Village Water Security Plan, Barbatta

Gram Panchayat - Barbatta

(Block Sarairanjan, District Samastipur)

Bihar

Plan prepared by

Barbatta Gram Panchayat, September 2019

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Inner Page: Land use mapping in Barbatta in September 2019

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Village Water Security Plan
Barbatta

September 2019

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ARID COMMUNITIES & TECHNOLOGIES

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Contents

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 Barbatta 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 Panchayats[1] 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 Barbatta 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.

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

[1] https://jalshakti-ddws.gov.in/sites/default/files/GPHandbook_0.pdf

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 11th 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 intreventions were presented, discussed and finalised in a Panchayat meeting held on 11th September 2019 (see Annex).

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 – Barbatta

State Code	State Name	District 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	Samastipur	01295	Sarairanjan	0286	Sarairanjan	0007	Barbatta	236948	Barbatta

2. Total current population in the GP and number of households

Total population of GP – 14161

Total Households of GP - 2312

3. Number of villages/habitations/wards in the GP

Total number of villages in GP – 2

Total number of wards in the GP – 13

4. Names of villages in the GP: Barbatta, Soapakar

5. Wards being proposed for coverage

Total eleven wards falling under Barbatta revenue village covering Ward no. 3,4,5,6,7,8,9,10, 11, 12 and 13.

6. Population of these villages/wards and number of households

Total population of the village – 10442

Number of households - 1998

7. Ward wise population details

Village	Tola Name/ Ward No	Households	Population	SC population	OBC population
BARBATTA	Ward No. 3	159	936	0	936
BARBATTA	Ward No. 4	176	893	0	893
BARBATTA	Ward No. 5	199	1047	372	675
BARBATTA	Ward No. 6	178	894	0	894
BARBATTA	Ward No. 7	167	600	169	431
BARBATTA	Ward No. 8	191	976	0	976
BARBATTA	Ward No. 9	205	858	216	642
BARBATTA	Ward No. 10	173	1028	386	642
BARBATTA	Ward No. 11	168	1008	0	1008
BARBATTA	Ward No. 12	184	1105	387	718
BARBATTA	Ward No. 13	198	1117	489	628
Total Barbatta		**1998**	**10462**	**2019**	**8443**

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

8. Description of the water system

100 % sampling of all water points (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.No.	Type of waterpoints	Number	Functional	Dysfunctional (Not working since over a year)	Not working since few days/months
1.	**Type and number of public water source**				
	Mark II Hand pumps	30	5	16	9
	Non-specific Hand pumps	0	0	0	0
	PHE6 Hand pumps	48	31	21	4
	Pipeline/tap (inside the house)	15	2	0	13
	Public tap/stand post	10	2	0	8
	Unprotected/Open Dug Well	0	0	0	0
	HH Connection	1433	1433	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**				**1433**
3.	**Families using private water source**				**565**

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 including HH connection has been updated based on inputs from Panchayat and WIMC members in meeting held on 11th September 2019 (Source: Panchayat and ward members)

9. Key issues

Open dug wells are being used by a few households in Barbatta. There is complete dependency on groundwater for agriculture. The village is located at higher elevations as compared to other villages programme villages situated around Debkhal Chaur. There is an issue of Iron contamination. Ponds in the village are limited and do not store water throughout the year. The ponds are used for domestic purposes and by livestock. In a year of good rainfall the water remains in the pond till February -March.

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**	-
2.	**Service improvement issues household piped water scheme**	-
3.	**Water safety issues household piped water schemes**	
	Water quality testing has been conducted for the new pipe water borewells but information has not been shared with beneficiary households. This has been made available to ward members on demand	
4.	**Water safety issues hand pumps**	
	Hand pumps and public stand posts with no platforms	28
	Hand pumps and public stand posts with cracked/broken platforms	26
	Hand Pumps and public stand posts with good condition platforms	32
	Fecal matter presence near water points	40
	Hand pumps and wells with toilets at a distance of less than 10 metres	30
	No drainage around Water points	36
	Run off from water point flows in to water body	10
	Coliform presence	11 public water points
	Hand pumps with Iron in excess of acceptable limits of 0.3 mg/litre	30 public water points
5.	**Operation and maintenance issues hand pumps**	
	Hand pumps requiring repair	30
	➢ Broken handles of hand pumps	➢ 9
	➢ Handle is too tight	➢ 18
	➢ Hand pumps with damaged water pipes	➢ 10

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)	Responsibility	Cost
Installation of new hand pumps	7	Next year	Mukhiya representation to Zila Parishad, MLAD, PHED, BDO for funding	Approximately Rs. 30000 – to- 40000/unit. Cost estimates would be prepared
Procurement of spare parts (cylinders)to repair hand pumps	22	Immediate	PHED	Rs. 500 – 1000/- /unit
Administrative tasks	Keeping ledgers on hand pumps, functionality and records	This year	Ward member updated every six months	

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 (Ward secretary and ward member)	Concerned Block level department	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 households, women headed households	Ward committee	Yes	

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/ WIMC members, Half yearly	Yes	
	Chlorine check	ASHA/ Ward members, Weekly	Yes	
	Record keeping of water quality rest reports	Ward committee		
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 database, billing and collection arrangements	✓ Procedures for new connection ✓ Application ✓ Billing and tariff collection ✓ Disconnection policy	Ward committee, monthly	Yes	
	Maintenance of record of houses with a connection Record of non-payment	Ward committee member/Operator, monthly	Yes	

VII. WATER SAFETY PLAN

Risks	Control measures	Units	Priority (Immediate/ This year/Next year/Later /Not required)	Costs per unit if any
Hand pumps, wells and stand posts				
Area around water points is muddy and poorly drained	Construction of raised platform around hand pumps and public stand posts	20	Next year	Rs 3000/unit
	Repair of existing platforms around hand pumps and public stand posts	18	Next year	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	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	31	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				
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 Nukkad Sabha		
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 Nukkad Sabha		
Household solid waste management				
Risk of contamination of water points, nitrification and dumping in open water bodies	Awareness generation through proper use of IEC materials to promote waste segregation practice	-		
	Training on Vermi composting	1		

VIII. SOURCE SUSTAINABILITY PLAN

1. Description of the sources

Water sources	Number	Use			Average depth
		Domestic	Irrigation	Groundwater recharge	
Open Wells	52	52	0		25-30 feet
Bore wells	18	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

Chikini Mitti is found from 0 to 5 feet below ground level. *Benga Mitti* are found between 5-12 feet. *Kankar Mitti* is found at around 18-24 feet. A sand at 24-30 feet forms the shallow aquifers.

3. Land use

Land use	Area in ha
Agriculture in two season	178.82
Agriculture in three season	269.22
Fishpond	0.05
Road and settlement	56.49
Waterbody	8.07
Plantation	3.09
Cemetery land	0.28
Total	**516.02**

4. Average water quality

Average TDS levels in observed dug wells was found to be mostly between 400 – 600 mg/l [2]

5. Average water table

Average water levels during monsoon ranges from 0 to 4 m below the surface. That depletes up to 4 to 10 m in the dry season. The north and west portions of the village area shows maximum depletion in water level during pre-monsoon to 8-10 m below ground level.

To understand groundwater flow Reduced Water Level (RWL) maps have been prepared. These maps (Annex IV) show that the groundwater flows from the central parts of the village outwards in all directions. The flow pattern remains same during summers as well as after monsoons.

6. Water balance

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

Water balance of the village is negative (- 0.441) but water balance can be improved by employing water efficient irrigation techniques, suitable water conservation and recharge measures and by preserving existing wetlands.

[2] Acceptable limits for drinking water is below 500 mg/l as per Bureau of Indian Standards

	Annual Water balance estimation for Barbatta village[3]	
Annual water demand (MCM)	Agriculture demand	5.505
	Domestic (@ 70 litres per capita/day)	0.27
Annual water supply (MCM)	Surface	5.33
	Groundwater	Not calculated
Water balance (MCM)		- 0.441

2. Problems with source sustainability and strategy

Depletion of shallow aquifers and lowering of water tables was found to be a major issue in the village. This is a major factor responsible for non-functionality of water points. Land use changes have taken place and there has been a gradual loss of surface water storage structures and hence groundwater recharge in the village as natural wetland areas in and around the village have declined over the years.

Barbatta is situated in the discharge zone in Debkhal Chaur basin. Hence water levels here also go deplete rapidly. Any recharge measure taken here will not only be good for this village but also for surrounding areas.

3. 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
Improvement of surface water storage				
1.	Rejuvenation of as water storage structure	3	This year but subject to availability of funds	Estimates have to be prepared
2.	Monthly awareness meetings through Nukkad Sabah for maintenance of water channels in the village and removal of encroachments/obstructions to water flow		This year	
3.	Awareness meetings through Nukkad Sabah for conservation of and rejuvenation of water regimes in by maintaining connectivity with village channels		This year	

[3] Note: The water balance estimation is subject to refinement after taking into consideration the groundwater component. 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

4.	Training on agro forestry practices for maintenance of buffer zone around water bodies for soil conservation	1	Next year	
Groundwater recharge in recharge zone				
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 ✓ Construction of roof water harvesting structures and diverting the flows to dugwells	-	This year to next year subject to availability of funds	
Water conservation in farming practices				
1.	Trainings to facilitate uptake of water conserving irrigation practices such as micro irrigation methods	-	This year	
2.	Awareness generation through Nukkad Sabha for 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	
Monitoring 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 – including permanent and seasonal extent of water bodies (ponds and chaur area), water levels, usage etc		Next year	
3.	Maintaining village level records on status of water sources integrating inputs from dugwell surveys and water body mapping that gets updated annually	-	Next year	

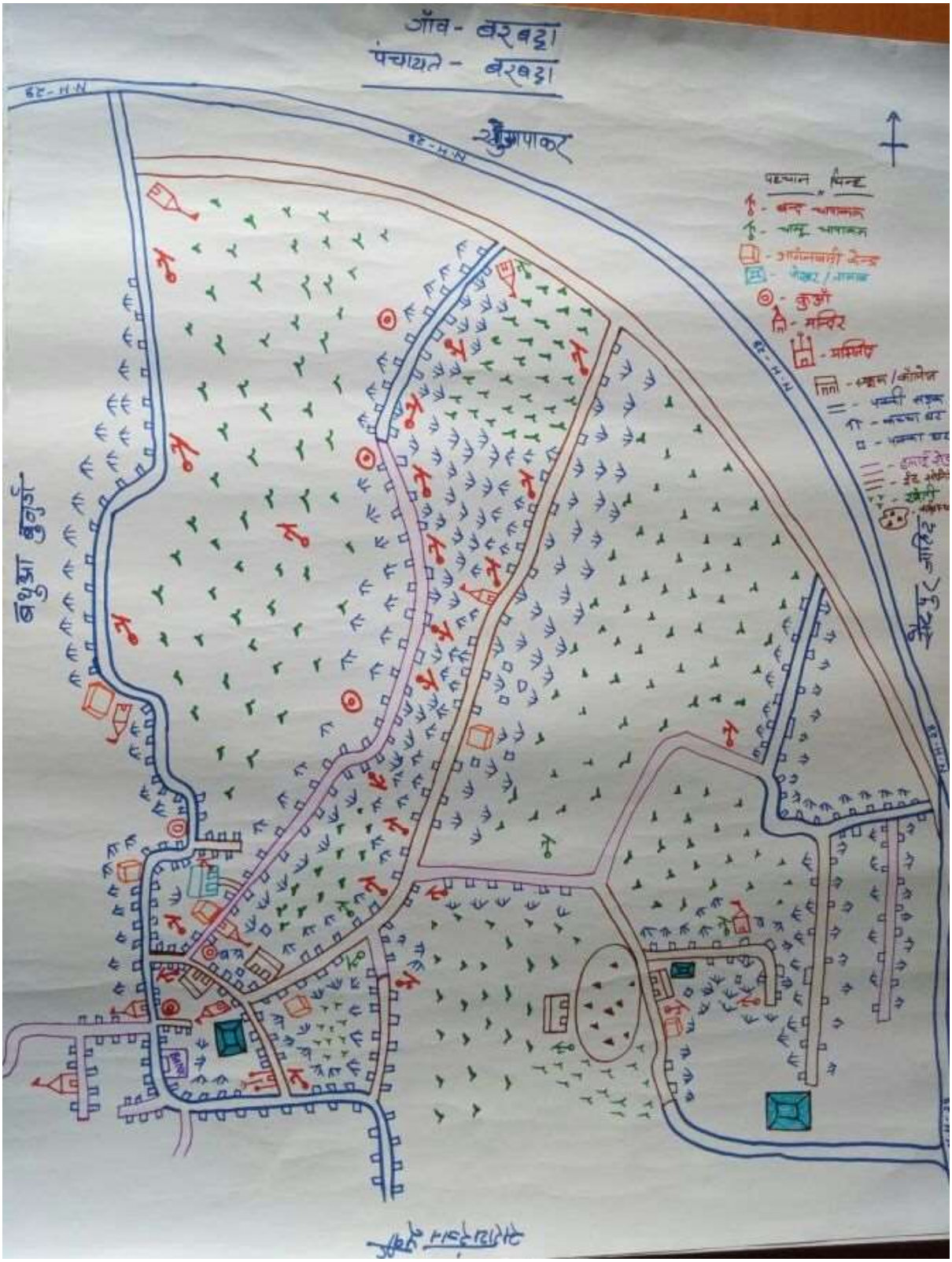
Construction of soak pit in Barbatta in 2019

Water regime assessments - Well inventory in Barbatta in July 2018

Water levels decline rapidly as Barbatta is situated in the groundwater discharge zone in the Debkhal Chaur basin, May 2017

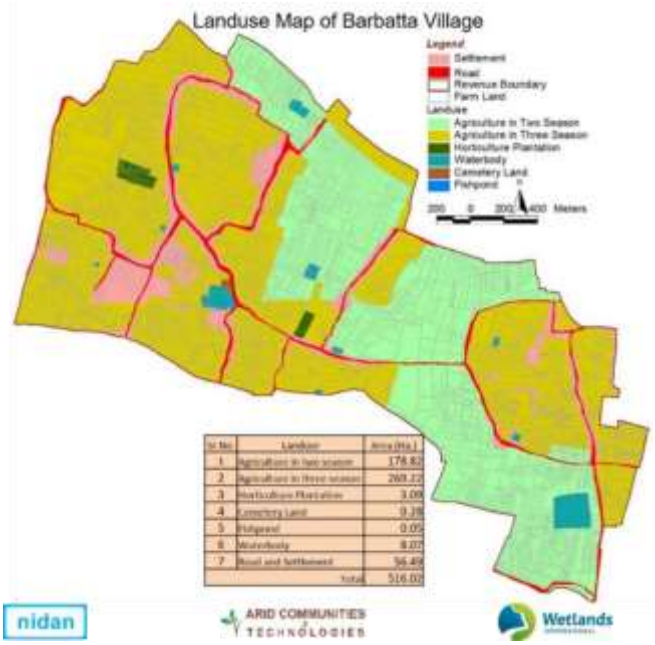
ANNEX: I

PRA resource map of Barbatta village



ANNEX II

Land use map of Barbatta village



Annex III.

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

A

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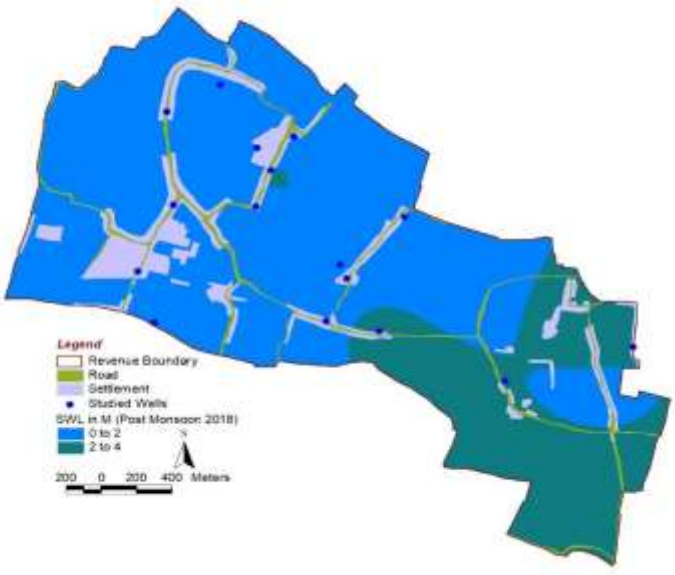
B



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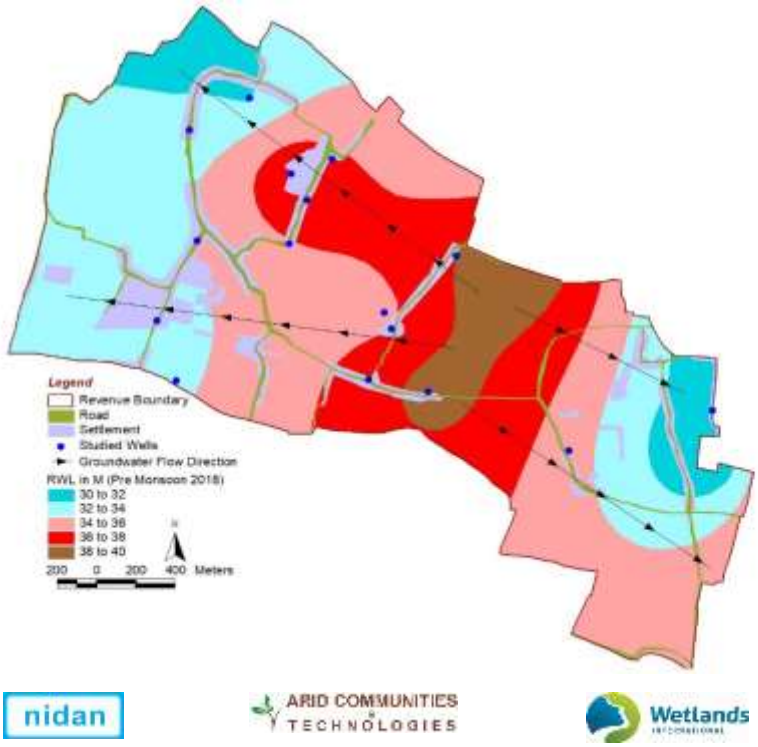
Annex IV.

Map showing Reduced Water Level Zones during (A) Pre-monsoon Season and (B) Post Monsoon Season in Village Barbatta during year 2018 - Arrows show direction of groundwater flows

A



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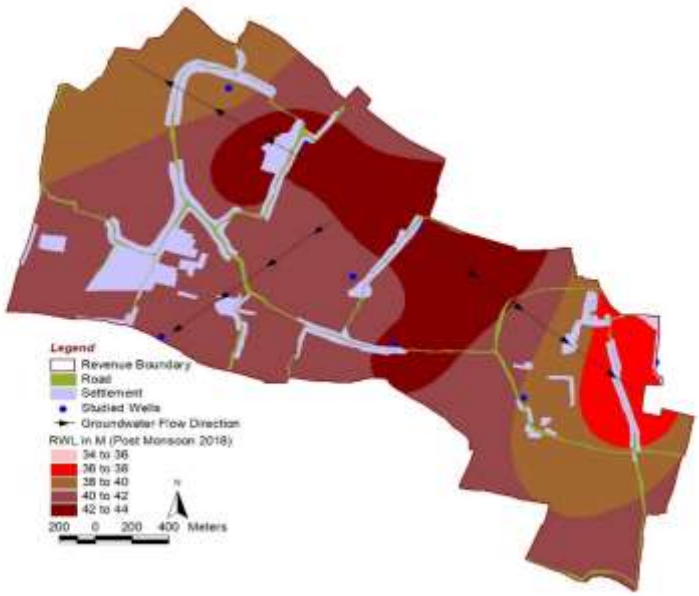
B



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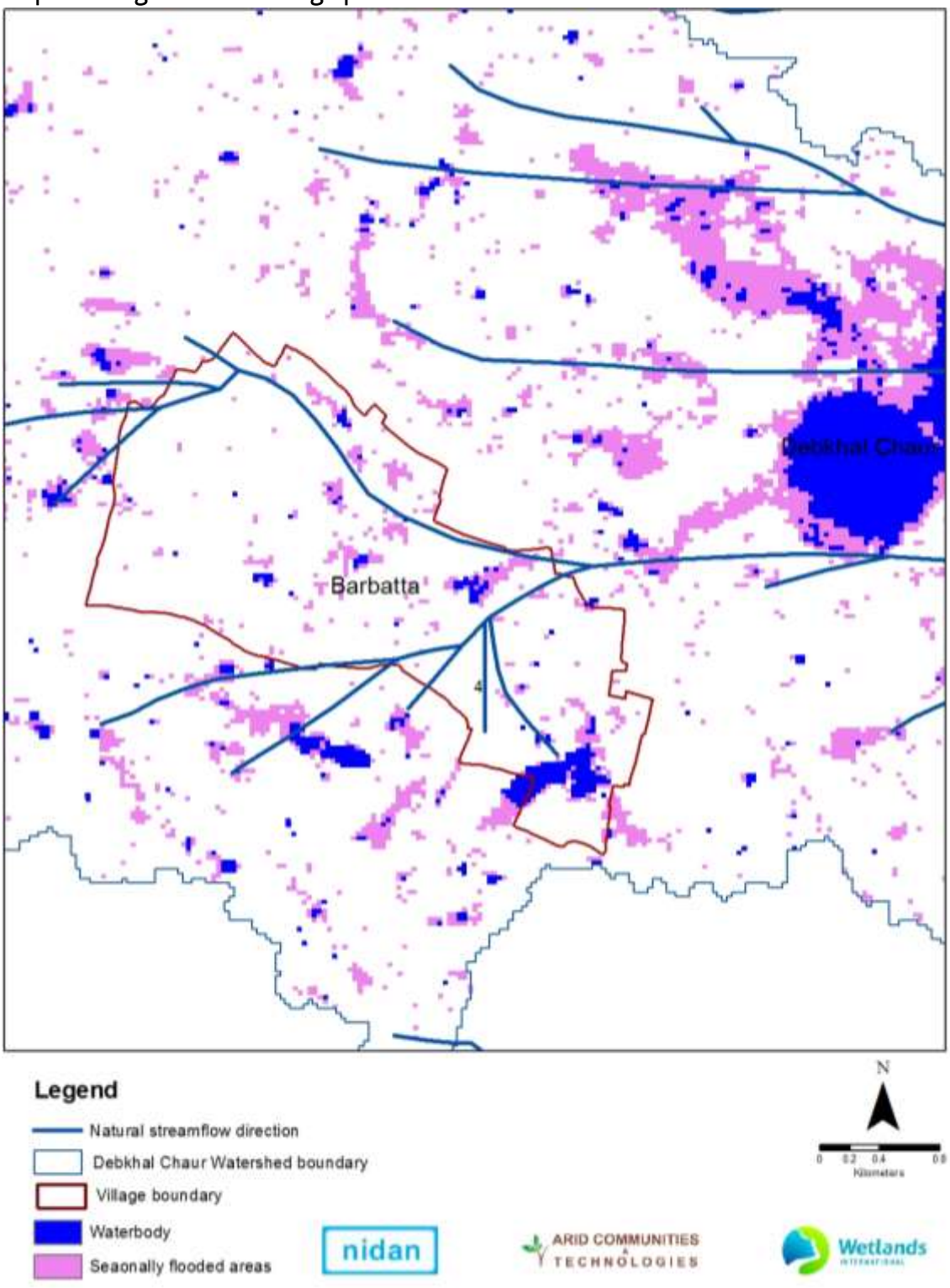
Annex V.

Map showing surface drainage pattern derived from satellite data and wetlands



Annex VI.

List of village representatives attending meeting for land use mapping held on September 11, 2019 in Barbatta

Sl. No.	Name	Designation	Ward No.
1.	RAMCHANDRA SAH	Mukhiya	
2.	VIKRAM SINGH	Community leader	
3.	MANJU DEVI	Ward Member	3
4.	CHANO DEVI	Ward Member	4
5.	ANOOP LAL DAS	Ward Member	5
6.	RAJESH KUMAR THAKUR	Ward Member	6
7.	RAM UDGAR RAM	Ward Member	7
8.	MD. TABREJ	Ward Member	8
9.	MANOJ KUMAR RAY	Ward Member	9
10.	AARTI DEVI	Ward Member	10
11.	USHA DEVI	Ward Member	11
12.	DEVANTI DEVI	Ward Member	12
13.	ATAL KISHORE	Ward Member	13
14.	RAJESH KUMAR	Community Member	

Annex VII:

List of village representatives attending meeting on water security planning held in September, 2019 in Barbatta

Sl. No.	Name	Designation	Ward No.
1.	RAMCHANDRA SAH	Mukhiya	
2.	VIKRAM SINGH	Community leader	
3.	MANJU DEVI	Ward Member	3
4.	CHANO DEVI	Ward Member	4
5.	ANOOP LAL DAS	Ward Member	5
6.	RAJESH KUMAR THAKUR	Ward Member	6
7.	RAM UDGAR RAM	Ward Member	7
8.	MD. TABREJ	Ward Member	8
9.	MANOJ KUMAR RAY	Ward Member	9
10.	AARTI DEVI	Ward Member	10
11.	USHA DEVI	Ward Member	11
12.	DEVANTI DEVI	Ward Member	12
13.	ATAL KISHORE	Ward Member	13
14.	RAJESH KUMAR	Community Member	

About the plan

This water security plan has been prepared by the Barbatta 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 https://watershed.nl/.

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