160												

Cropping Intensity 145 %

Meeting with Beneficiaries

Cost –Benefit Analysis of the Maize-Millet-Black gram cropping pattern per Ropani

Cost	Income
Manure/ Fertilizer: Rs. 1200.00 Seed: Rs. 445.00 Labor: Rs. 2455.00 Harvesting /Storage: Rs. 200 **Total : Rs. 4300**	Maize : Rs. 4200 Millet: Rs. 1500 Black gram: Rs. 2000 **Total: Rs. 7700**
Net Benefit: Rs. 3400.00	

Ropani is the 1/20 part of a hectare

Cost –Benefit Analysis of Winter Cabbage per Ropani (Season: October- January)

Cost	Income
Manure/ Fertilizer: Rs. 1450.00 Seed/supplements: Rs. 950.00 Labor: Rs. 1600.00 Marketing: Rs. 500 **Total : Rs. 4500**	**Marketable Product 1024 kg @Rs. 15/ kg** **Total: Rs. 15360**
Net Benefit: Rs. 10860.00	

Cost –Benefit Analysis of Bitter gourd per Ropani

(Season: February-July)

Cost	Income
Manure/ Fertilizer: Rs. 1200.00 Seed & Supplemental: Rs. 900.00 Labor: Rs. 1600.00 Marketing : Rs. 600 **Total : Rs. 4410.00**	**Marketable Product 1084.8 kg @Rs. 20/ kg** **Total: Rs. 21696.00**
Net Benefit: Rs. 17286.00	

Incremental Benefit per Ropani/yr:

- Existing cropping Pattern: Maize-Millet-Blackgram Rs. 3400.00
- Vegetable (Cabbage- Bitter gourd):

  Rs. 10860.00 + Rs. 17286.00= Rs. 28146

Difference= Rs. 24, 746.00/ Ropani-yr

Basic Information of the Proposed Activities

S No	Description	Demo. Phase	Expansion Phase	Total
1	Period	2 Yrs	2 Yrs	4 Yrs
2	Command Area	120 Ropani	240 Ropani	360 Ropani
3	Direct Beneficiaries	60 HH	120 HH	180 HH
4	Field Outlet Nos	R1, R3, R5	R2, R4, R6, R7	7
5	Microirrigation			
	Drip System	24	36	60
	Sprinkler	20	20	40
	Hose	20	20	40
	Tank with Can	20	20	40

Basic Information contd…

S No	Description	Demo. Phase	Expansion Phase	Total
6	Green House Nos	8 Units	16 Units	24 Units
7	3 Cum cement Jar	4	4	8
	40 Cum Stone masonry Tank (Rehab)	0	1	1
	Field Outlets	42	56	98
	Valve Chambers	12	19	31
8	Pipe line	2520 m	3915 m	6435 m

Cost of the Project

Overall Cost of the Project

S No	Description of Components	Demonstration Phase (Rs)	Extension Phase (Rs)	Total (Rs)
1	IRRIGATION	2298695.12	3667632.11	5966327.23
2	AGRICULTURE	831088.20	831088.20	1662176.39
3	TRAINING	452000.00	452000.00	904000.00
4	CONSULTANTS SERVICE	998355.00	998355.00	1996710.00
	TOTAL	4580138.32	5949075.31	10529213.63

Sprinklers / Micro-sprinklers

Drip Irrigation System

Cost Benefit Analysis

B: Net Annual Benefit during Demonstration phase				
Crop	Area (Ropani)	Net Income /Ropani	Total net Income	
Winter and Spring Vegetables	120	24746	2969520	
B: Net Annual Benefit during Post-Demonstration phase				
Crop	Area (Ropani)	Net Income /Ropani	Total net Income	
Winter and Spring Vegetables	240	24746	5939040	

Cost Benefit Analysis

Cash Flow					
Year	Cost	O &M Cost	Total Cost	Benefit	Difference
1	4,958,126.10	49,581.26	5,007,707.36	1484760.00	(3,522,947.36)
2		49,581.26	49,581.26	2969520.00	2,919,938.74
3	5,251,000.30	52,510.00	5,303,510.30	2969520.00	(2,333,990.30)
4		52,510.00	52,510.00	5939040.00	5,886,530.00
5		52,510.00	52,510.00	5939040.00	5,886,530.00
		Total	10,465,818.93	19,301,880.00	
		B:C Ratio		1.84	

Conclusion

1. a new initiative for improving on farm water management and crop productivity.
2. easier to control water at different part of the command area due to pipe network
3. community is highly encouraged to participate in the project
4. highly social inclusive.
5. Soil erosion / fertilizer losses greatly minimized (environmental benefits).
6. Cost benefit analysis indicates that it has a attractive benefit cost ratio
7. Can reduce the design section in vulnerable zone
8. Income generation (Vegetable production and sales), Improved food security leads to Poverty Reduction (Livelihood enhancement)
9. project can be replicated in other part of the world in similar condition.

Thank you for your Attention

Query, Comments n Suggestions ???