

# Village Water Security Plan, Rupauli Buzrug

Gram Panchayat - Rupauli Buzrug

(Block Ujiarpur, District Samastipur) Bihar

# Plan prepared by

Rupauli Buzrug Gram Panchayat, September 2019

## Supported by

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Cover: Debkhal Chaur wetland, Samastipur, Bihar

Inner Page: Gram Panchayat Development Meeting, Rupauli Buzrug, October 30, 2018

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# Village Water Security Plan Rupauli Buzrug



September 2019







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I. GRAM PANCHAYAT APPROVAL OF THE PLAN

#### II. BACKGROUND

The National Rural Drinking Water Programme prescribes the preparation of village water security plans for safeguarding the sustainability of drinking water services in villages. This water security plan has been prepared by the Gram Panchayat and Ward Implementation and Management Committees of Rupauli Buzrug Gram Panchayat, Sarairanjan block, Samastipur District, Bihar in keeping with the guidelines issued by the Department of Drinking Water and Sanitation, Ministry of Jal Shakti, Government of India in its Handbook for Gram Panchayats¹ to help village institutions plan, implement, operate, maintain and manage drinking water supplies and ensure its sustainability.

Technical support for water point and household surveys, dug well surveys and water regime mapping, land parcel mapping, Participatory Rural Appraisals, identification of WASH (Water, Sanitation and Hygiene) and source sustainability issues and possible water security interventions among other things was provided by the Watershed India Programme. The programme focuses on improved management and governance of water and sanitation services and water resources they depend upon. The programme is being implemented in Samastipur District in Bihar. The programme details are given in the Annex VIII.

#### III. PARTICIPATORY PLANNING PROCESS

Baseline assessments of WASH and water resources was carried out in Rupauli Buzrug village using the following tools

- 1) Secondary data collection from existing government records
- 2) Key Informant Interviews
- 3) Survey of all public water points in the villages
- 4) A sample household survey
- 5) Focal Group Discussions (FGD) and Participatory Rural Appraisals

#### WASH planning

Community participation at various levels was ensured through Focal Group Discussions (FGD), participatory mapping exercises. Ward wise meetings with ward members, women and marginalised communities were held to capture water and sanitation issues and identify priorties with respect to drinking water, sanitation and hygiene services.

#### Source security planning

FGDs and key informant interviews helped outline historical trends in water regimes. Remote sensing and GIS (Geographic Information System) mapping technology were used to understand surface water flows and its pathways and map hydrological structures. SRTM Digital elevation Model (DEM) was used to derive surface drainage networks and understand water flow pathways. This was ground checked using mobile GIS mapping technologies.

<sup>&</sup>lt;sup>1</sup> https://jalshakti-ddws.gov.in/sites/default/files/GPHandbook 0.pdf

The finer natural and man made drainages not captured through Remote Sensing data in and around village was digitised using mobile based applications, Google Earth. Remote Sensing and GIS tools were also used for water body mapping, analysis of land use and land cover changes over time. Indian Meteorological Department (IMD) data was used to understand rainfall variation.

To capture groundwater dimensions and see its behaviour *vis a vis* geology and landform, dug well inventorisation of sample wells and borewells in the village and its surrounding areas was conducted during pre and post monsoon season in 2018 after a training of Watershed partners, Panchayat and ward members on its methodology. This led to mapping for geology, generation of sub-surface geo-hydrological profiles across the watershed and development of groundwater level maps i.e. Reduced Water Level (RWL) maps for flow direction and Static Water Level (SWL) maps for occurrences of groundwater at different depth.

Village meeting on 21st September 2019 was held to conduct parcel wise land use mapping, survey of defunct borewells, calculation of water balance based on local water demand and supply with the participation of ward members, women, Village Panchayati Raj Institution head (Mukhiya), local key informants and youth. Appropriate source security interventions and sustainable land and water management activities were discussed and framed as part of this meeting.

The water source interventions, the service improvement, operationand maintenance and water safety interventions were presented, discussed and finalised in a Panchayat meeting held on 21 September 2019 (Annex VI).

#### IV. WATER SECURITY PLAN COMPONENTS

This water security plan contains

- Water balance estimates
- Source sustainability interventions
- Water safety interventions
- Service improvement measures for hand pumps and piped water supply schemes

## V. VILLAGE PROFILE

#### 1. Name of the GP

## Rupauli Buzrug

State Cod e	State Name	Dist- rict Code	District Name	Sub District Code	Sub District Name	CD Block Code	CD Block Name	GP Code	GP Name	Village Code	Village Name
10	BIHAR	221	Samasti pur	0129 5	Saraira njan	0283	Sarair anjan	0005	Rupauli Buzrug	236918	Rupauli Buzrug

#### 1. Total current population in the GP and number of households

Total population of GP – 12,498 Total Households of GP – 2,481

## 2. Number of villages/habitations/wards in the GP

Total number of villages in GP - 1

Total number of Tolas/Habitations- Rupauli Tol, Banghara Tol, Hundahiya Tol, Godha Tol, Gachhi Tol

Total number of wards in the GP - 11

### 3. Names of villages in the GP

Rupauli Buzrug

### 4. Wards being proposed for coverage

Total eleven wards falling under Rupauli Buzrug revenue village Ward no. 1 to Ward no. 11

## 5. Population of these villages/wards and number of households

Total population of the village -12,498 (There is only one village in this panchayat) Number of households -2,481

#### 6. Ward wise population details

Village	Tola Name/Ward No	Households	Population	SC population	OBC population
RUPAULI BUZRUG	Ward No. 1	232	1284	267	1017
RUPAULI BUZRUG	Ward No. 2	245	1123	498	625
RUPAULI BUZRUG	Ward No. 3	201	1301	423	878
RUPAULI BUZRUG	Ward No. 4	220	1289	412	877
RUPAULI BUZRUG	Ward No. 5	263	1248	204	1044
RUPAULI BUZRUG	Ward No. 6	227	1115	223	892
RUPAULI BUZRUG	Ward No. 7	219	1233	354	879
RUPAULI BUZRUG	Ward No. 8	190	867	514	353
RUPAULI BUZRUG	Ward No. 9	233	1010	326	684
RUPAULI BUZRUG	Ward No. 10	212	684	0	684
RUPAULI BUZRUG	Ward No. 11	239	1344	218	1126
	Total Rupauli Buzrug	2481	12498	3439	9059

Note: Population is based on lists available at Panchayat level, Source: Mukhiya, Rupauli Buzrug Panchayat and ward members, 2019

#### 7. Description of the water system

100 % sampling of all waterpoints (safe and unsafe) including hand pumps, wells, public stand posts, tap inside house was done for the village. All the water points were geo-located and photographed. The baseline figures were updated to arrive at current figures. The water point survey covers the following topics –

Information about the type of water point

- Functionality and service levels
- Users per water point and water usage
- Installation, O & M of water points
- Response of service providers for O & M
- Seasonality and sufficiency of water supply
- Water quality and existing monitoring mechanisms
- Drainage and water safety
- Perceptions about water quality
- Institutions responsible for O & M
- User tariffs
- Fund utilization and management

S.N o.	Type of waterpoints	Number	Functional	Dysfunctional (Not working since over a year)	Not working since few days/month s
1.	Type and number of public water	r source			
	Mark II Hand pumps	16	12	4	0
	Non-specific Hand pumps	0	0		
	PHE6 Hand pumps	39	31	4	4
	Pipeline/tap (inside the house)	0	0	0	0
	Public tap/stand post	0	0	0	0
	Unprotected/Open Dug Well both private and public	32	15	0	0
	HH Connection	0	0	0	0
	Overhead tanks	0	0	0	0
	No. of tube wells pumping water in piped water supply schemes	0	0	0	0
2.	Families using public water source		1	1	1568
3.	Families using private water source				708

Note: The figures are based on water point surveys of all public water points in September – October 2017. The number and status of water points has been updated based on inputs from Panchayat and WIMC members in meeting held on 21st September 2019, Source: Panchayat and ward members

### 8. Key issues

The general perception around water quality is that it is good and the taste of water here is also acceptable. Most handpumps functioned. Platforms around hand pumps were not constructed earlier leading to accumulation of dirty water around water points. These are being constructed in recent times but still more platforms need to be constructed and maintained. A canal or small drain passes through the village. There is no mechanism for the removal of waste or dirty water. The drainage water flows on the road and this situation worsens even during rainy days. There is no drainage on the side of the road; people throw the garbage around the house.

At the time of preparation of this plan the piped water schemes are new and work is still in progress. Some issues with respect to operation have been recognized. The main issues observed in hand pumps and the piped water schemes are listed below.

S. No.	Issues	Units
1.	Service improvement issues hand pumps	
	Newly constructed households away from main habitation have poor access to hand pumps	0
2.	Service improvement issues household piped water scheme	
3.	Water safety issues household piped water schemes	
	Non availability of information on water quality of new pipe water bore wells at Panchayat and ward level	
4.	Water safety issues hand pumps	
	Hand pumps and public stand posts with no platforms	15
	Hand pumps and public stand posts with cracked/broken platforms	17
	Hand Pumps and public stand posts with good condition platforms	23
	Fecal matter presence near water points	29
	Hand pumps and wells with toilets at a distance of less than 10 metres	26
	No drainage around Water points	18
	Run off from water point flows in to water body	6
	Coliform presence	18/37

	Hand pumps with Iron in excess of acceptable limits of 0.3 mg/litre	18/37 public water points
5.	Operation and maintenance issues hand pumps	
	Hand pumps requiring repair	30
	Broken handles of hand pumps	6
	Handle is too tight	16
	Hand pumps with damaged water pipes	8

Note: These are figures based on a survey conducted in 2017. The figures have been updated in 2019 at the time water security planning based on discussions with the Panchayat and ward members

## VI. SERVICE IMPROVEMENT AND O & M PLAN

# 1. Hand pumps operation and maintenance

Type of service Improvement/ O & M	Units	Priority (Immediate/ This year/Next year/ Later/ Not required)	Cost
Procurement of spare parts (cylinders)to repair hand pumps	17	Immediate	Rs. 500 – 1000/-
Administrative tasks	Keeping ledgers on hand pumps, functionality and records	This year	

## 2. Piped Water Supply System

This lists down the training requirement and operational activities for piped water supply connections in the wards.

Type of Service Improvement/ Operation and Maintenance	Action proposed	Responsibility, and how frequently	Priority (Yes/ No) (Immediate / Next year)	Cost if any
Contract management capability for ward committee members	Training to ward committee members		Immediate	
Operation and maintenance capability	Design terms of reference or basic service agreement for operator	Ward committee	Immediate	
Household Connections	Subsidizing connection cost for SC, ST or BPL	Ward committee	Yes	

	households, women headed households		
Spare part management	Procurement of spare	Operator	Yes
Regular operation and maintenance	Pump operation	Operator	Yes
	Checking of valves	Operator	
	Flow, pressure, electric panel, wiring check	Operator	
Storage tank maintenance	Tank cover	Operator, Monthly	Yes
	Regular cleaning of tanks	Operator, Three months	
	Any other	Operator	
Pipe network (leakage)	Leak detection and repair	Operator, monthly	Yes
Water quality	Sanitary surveys, Sample collection for regular testing at district laboratories	ASHA, Half yearly	Yes
	Chlorine check	ASHA, Weekly	Yes
Customer Service	Setup a customer complaints recording system and set response time	Ward committee	Yes
Accounts and Bookkeeping	Keep ledgers for operational and financial records	Ward committee, monthly	Yes
Customer	✓ Procedures for new connection	Ward committee,	Yes
database, billing and collection	✓ Application	monthly	
arrangements	<ul><li>✓ Billing and tariff collection</li><li>✓ Disconnection policy</li></ul>		
	Maintenance of record of houses with a connection Record of non- payment	Ward committee member/Oper ator, monthly	Yes

# VII. WATER SAFETY PLAN

Risks	Control measures	Units	Priority (Immediate/ This year/Next year/Later/ Not required) and Responsibility	Costs per unit if any
Hand pumps, wells	<u> </u>			
Area around water points is muddy and poorly drained	Construction of raised platform around handpumps and public stand posts	15	Next year- Mukhiya	Rs 3000/unit
	Repair of existing platforms around handpumps and public stand posts	17	Next year- Mukhiya	Rs 500 - 1000 /unit
	Construction of wastewater drains to take water away from water points under the the Har Ghar Nali Gali scheme		Next year- WIMC	Estimate would be prepared and integrated in the scheme
Livestock encroachment and animal feces	Fencing	-	Not required	
Risk of contamination from toilet effluents	Relocate latrines at least 10 meters away	29	Not possible due to space constraint	
Fecal matter around water points	Public awareness through in Panchayat meetings, Use of IEC signboards	Monthly Nukkad Sabha		
Livestock effluents	Public awareness for construction of Nullahs by livestock owners to relocate effluent pathways away from hand pumps in consultation with livestock owners	Monthly Nukkad Sabha		

Treatment systems	Treatment systems						
Chemical and bacteriological contamination	Monthly ward meetings with participation of ASHA workers to take stock and to ensure that bleaching is done every three months by ASHA workers	-					
	Pre monsoon and post monsoon sample collection by WIMC members and sending to District laboratories for testing	-					
Household storage	and handling						
Unclean storage container, absence of lid on storage container, no hand washing with soap	Public awareness/IEC and empower women groups to advocate for personal hygiene and proper storage and handling	Discussion on water handling, health and hygiene in monthly					
Drinking water does not meet potable standards	Household drinking water purification – IEC on household water treatment measures	Discussion on water handling, health and hygiene in monthly					
Household solid wa	Household solid waste management						
Risk of contamination of water points, nitrification and dumping in open	Awareness generation through proper use of IEC materials to promote waste segregation practice	-					
water bodies	Training on Vermi composting	1					

#### VIII. SOURCE SUSTAINABILITY PLAN

#### Description of the source(s)

Water sources	Number	Use			Average depth
		Domestic	Irrigation	Groundwater recharge	
Open Wells	32	32	0		25-30 feet
Bore wells	19	0	19	0	60-90 feet
Pond	3	0	3	No	25-30 feet
River	No	No	No	No	No
Chaur, Maun, Jheel	1 (Debkhal chaur)	No	Yes	No	1-6 feet

## 2. Geo-hydrological characteristics

Predominantly *Chikini Miitti* with *Domat Mitti*at places is found from 0 -5 feet below ground level. *Benga Mitti* with *Chikini Mittii* at places is found between 5-11 feet. *Kali Mitti* is found between 12-18 feet. After this a layer *Kankrit* is present at 18- 24 feet. A sandy layer at 25-30 feet forms the shallow aquifershaving a thickness of 5 feet.

#### 3. Land use

Land use land cover	Area (ha)
Agriculture in two season	477.46
Horticulture plantation	13.37
Waterbody	64.35
Road	23.16
Settlements	80.73
Total	659.07

#### 4. Average water quality

Average TDS levels in observed dug wells was found to be in the range of 180 - 580 mg/l (Acceptable limits for drinking water is blow 500 mg/l).

#### 5. Average water table

Average water levels during post monsoon season ranges from 0 to 4 m below the surface. That depletes up to 6-10 m during pre-monsoon season. Large parts of wetland show near surface water levels between 0 -2 m post monsoon. In summers the depletion is more in the north and west parts of the village.

To understand groundwater flow reduced water level maps have been prepared. The ISO RWL map reveals that the groundwater flow during post-monsoon season is from west to east and

towards south direction whereas it is predominantly towards the centre of the village in the dry season.

#### 6. Water balance

Water demand estimation has been done using area cultivated under different crops as per the cropping mix prevalent in nearby villages in the current year and domestic water consumption. Surface water supply estimates were calculated using rainfall and other parameters.

Water balance of the village taking in to account local rainfall is positive (0.781 MCM). The water balance may improve, if riverine inflows and groundwater component are also considered. Rupauli Buzrug nevertheless it is important that village optimizes its water consumption which can be done employing water efficient irrigation techniques, suitable water conservation and recharge measures and by preservation and restoration of wetland regimes.

	Annual Water balance estimation for Rupauli Buzrug village <sup>2</sup>			
Annual water	Agriculture demand	5.765		
demand (MCM)	Domestic (@ 70 litres per capita/day)	0.251		
Annual water	Surface	6.797		
supply (MCM)	Groundwater	Not calculated		
Water balance		0.781		
(MCM)				

#### 7. Problems with source sustainability and strategy

Roughly 10 % area of the village is under wetlands - Debkhal Chaur. This keeps the water table sufficiently high in the village. Seasonal flooding helps groundwater recharge and agriculture in only two seasons adjusted to flooding regimes helps to maintain a positive water balance in the village. This keeps most of the handpumps running. The following measures are proposed

- Continuing the present two season cropping systems
- Improvement of surface water storage by restoration and rejuvenation of wetlands such as ponds, Chaur and nullahs (Annex V)
- Adopting soil and moisture conservation practices in agriculture including suitable agroforestry systems. This will reduce erosion and reduce siltation of Chaur
- Use of surface water and shallow aquifers for irrigation
- Adopting less water intensive cropping choices and use of water efficient irrigation practices

<sup>&</sup>lt;sup>2</sup> Note: The water balance estimation is subject to refinement after taking into consideration the groundwater component and also riverine inflows. Livestock water requirement being a very small fraction of overall water use has not been added. However the estimates here roughly capture the water balance situation



District dissemination workshop with CSOs and PRIs to share water resource assessments findings, Samastipur, 22 January 2019



Celebration of Swacchta Pakhwara in Rupauli Buzrug High School, September 29, 2018



Fisher in Debkhal in October2019. Water regimes of Debkhal Chaur need to be maintained to support fisher livelihoods, irrigation and for groundwater recharge. The wetland mostly dries up by March - April.

# 8. Water Source Plan

Accordingly the following strategies have been proposed for water management in the village.

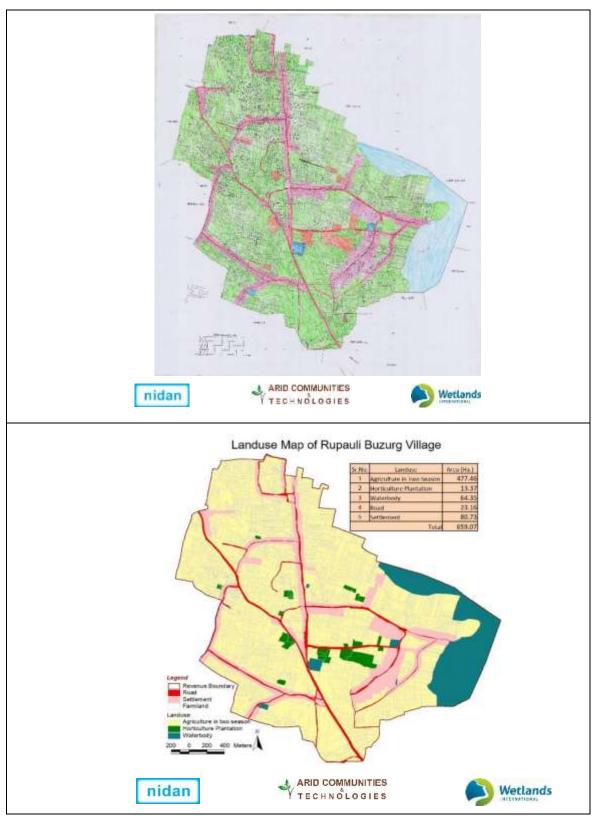
S No.	Sustainability strategies	Units	Priority (Immediate/ This year/Next year/Later /Not required)	Cost per unit		
Impro	Improvement of surface water storage					
1.	Rejuvenation of <b>Pokhar and Debkhal Chaur</b> as water storage structure	No. of Pokhar- 3 Chaur- 1	This year but subject to availability of funds of MNREGS under "Jal Jeevan Hariyaali" mission or other funds	Based on actual estimates		
2.	Restoration and maintenance of water channels in the village and removal of encroachments/obstructions to water flow		This year but subject to funds under MNREGS			
3.	Monthly awareness meetings through Nukkad Sabah for maintenance of water channels in the village and removal of encroachments/obstructions to water flow		This year			
4.	Training on soil conservation and agroforestry practices to reduce siltation of Debkhal Chaur	1	Next year			
Groun	ndwater recharge in recharge zor	ne	,			
1.	Demonstration on conversion of borewells in to recharge structures	1	Immediate			
2.	Awareness meetings to promote uptake by borewell owners Conversion of abandoned borewells into recharge borewells		Immediate to this year			
3.	Training on use of dug wells in to recharge structures	1	This year to next year			
4.	Use of dug wells as recharge structures  ✓ Cleaning of wells ✓ Cover the dug wells	-	This year to next year subject to availability of funds			

	✓ Construction of roof water harvesting structures and diverting the flows to dugwells			
Water	conservation in farming practice	es		
1.	Trainings to facilitate uptake of water conserving irrigation practices such as micro irrigation methods	-	This year	
2.	Awareness generation through Nukkad Sabhafor promoting conjunctive use of groundwater and surface water for agriculture		Yes	
3.	Awareness generation through Nukkad Sabha for promoting water demand side management measures		Yes	
4.	Knowledge dissemination through IEC on less water intensive crops		This year	
Monit	oring of water regimes			
1.	Monitoring of water levels and water quality in dugwells through survey in pre and post monsoon season		Next year	
2.	Training on mapping and monitoring of water bodies – permanent and seasonally extent of water bodies (ponds and chaur area), water levels, usage etc		Next year	
3.	Maintenance of village level records on status of water sources integrating inputs from dugwell surveys and water body mapping, updated annually	-	Next year	

PRA resource map of Rupauli Buzrug village

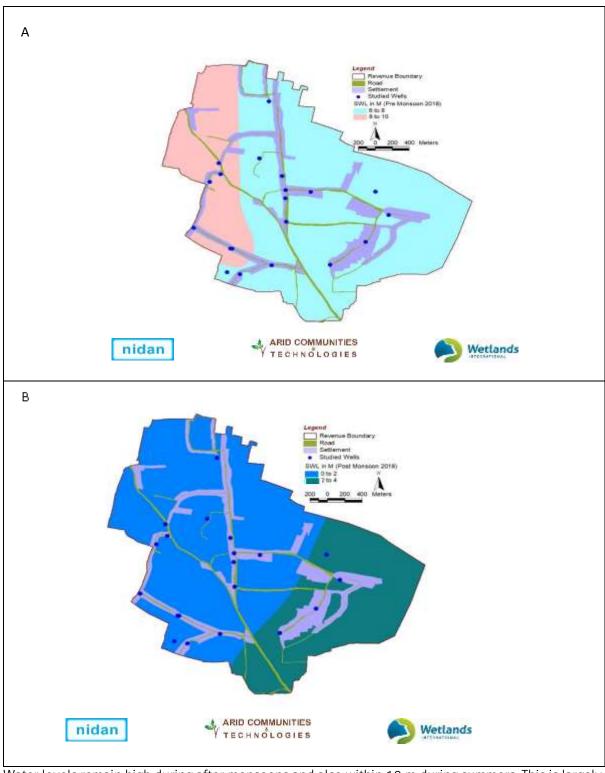


# Land use map of Rupauli Buzrug village



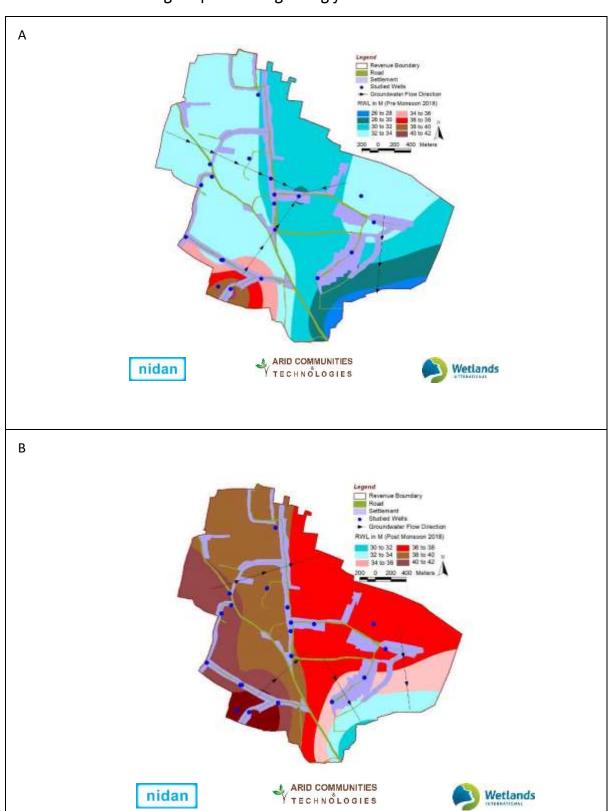
Most area of the village is under two season cropping. Parts of village overlay Debkhal Chaur. And this is responsible for a positive water balance as compared to other villages

Map showing Static Water Levels during (A) Pre-monsoon season and (B) post monsoon season in village Rupauli Buzrug during year 2018



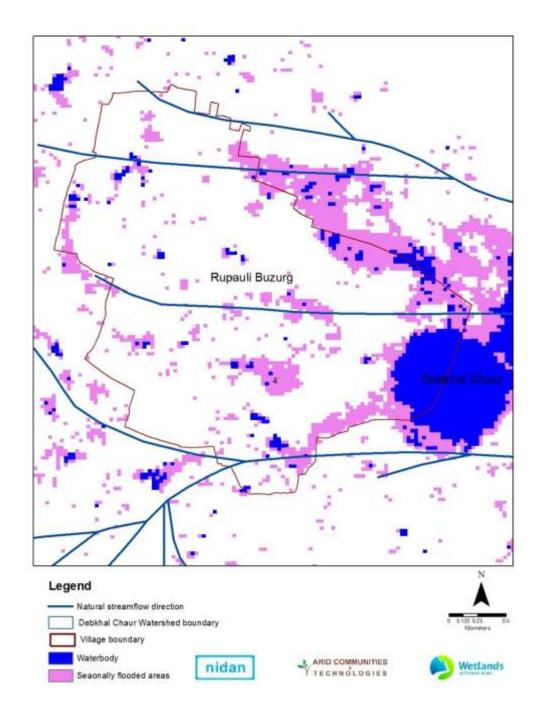
Water levels remain high during after monsoons and also within 10 m during summers. This is largely attributed to presence of Debkhal Chaur and groundwater that flows towards the centre of the village. This is reason for high rate of functionality of handpumps as compared to other villages.

# Map showing Reduced Water Level Zones during (A) Pre-monsoon Season and (B) Post Monsoon Season in village Rupauli Buzrug during year 2018



Arrows show direction of groundwater flows towards the centre of village in summers and from west to east after monsoons

# Map showing surface drainages pattern derived from satellite data and wetlands



This information can be used to align drainage lines in and around Rupauli Buzrug. The map shows wetland areas (*Chaur* areas) both seasonal and permanent that can be rejuvenated. Debkhal Chaur overlays parts of the village

# List of village representatives attending meeting for land use mapping held on 21 September 2019 in Rupauli Buzrug

Sl. No.	Name	Designation	Ward No.
1.	Pushpa Kumari	Mukhiya	
2.	Ram Babu Rai	Community leader	
3.	Jagarnath Ram	Vikash Mitra	
4.	Shyam Sahani	Ward Member	1
5.	Neela Devi	Ward Member	2
6.	Reshma Devi	Ward Member	3
7.	Uman Sada	Ward Member	4
8.	Sanjay Kumar Sah	Ward Member	5
9.	Anita Devi	Ward Member	6
10.	Indira Devi	Ward Member	7
11.	Neelam Devi	Ward Member	8
12.	Anita Devi	Ward Member	9
13.	Arun Thakur	Ward Member	10
14.	Jai Shankar Poddar	Ward Member	11

Annex VII:

# List of village representatives attending meeting on water security planning held on 21 September,2019 in Rupauli Buzrug

Sl. No.	Name	Designation	Ward No.
1.	Pushpa Kumari	Mukhiya	
2.	Ram Babu Rai	Community leader	
3.	Jagarnath Ram	Vikash Mitra	
4.	Shyam Sahani	Ward Member	1
5.	Neela Devi	Ward Member	2
6.	Reshma Devi	Ward Member	3
7.	Uman Sada	Ward Member	4
8.	Sanjay Kumar Sah	Ward Member	5
9.	Anita Devi	Ward Member	6
10.	Indira Devi	Ward Member	7
11.	Neelam Devi	Ward Member	8
12.	Anita Devi	Ward Member	9
13.	Arun Thakur	Ward Member	10
14.	Jai Shankar Poddar	Ward Member	11

#### About the Watershed India Programme

This water security plan has been prepared by the Rupauli Buzrug Gram Panchayat and village communities with the support of Wetlands International South Asia, Nidan and Arid Communities and Technologies (ACT) under the Watershed India programme.

Watershed India is a strategic partnership programme of the Dutch Ministry of Foreign Affairs, Wetlands International, IRC and Akvo. The programme is being implemented in Debkhal Chaur wetland basin in Samastipur District, Bihar in partnership with Nidan and in Tampara wetland basin, Ganjam District, Odisha in partnership with Gram Utthan.

Working through pilot locations where water resources are scarce or contested and where environmental management is at the core of the WASH sustainability challenge, the programme aims to deliver improvements in the governance and management of water, sanitation and hygiene services and ensuring sustainability of water resource they depend on. More about the programme can be accessed from the website <a href="https://watershed.nl/">https://watershed.nl/</a>.

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