

A draft report on

Status assessment and planning for reduction in water stress

A case study of Pathardi village of Mokhada Taluka

TDSC- Aroehan-Siemens CSR



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Abbreviations

CNB: Cement Nala Bund

ENB: Earthen Nala Bund

LPCD: Liters per Capita per Day

MDWS: Ministry of Drinking Water and Sanitation

MSL: Mean Sea Level

PRA: Participatory Rural Appraisal

PWSS: Piped Water Supply Scheme

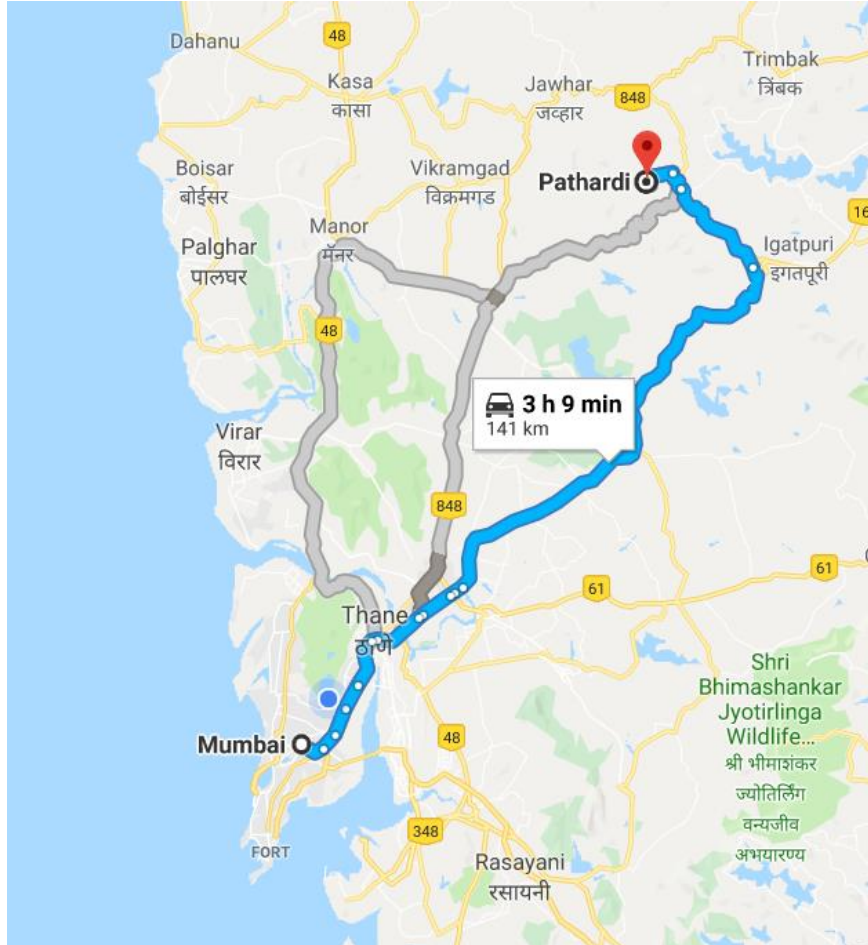
SPV: Solar Photo-Voltaic

SSB: Sub Surface Bund

This report is outcome of an initiative to understand issues related to drinking water that are leading to water stress and to further give interventions for the reduction in stress. The study area is Pathardi village of Mokhada taluka in Palghar District of Maharashtra. The study is a joint initiative of Technology Development Solution Cell (TDSC) at IIT Bombay and Aroehan, an NGO, financially supported by Siemens Ltd India.

Introduction

Pathardi is a Village in Mokhada Taluka of Palghar district. Pathardi village is situated approximately 150 km from Mumbai and 26 km from taluka headquarter-Mokhada as shown in Figure 1. The nearest Centre for Hospitals, banks, markets, etc. is Khodala village and it is approx. 12kms away.



The population of the Pathardi village is approximately 1005 people residing in 212 households. This village is spread over an area of 791 ha and fragmented into five habitations situated at an altitude ranging from 170 to 384 meters above MSL, with individual populations ranging from 84 to 340. These five habitations are Dongarwadi, Bhirobachiwadi (Dhindewadi), Ramwadi (Naviwadi), Patilpada (Khalchi Pathardi) and Varchi Pathardi namely. Out of these, four habitations are adjacent to each other and the fifth one is the farthest as shown Figure 2

Figure 1: Map showing geographic location of Pathardi village

Pathardi village is located along Pinjal River, One nala flows from Gomghar to Pathardi and meet at Pinjal River near Pathardi. Almost all habitations except Dongarwadi are along this main nala. The major source of water in this village is groundwater. Figure 2 indicates the spatial boundaries of village along with the habitations and waterbodies.

The village comprises of three Z.P. schools upto 5th standard, one Z.P. school upto 8th standard, four Anganwadi, provision of Asha worker in each habitation (except Ramwadi) and one PDS. For all other facilities, people are dependent on Adoshi and Khodala villages. Primary source of income is dependent on agriculture, but due to scarcity of water only one crop a year is produced, leading to migration during non-monsoon season.

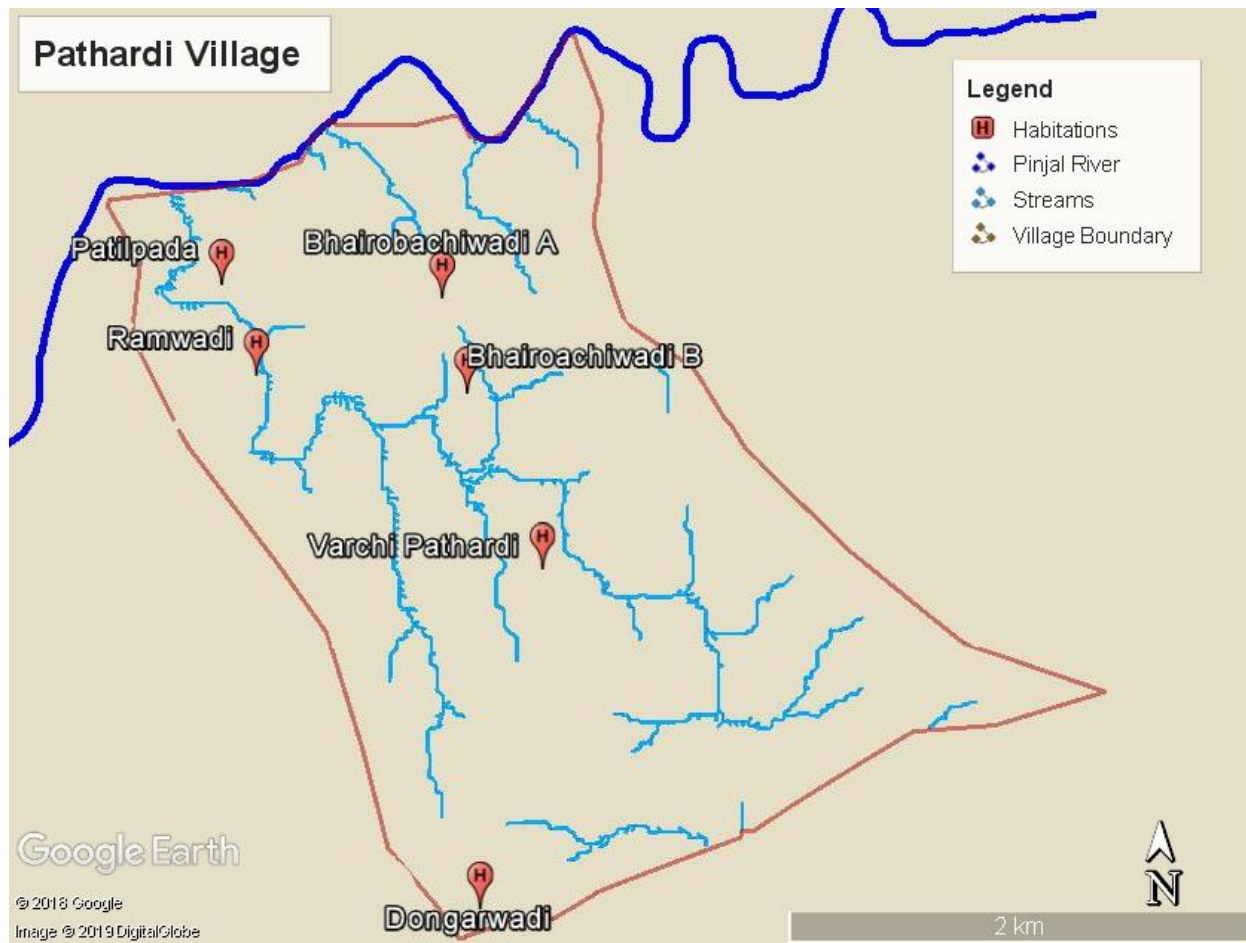


Figure 2: Spatial boundaries of village along with the habitations and waterbodies

The report comprises of five habitations and each habitation is divided into four parts- Baseline data collection, PRA verification, Need assessment, and Intervention planning. Baseline data collection describes habitation wise status of all the existing assets and further compares the same with the data set collected by the on-field/ survey team during PRA. Need assessment quantifies the current need and states the forecasted need of water. The fourth part suggests the possible assets that can be considered for intervention planning and the type of interventions possible in the given condition.

The report ends with a general observation throughout the village and recommendation.

1. Status assessment of water assets and need analysis of Dongarwadi Habitation

Dongarwadi habitation is located approx. 32kms away from Mokhada and 7 kms from Khodala at the highest part of the village (386m altitude). It is well connected with Khodala and Mokhada by an all-weather road. According to MDWS, the total population of the Dongarwadi habitation is 159 and the total number of households is 33. The habitation is surrounded by forest land on the northern edge.

There is a Zilla Parishad school within the habitation upto 5th standard. For further education students travel to either Khodala (7kms) or Suryamal (6.5kms) villages. Currently, 2 teachers and 32 students are enrolled in the school.

1.1 Baseline data collection

This step is an important step for assessing any asset as it comprises of all preliminary data such as location, dimensions, distance and physical condition of all assets in a village/habitation. Dongarwadi habitation consists of five drinking water assets, and no storage or recharge structures.

1.1.1 Drinking water assets (Well, hand pump, PWS, cordon)

Dongarwadi habitation is located at the highest point of Pathardi village at an altitude of 384m. The habitation is spread over at ridge point and has a few 1st order streams in the periphery. There are three wells and one Budka in close proximity (within 500m) of habitation and one well is located approx. 900m away from the habitation in the forest area. There are no hand pumps, PWS or cordon available.

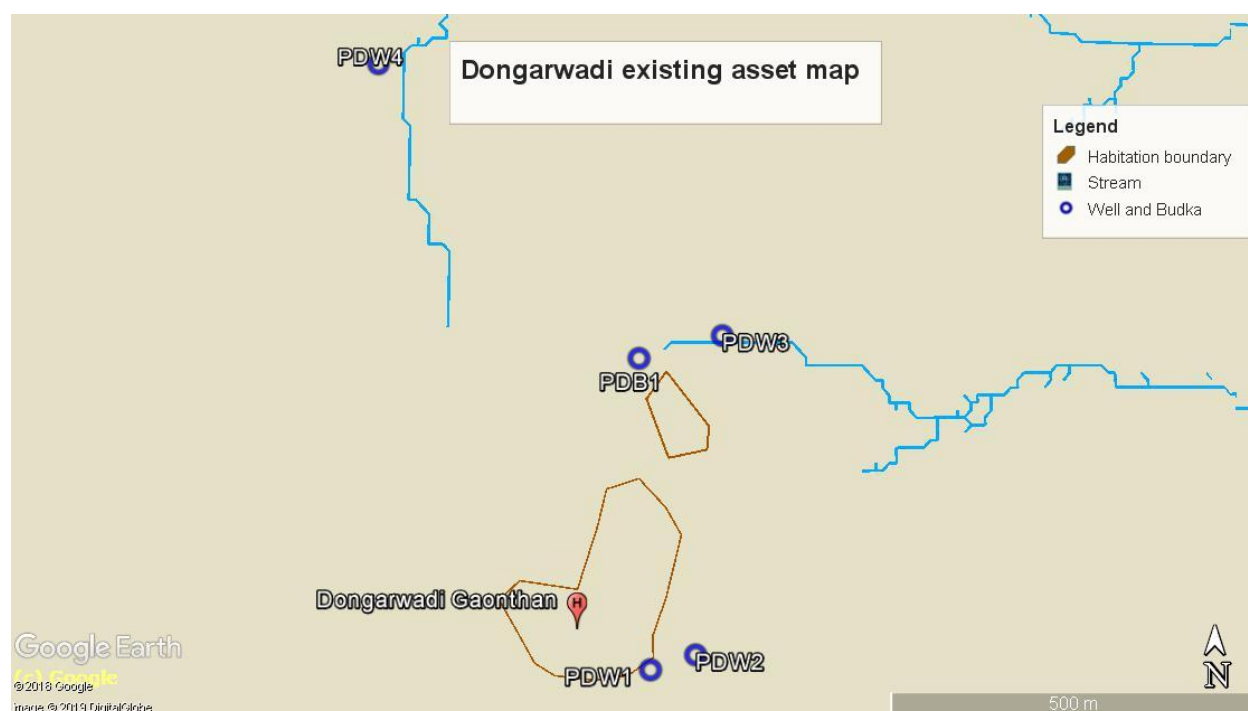


Figure 3: Existing drinking water assets of Dongarwadi Habitation

Figure 3 shows all the existing drinking and domestic water assets of the habitation. It also shows the seasonal streams prevailing in the habitation along with an indicative habitation boundary.

Table 1: Existing drinking and domestic water assets of Dongarwadi Habitation

Asset Name	Physical condition	Dimension	Water Availability	Current water level	Accessibility			Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	(Dia* Depth) in meter	Till which month	Below ground level in meters	Distance from habitation	Elevation	Condition of approach road	Ok/Not ok and people's perception	Usage for drinking/ domestic. Dependency (No. HH)
PDW1 Government	Good (Physically intact) Repair- A	6.0m*6.45m	Till January end	Tanker water	100m	380m	Kuccha road		Both Drinking and Domestic. 100% HH
PDW2 Government	Good (Physically intact)	6.1m*7.25m	Till February end	6.05m	175m	374m	Kuccha road	Not okay	Domestic and animal (It is used when water is not available in PDW1). 100% HH
PDW3 Panchayat Samiti-sondhechivihir	Good, Repair-C	6.3m*8.65m	Till February end	6.65m	500m	355m	Kuccha road	Okay	Drinking, Domestic and animal. 50% HH
PDW4 Jalswarajya	Partially damaged, Repair-A,B&C.	6.3m*6.75m	12 months	1.75m	900m	321m	Kuccha and sloppy road	Okay	Agriculture and Drinking water when all other wells dry
PDB1	Partially damaged, Repair-A,B&C.	2.9m * 2.0m	Only rainy season	No water	400m away from main habitation, 100 m away from adjacent habitation	367m	Kuccha road		Drinking. 100% HH during rains
Notes:									
Asset Code: Village name (Pathardi) + Habitation Name (Dongarwadi) + Asset Name (Well/Budka) + Asset Number (1, 2...)									
Physical condition parameters: A- Parapet wall, B- Waterproofing layer yes/no, C- Platform									

Table 1 gives list of all the existing assets in the Dongarwadi habitation along with the distance of each asset, its usage and dependency.

1.1.2 Agriculture water (Storage structures- CNB, ENB, Farm pond, storage tank)

There are no existing storage structures like CNB/ENB or Farm ponds in Dongarwadi habitation. The habitation population is dependent only on rain fed agriculture- only one crop a year (Kharif). Apart from that there is one Rain Water Harvesting/ Roof water collection tank in Z.P. school of the Habitation that stores 1000 liters of water that is used for handwashing and cleaning purpose.

There are certain potential areas/ locations for making storage structures that will support agricultural activities. Such structures are described further in the report.

1.1.3 Recharge structures (ENB, SSB)

There are no existing recharge structures like Earthen Nala Bund or Sub Surface bunds in Dongarwadi habitation. But, there are certain potential areas/ locations for making recharge structures. It is described further in the report.

According to status assessment of existing assets and field study, Dongarwadi habitation consists of four wells and one Budka, the habitation experiences stress of availability and accessibility post February for almost four months a year. It is dependent on tanker water for these months even though there is a source available with water that is located 900m away from habitation and has an altitude/elevation difference of 65m.

1.2 Validation of PRA data for drinking water

PRA data was collected by team Aroehan in the year 2017-18.

Table 2: PRA data of Dongarwadi habitation

Source	Type of well	Water Availability	Water Accessibility	Water Quality	Stress Category
Well 1 (Borichi well)	Primary	3	1	1	AvH (High stress of availability)
Well 2 (Bandel well)	Tertiary	2	1	2	QAvH (High stress of Quality and Availability)
Well 3	Primary	1	1	1	No stress

Note- 1: Low, 2: Medium, 3: High

Table 2 shows the data collected during PRA. According to PRA data, Dongarwadi habitations comes under 'Stress of Availability' category. But the baseline data states that the habitation of stress of accessibility and availability.

1.3 Need assessment of Dongarwadi Habitation

Section 1.1 indicates the available assets in the habitation and its current status. The summary indicates dependency on external sources of water during peak/ summer months.

1.3.1 Current requirement for water

This section is quantification of current water needs for various purposes

- **Drinking water demand**

For rural areas, according to NRDWP, 20 - 40 LPCD is adequate quantity with acceptable quality is available if within 200m from habitation. Then the habitation is under no stress.

Quantification = Population*lpd demand

For Dongarwadi Habitation that has a population of 159 and considering 30 LPCD as demand,

Drinking water demand = 159×30 LPCD

= 4770 LPCD

- **Livestock water demand**

Adequate quantity (20 lpcd) of water available within 500 m from habitation. (No. of cattle/goat are estimated from habitation survey). Dongarwadi habitation had an average 1 goat/ household¹, there are 33 cattle/goat.

Quantification = Population*lpd demand

Dongarwadi Habitation has 33 cattle/goat and 20 LPCD demand,

Drinking water demand = 33×20 LPCD

= 660 LPCD

- **Institutional water demand**

Institutional demand comprises of demand for PHC, Sub center, Schools, Anganwadi, Ashram school etc. For institutes apart from Ashram schools, approx. 20 lpcd water should be available within boundary of institute, for Ashram school per capita demand would be 40 lpcd.

Dongarwadi habitation has one Z.P. school with 32 students and 2 faculties. Also, it has one Anganwadi, but that lacks a separate building and thus no separate provisions for water are made.

Quantification = Population*lpd demand

Dongarwadi habitation has 34 institutional population

Institutional demand = 34×20 LPCD

= 680 LPCD

The total current water demand for Dongarwadi habitation comes to 6110 LPCD

1.3.2 Forecasted requirement for drinking water

Any ground water structure is designed at least for a duration of 20 years and surface water structure is designed for 30 years, thus before designing any structure population should be forecasted. There are various methods for forecasting such as arithmetic increase, geometric increase or incremental increase.

Due to lack of such data at habitation level, an average of 15% rise in population can be considered (based on average increase)

Quantification = Population*lpd demand*15%

Current population of Dongarwadi habitation is 6110 LPCD

Institutional demand = $6110 \times 15\%$ LPCD

= 7027 LPCD

1.4 Intervention Planning Dongarwadi Habitation

There are a list of interventions that can considered for providing adequate amount of water for drinking, domestic and institutional purpose. Intervention planning can be four possible ways- repair of existing source/recharge structure, water accessibility, water availability, and improvising the quality of water.

¹ An assumption based on a Report on 19th Livestock Census – 2012 Maharashtra State Commissionerate of Animal Husbandry, PUNE

The first priority can be given to the repair of existing assets, second is to make available water accessibility, the third can be by making recharge/ storage structures for making water available and lastly if water is accessible and available, priority can be given to quality of water.

1.4.1 Repair work– Source or recharge structure

From Table 1 we can extract the physical conditions of various wells. Out of that, the repairable wells should be given priority.



Figure 4: Partial damage in PDW1 well parapet wall



Figure 5: Depleted condition of Parapet wall, Waterproofing layer, Platform of PDW4 well

Figure 4 and Figure 5 shows the condition of wells that need repair. The severity of the damage of these assets can be checked verified by the engineers of the relevant department and accordingly measures can be taken.

1.4.2 Accessibility

For making available water accessible, pumping can be a possible solution. In case of Dongarwadi habitation, there is a perennial source (PDW4) available at a distance of 900m, to reduce the stress of accessibility and to make water available, water can be pumped from this well to a higher elevation in close proximity to habitation.

1.4.3 Availability

For making water available, either source strengthening in form of recharge structure can be carried out or new assets or structures can be constructed. It is crucial to identify the location of new assets. In Dongarwadi, we carried out transect walk with habitants of habitation and identified the possible locations for new assets such as Cordon, Budka and CNB. The possible locations are shown in Figure 6

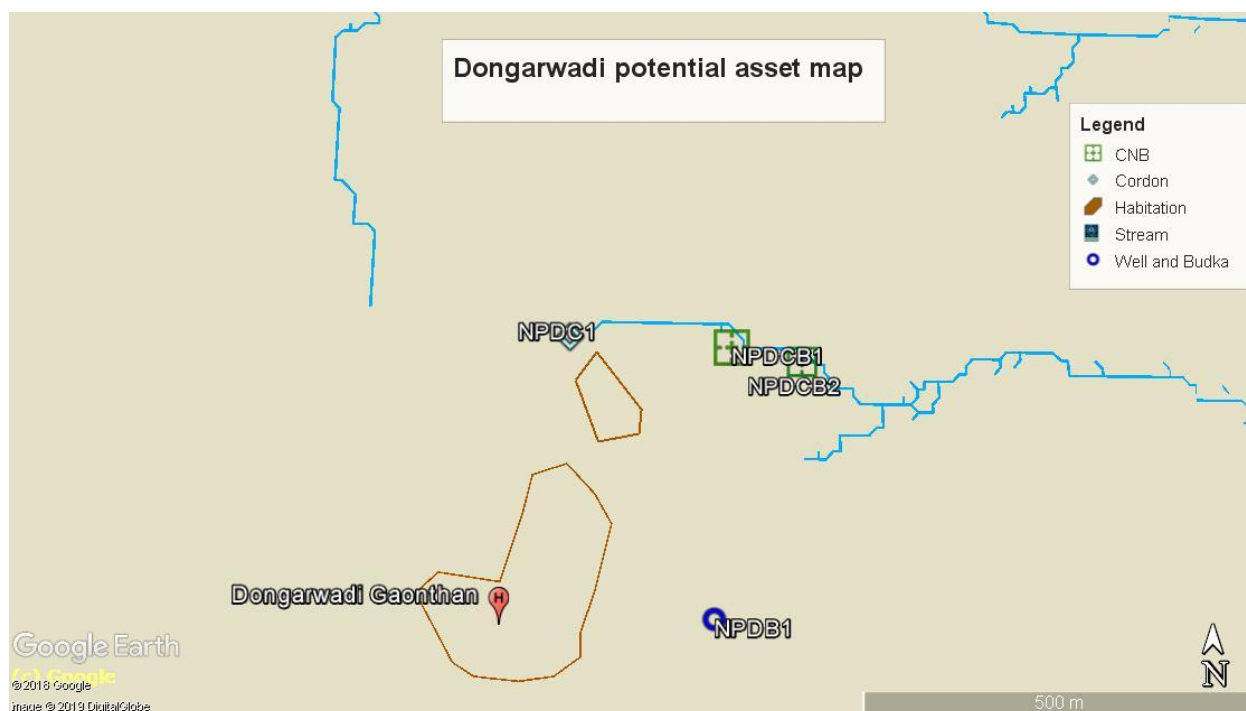


Figure 6: Potential location for new assets in Dongarwadi habitation

The locations of these assets can be further verified by following a standard norms and procedure.

Table 3: Potential location for new assets in Dongarwadi Habitation

Asset Code	Location	Distance
Code-Refer note	Latitude and longitude	From habitation in meters
NPDB1	In periphery (Lat- 19°46'39.77"N, Long- 73°21'37.43"E)	300m
NPDC1	Near Habitation (Lat- 19°46'51.01"N, Long- 73°21'31.30"E)	100m from peripheral habitation and 400m from main habitation
NPDCB1	In close proximity (Lat- 19°46'50.69"N, Long- 73°21'38.34"E)	500m
NPDCB2	In close proximity (Lat- 19°46'50.15"N, Long- 73°21'41.47"E)	550m
Notes:		
Asset Code: New+ Village name (Pathardi) + Habitation Name (Dongarwadi) + Asset Name (CNB/ENB) + Asset Number (1, 2....)		

Table 3 provides the details of possible location of new assets for making water accessible.

1.4.4 Quality

Once the water is available and accessible, quality can be taken care of. Quality of water can be tested by checking biological contamination, rare earth metals, TDS, etc. and based on these suitability of usage of water can be identified.

2. Status assessment of water assets and need analysis of Bhairobhachiwadi Habitation

Bhairobhachiwadi habitation is also known as Dhindewadi. This habitation is scattered at two locations, for distinguishing them named as Bhairobhachiwadi A and B. The habitation is located approx 25kms away from Mokhada and 10kms from Khodala. It is well connected with Khodala and Mokhada by an all-weather road. According to NRDWP, the total population is 190 and the number of Households are 40.

There is a Zilla Parishad school within the habitation upto 5th standard. For further education students travel to either Khodala (10kms) or Adoshi (6.5kms) villages. Currently, 2 teachers and 30 students are enrolled in the school.

2.1 Baseline data collection

Bhairobhachiwadi habitation consists of two drinking water assets, and no storage or recharge structures.

2.1.1 Drinking water assets (Well, hand pump, PWS, cordon)

The habitation is located at an altitude of 242m. The habitation is scattered at two locations (for easy of understanding we call it Bhairobhachiwadi-A & B) and only Bhairobhachiwadi-B has water source available. Bhairobhachiwadi-A has a ground water Budka (earthen well) that dries up after 2-3 months after monsoon. There are two wells in Bhairobhachiwadi-B that are in close proximity (within 150m) of habitation. There are no hand pumps, PWS or cordon available.

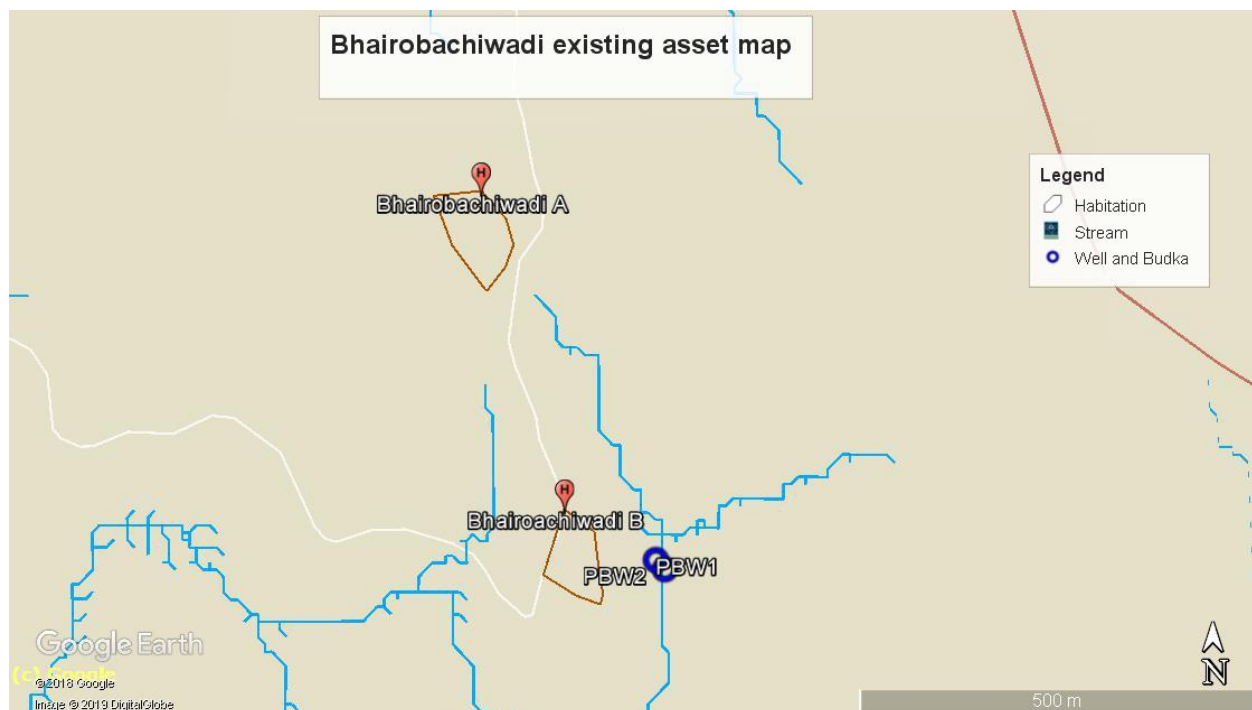


Figure 7: Existing drinking water assets of Bhairobhachiwadi Habitation

Figure 7 shows all the existing drinking and domestic water assets of the habitation. It also shows the seasonal streams prevailing in the habitation along with an indicative habitation boundary.

Table 4: Existing drinking and domestic water assets of Bhairobhachiwadi Habitation

Asset Name	Physical condition	Dimension	Water Availability	Current water level	Accessibility			Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	(Dia* Depth) in meter	Till which month	Below ground level in meters	Distance from habitation	Elevation	Condition of approach road	Ok/Not ok and people's perception	Usage for drinking/ domestic. Dependency (No. HH)
PBW1	Good (Physically intact) Repair- A	7.3m*6.7m	12 months		100m from Bhairobhachiwadi-B, 650m from Bhairobhachiwadi-A	222m	Kuccha road		Both Drinking and Domestic. 100% HH
PBW2 Private well	Good (Physically intact)	6.9m* 7.1m	12 months		175m from Bhairobhachiwadi-B, 725m from Bhairobhachiwadi-A	221m	Kuccha road	Not okay	Drinking
Notes:									
Asset Code: Village name (Pathardi) + Habitation Name (Bhairobhachiwadi) + Asset Name (Well/Budka) + Asset Number (1, 2...)									
Physical condition parameters: A- Parapet wall, B- Waterproofing layer yes/no, C- Platform									

Table 4 gives list of all the existing assets in the Bhairobhachiwadi habitation along with the distance of each asset, its usage and dependency.

2.1.2 Agriculture water (Storage structures- CNB, ENB, Farm pond, storage tank)

There are no existing storage structures like CNB/ENB or Farm ponds in Bhairobhachiwadi habitation. The habitation population is dependent only on rain fed agriculture- only one crop a year (Kharif).

There are certain potential areas/ locations for making storage structures that will support agricultural activities. Such structures are described further in the report.

2.1.3 Recharge structures (ENB, SSB)

There are no existing recharge structures like Earthen Nala Bund or Sub Surface bunds in Bhairobhachiwadi habitation. There was one ENB found in broken condition.

According to status assessment of existing assets and field study, Bhairobhachiwadi habitation consists of two wells and one Budka, a part of habitation (Bhairobhachiwadi-A) experiences stress of availability and accessibility post December for almost six months a year. Bhairobhachiwadi-A is dependent on water sources of Bhairobhachiwadi-B for these months even though there is a source available but that dries up.

2.2 Validation of PRA data for drinking water

PRA data was collected by team Aroehan in the year 2017-18.

Table 5: PRA data of Bhairobhachiwadi habitation

Source	Type of well	Water Availability	Water Accessibility	Water Quality	Stress Category
Well 1 (Patlanchi well)	Primary	1	2	1	AcL (Low stress of Accessibility)
Well 2 (Dhidenchi well)	Primary	1	2	1	AcL (Low stress of Accessibility)

Note- 1: Low, 2: Medium, 3: High

Table 5 shows the data collected during PRA. According to PRA data, Bhairobhachiwadi habitations comes under 'Stress of Availability' category. But the baseline data states that one part of habitation (Bhairobhachiwadi-A) is under high stress of accessibility and availability

2.3 Need assessment of Bhairobhachiwadi Habitation

Section 2.1 indicates the available assets in the habitation and its current status. The summary indicates dependency on external sources of water during peak/ summer months.

2.3.1 Current requirement for water

This section is quantification of current water needs for various purposes

- **Drinking water demand**

For rural areas, according to NRDWP, 20 - 40 LPCD is adequate quantity with acceptable quality is available if within 200m from habitation. Then the habitation is under no stress.

Quantification = Population*lpcd demand

Bhairobhachiwadi Habitation has a population of 190 and considering 30 LPCD as demand,

Drinking water demand = 190 x 30
= 5700 LPCD

- **Livestock water demand**

Adequate quantity (20 lpcd) of water available within 500 m from habitation. (No. of cattle/goat are estimated from habitation survey). Bhairabhachiwadi habitation had an average 1 goat/ household², thus there are 40 cattle/goat.

Quantification = Population*lpcd demand

Bhairabhachiwadi Habitation has 40 cattle/goat and 20 LPCD demand,

Drinking water demand = 40×20 LPCD
= 800 LPCD

- **Institutional water demand**

Bhairabhachiwadi habitation has one Z.P. school with 30 students and 2 faculties. Also, it has one Anganwadi, but that lacks a separate building and thus no separate provisions for water are made.

Quantification = Population*lpcd demand

Bhairabhachiwadi habitation has 32 institutional population

Institutional demand = 32×20 LPCD
= 640 LPCD

The total current water demand for Bhairabhachiwadi habitation comes to 7140 LPCD

2.3.2 Forecasted requirement for drinking water

Any ground water structure is designed at least for a duration of 20 years and surface water structure is designed for 30 years, thus before designing any structure population should be forecasted. There are various methods for forecasting such as arithmetic increase, geometric increase or incremental increase.

Due to lack of such data at habitation level, an average of 15% rise in population can be considered (based on average increase)

Quantification = Population*lpcd demand*15%

Current population of Bhairabhachiwadi habitation is 7140 LPCD

Institutional demand = $7140 \times 15\%$ LPCD
= 8211 LPCD

2.4 Intervention Planning Bhairabhachiwadi Habitation

There are a list of interventions that can considered for providing adequate amount of water for drinking, domestic and institutional purpose. Intervention planning can be four possible ways- repair of existing source/recharge structure, water accessibility, water availability, and improvising the quality of water. The first priority can be given to the repair of existing assets, second is to make available water accessibility, the third can be by making recharge/ storage structures for making water available and lastly if water is accessible and available, priority can be given to quality of water.

2.4.1 Repair work– Source or recharge structure

From Table 4 we can extract the physical conditions of various wells. Out of that, the repairable wells should be given priority.

² An assumption based on a Report on 19th Livestock Census – 2012 Maharashtra State Commissionerate of Animal Husbandry, PUNE

2.4.2 Accessibility

For making available water accessible, pumping can be a possible solution. In case of Bhairabhachiwadi habitation, there is stress of accessibility for one part of the habitation (Bhairabhachiwadi-A). There is a perennial source (PBW1) available at a distance of 650m, to reduce the stress of accessibility and to make water available, water can be pumped from this well to a higher elevation in close proximity to other part of the habitation (Bhairabhachiwadi-A).

2.4.3 Availability

For making water available, either source strengthening in form of recharge structure can be carried out or new assets or structures can be constructed. It is crucial to identify the location of new assets. In Bhairabhachiwadi, we carried out transect walk with habitants of habitation and identified the possible locations for new well in Bhairabhachiwadi-A. The location consist of already existing earthen well, that dries up after monsoon. Such wells can be identified and revived if falling under standard norms.

2.4.4 Quality

Once the water is available and accessible, quality can be taken care of. Quality of water can be tested by checking biological contamination, rear earth metals, TDS, etc. and based on these suitability of usage of water can be identified.



Figure 8: Water quality of PBW2 well



Figure 9: Water quality of PBW1 well

Figure 8 and Figure 9 shows the visual quality of water in both wells of the habitation

3. Status assessment of water assets and need analysis of Ramwadi Habitation

Ramwadi habitation is also known as Naviwadi and is the newest habitation in Pathardi Village. According to NRDWP (2018), Ramwadi and Naviwadi are two separate habitations; but, on the ground there is only one continuous habitation named Ramwadi. The habitation is located approx. 25kms away from Mokhada and 10kms from Khodala. It is well connected with Khodala and Mokhada by an all-weather road. According to NRDWP, the total population is 179 and the number of Households are 35. The habitation and surrounding area is covered by forest land. All households were landless and Van Patta of 300 m² per household was given

There are no school nor Anganwadi in the habitation, it is dependent on Patilpada for the same. For further education students travel to either Khodala (10kms) or Adoshi (6.5kms) villages.

3.1 Baseline data collection

Ramwadi habitation consists of two drinking water assets, and one storage/ recharge structures.

3.1.1 Drinking water assets (Well, hand pump, PWS, cordon)

The habitation is located at an altitude of 198 m. There is one well and one budka in Ramwadi that is within the habitation. There are no hand pumps, PWS or cordon available.

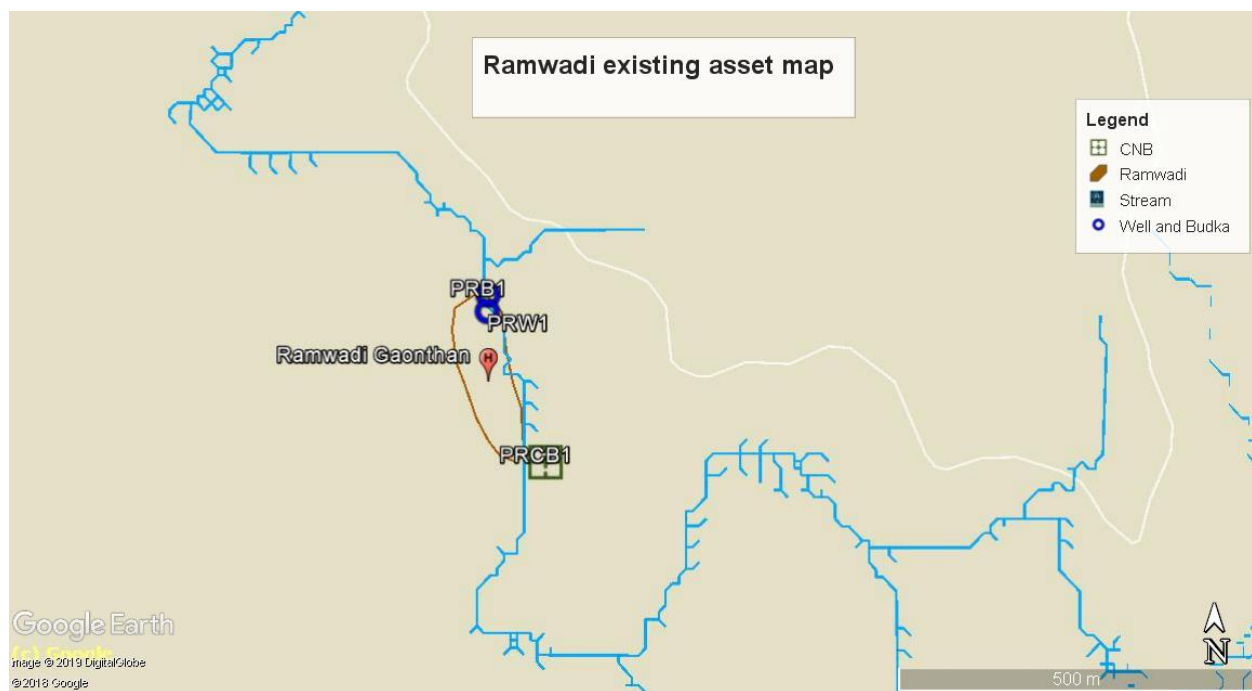


Figure 10: Existing drinking water assets of Ramwadi Habitation

Figure 10 shows all the existing drinking and domestic water assets of the habitation. It also shows the seasonal streams prevailing in the habitation along with an indicative habitation boundary.

Table 6: Existing drinking and domestic water assets of Ramwadi Habitation

Asset Name	Physical condition	Dimension	Water Availability	Current water level	Accessibility			Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	(Dia* Depth) in meter	Till which month	Below ground level in meters	Distance from habitation	Elevation	Condition of approach road	Ok/Not ok and people's perception	Usage for drinking/ domestic. Dependency (No. HH)
PRW1	Good (Physically intact)	8.1m*8.3m	Till March		120m	195m	Pucca road	OK	Both Drinking and Domestic. 100% HH
PRB1	Good (Physically intact)	2.5m*3.8m	Till Jan		140m	195m	Pucca road	OK	animals and Domestic. 100% HH
Notes:									
Asset Code: Village name (Pathardi) + Habitation Name (Ramwadi) + Asset Name (Well/Budka) + Asset Number (1, 2...)									
Physical condition parameters: A- Parapet wall, B- Waterproofing layer yes/no, C- Platform									

Table 6 gives list of all the existing assets in the Ramwadi habitation along with the distance of each asset, its usage and dependency.

3.1.2 Agriculture water (Storage structures- CNB, ENB, Farm pond, storage tank)

There is one storage structures -Cement Nala Bund in close proximity (160 m) to habitation and the water is used for domestic purpose. The habitation population is dependent only on rain fed agriculture- only one crop a year (Kharif).

Table 7: Existing storage structures in Ramwadi Habitation

Asset Name	Physical condition	Type	Dimension	Water Availability	Max Backwater length	Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	Vented/ Normal/ KT Wier	(L*H) in meter	Till which month	In meter	Ok/Not ok and people's perception	Usage (domestic/A griculture/ Recharge) and Is there direct use (Nos of Beneficiary)
PRCB1 Aroehan (2013-14)	Good (Physically intact)	Vented (1 vent)	22*1.15, C.L. = 0.85 m	12 months	100-150m	OK	Domestic, animal and brick making
Notes:							
Asset Code: Village name (Pathardi)+ Habitation Name(Ramwadi)+ Asset Name(CNB/ENB)+ Asset Number							
Physical condition parameters: A- Main body, B- Flank wall, C- Wing wall							

Table 7 gives list of all the existing storage structures in the Ramwadi habitation along with the distance of each asset, its usage and dependency.

3.1.3 Recharge structures (ENB, SSB)

There are no existing recharge structures like Earthen Nala Bund or Sub Surface bunds in Ramwadi habitation.

According to status assessment of existing assets and field study, Ramwadi habitation consists of one well and one Budka, and the main well depletes in the month of march, thus thereafter habitants experiences stress of availability for remaining three months. For these months the habitants have to travel to nearby habitation- Patilpada that is approx. 400m away.

3.2 Validation of PRA data for drinking water

PRA data was collected by team Aroehan in the year 2017-18.

Table 8: PRA data of Ramwadi habitation

Source	Type of well	Water Availability	Water Accessibility	Water Quality	Stress Category
Well1 (Hohalachi Well)	Primary	1	3	1	AcH (High stress of Availability)

Note- 1: Low, 2: Medium, 3: High

Table 8 shows the data collected during PRA. According to PRA data, Ramwadi habitations comes under 'high stress of availability' category

3.3 Need assessment of Ramwadi Habitation

Section 3.1 indicates the available assets in the habitation and its current status. The summary indicates dependency on external sources of water during peak/ summer months.

3.3.1 Current requirement for water

This section is quantification of current water needs for various purposes

- **Drinking water demand**

For rural areas, according to NRDWP, 20 - 40 LPCD is adequate quantity with acceptable quality is available if within 200m from habitation. Then the habitation is under no stress.

Quantification = Population*lpcd demand

Ramwadi Habitation has a population of 179 and considering 30 LPCD as demand,

Drinking water demand = 179×30
= 5370 LPCD

- **Livestock water demand**

Adequate quantity (20 lpcd) of water available within 500 m from habitation. (No. of cattle/goat are estimated from habitation survey). Ramwadi habitation had an average 1 cattle/ household³, thus there are 35 cattle/goat.

Quantification = Population*lpcd demand

Ramwadi Habitation has 35 cattle/goat and 20 LPCD demand,

Drinking water demand = 35×20 LPCD
= 700 LPCD

- **Institutional water demand**

Ramwadi habitation has no school or anganwadi, both are located in the nearby habitation (300-400m away).

The total current water demand for Ramwadi habitation comes to 6070 LPCD

³ An assumption based on a Report on 19th Livestock Census – 2012 Maharashtra State Commissionerate of Animal Husbandry, PUNE

3.3.2 Forecasted requirement for drinking water

Any ground water structure is designed at least for a duration of 20 years and surface water structure is designed for 30 years, thus before designing any structure population should be forecasted. There are various methods for forecasting such as arithmetic increase, geometric increase or incremental increase.

Due to lack of such data at habitation level, an average of 15% rise in population can be considered (based on average increase)

Quantification = Population*lpd demand*15%

Current population of Ramwadi habitation is 6070 LPCD

Institutional demand = 6070x 15% LPCD

= 6981 LPCD

3.4 Intervention Planning Ramwadi Habitation

There are a list of interventions that can considered for providing adequate amount of water for drinking, domestic and institutional purpose. Intervention planning can be four possible ways- repair of existing source/recharge structure, water accessibility, water availability, and improvising the quality of water. The first priority can be given to the repair of existing assets, second is to make available water accessibility, the third can be by making recharge/ storage structures for making water available and lastly if water is accessible and available, priority can be given to quality of water.

3.4.1 Repair work– Source or recharge structure

From Table 6 we can extract the physical conditions of various wells. Out of that, the repairable wells should be given priority.

3.4.2 Accessibility

For making available water accessible, pumping can be a possible solution.

3.4.3 Availability

For making water available, either source strengthening in form of recharge structure can be carried out or new assets or structures can be constructed. It is crucial to identify the location of new assets. In case of Ramwadi, the water is available only till the month of March, post March habitants have to travel to neighboring habitation for water.

3.4.4 Quality

Once the water is available and accessible, quality can be taken care of. Quality of water can be tested by checking biological contamination, rear earth metals, TDS, etc. and based on these suitability of usage of water can be identified.

4. Status assessment of water assets and need analysis of Patilpada Habitation

Patilpada habitation is also known as Khalchi Pathardi. It is located adjacent to Pinjal River and near Ramwadi habitation. The habitation is located approx. 20kms away from Mokhada and 10kms from Khodala. It is well connected with Khodala and Mokhada by an all-weather road. According to NRDWP, the total population is 137 and the number of Households are 29.

Patilpada habitation has one Z.P. school. It is a primary and middle school, 1st to 8th standard. The school has 8 standards, but only 3 class rooms and 4 teachers are available. Total strength of school is 132 currently. Number of students in 1st to 5th class is lower as compared to 6th - 8th class. There are no middle schools in the close proximity, therefore students from 5-6 nearby habitation come to this school namely Markadwadi, Belpada, Botoshi, Bhojpada, Bhuritek, khalchi Pathardi and Ramwadi. For further education students travel to either to Nandgaon, or Adoshi (7 kms), or Khodala (10kms) villages.

4.1 Baseline data collection

Patilpada habitation consists of four drinking water assets, and five storage/ recharge structures.

4.1.1 Drinking water assets (Well, hand pump, PWS, cordon)

The habitation is located at an altitude of 200m. There are two wells and two budkas in this habitation that are located in close proximity (within 500m) to habitation.

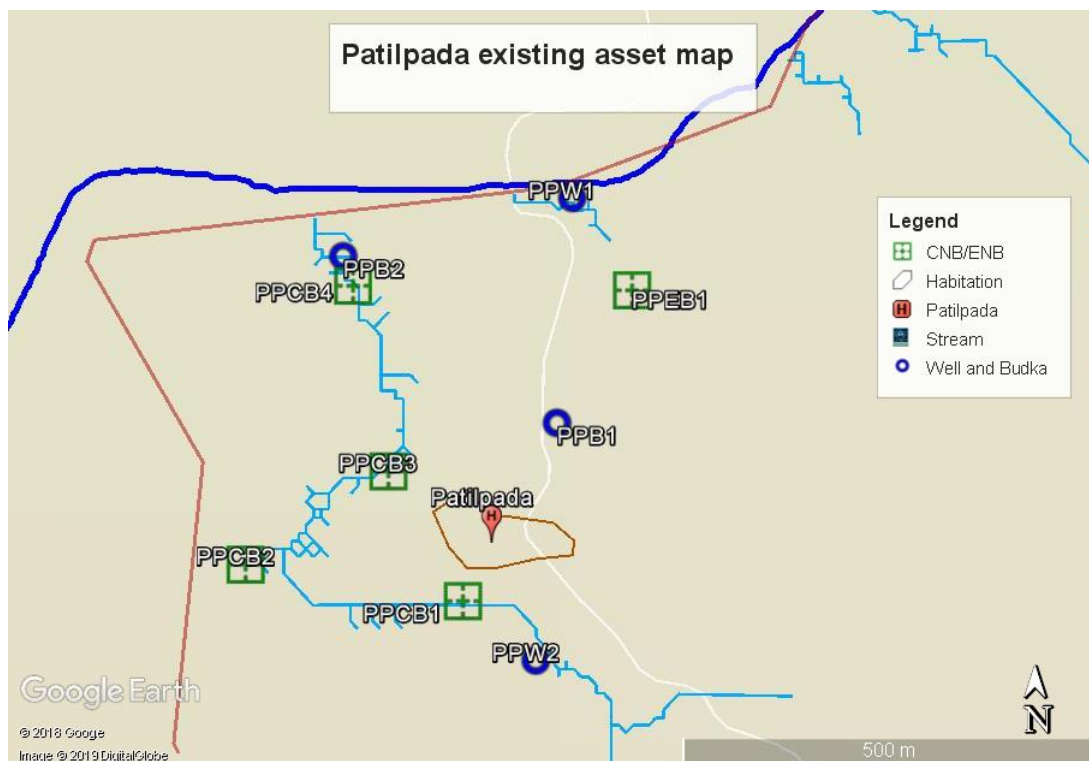


Figure 11: Existing drinking water assets of Patilpada Habitation

Figure 11 shows all the existing drinking and domestic water assets of the habitation. It also shows the seasonal streams prevailing in the habitation along with an indicative habitation boundary.

Table 9: Existing drinking and domestic water assets of Patilpada Habitation

Asset Name	Physical condition	Dimension	Water Availability	Current water level	Accessibility			Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	(Dia* Depth) in meter	Till which month	Below ground level in meters	Distance from habitation	Elevation	Condition of approach road	Ok/Not ok and people's perception	Usage for drinking/ domestic. Dependency (No. HH)
PPW1	Good (physically intact)	5.7m*6.0m	12 months		500m	178m	Kutcha road	Okay	Drinking and Institutional
PPB1	Depleted	3.9m*4.6m	Till December		215m	194m	Kutcha road	Okay	Drinking during monsoon
PPW2	Good (physically intact)	6.1m*7.5m	Till March		235m	196m	Kutcha road	Okay	Drinking and domestic
PPB2	Depleted	3.8m*2.9m	Till March		460m	178m	Kutcha road		animal and domestic
Notes:									
Asset Code: Village name (Pathardi) + Habitation Name (Patilpada) + Asset Name (Well/Budka) + Asset Number (1, 2...)									
Physical condition parameters: A- Parapet wall, B- Waterproofing layer yes/no, C- Platform									

Table 9 gives list of all the existing assets in the Patilpada habitation along with the distance of each asset, its usage and dependency.

4.1.2 Agriculture water (Storage structures- CNB, ENB, Farm pond, storage tank)

There is one storage structures -Cement Nala Bund in close proximity (160 m) to habitation and the water is used for domestic purpose. The habitation population is dependent only on rain fed agriculture- only one crop a year (Kharif).

Table 10: Existing storage structures in Patilpada Habitation

Asset Name	Physical condition	Type	Dimension	Water Availability	Max Backwater length	Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	Vented/ Normal/ KT Wier	(L*H) in meter	Till which month	In meter	Ok/Not ok and people's perception	Usage (domestic/Agriculture/ Recharge) and Is there direct use (Nos of Beneficiary)
PPCB1	Good (Physically intact)	Vented (4 vents)	20.4m*1.75 m	Till march			Agriculture and Domestic
PPCB2	Broken. Damaged- A	Normal	38.0m*2.8m				Agriculture
PPCB3	Leaky. Damaged	Normal	23.0m*5.0m				Agriculture
PPCB4	Leaky. Damaged	Normal	30.1m*4.5m	Till November			Agriculture
PPEB1	Broken. Damaged	Normal	30.0*4.5m	Till November			
Notes:							
Asset Code: Village name (Pathardi)+ Habitation Name(Patilpada)+ Asset Name(CNB/ENB)+ Asset Number							
Physical condition parameters: A- Main body, B- Flank wall, C- Wing wall							

Table 10 gives list of all the existing storage structures in the Patilpada habitation along with the distance of each asset, its usage and dependency.

4.1.3 Recharge structures (ENB, SSB)

There is one Earthen Nala Bund in Patilpada habitation but that is in broken condition.

According to status assessment of existing assets and field study, Patilpada habitation consists of two wells, two Budkas, four CNB and one ENB in the habitation. But Both Budka are in depleting condition and

are occasionally used. Also there are four CNB, but three are either in broken condition or are leaking and only one CNB stores water.

4.2 Validation of PRA data for drinking water

PRA data was collected by team Aroehan in the year 2017-18.

Table 11: PRA data of Patilpada habitation

Source	Type of well	Water Availability	Water Accessibility	Water Quality	Stress Category
Well 1 (Vahlachi)	1	1	3	1	AcH (High stress of Accessibility)
Well 2 (Nadichi)	1	1	2	1	AcL (Low stress of Accessibility)
Well 3 (Budkha)	1	3	2	2	AvQAcH (High Stress of Availability, Quality and Accessibility)

Note- 1: Low, 2: Medium, 3: High

Table 11 shows the data collected during PRA. According to PRA data, Patilpada habitations comes under 'Stress of Accessibility' category

4.3 Need assessment of Patilpada Habitation

Section 4.1 indicates the available assets in the habitation and its current status. The summary indicates dependency on external sources of water during peak/ summer months.

4.3.1 Current requirement for water

This section is quantification of current water needs for various purposes

- Drinking water demand**

For rural areas, according to NRDWP, 20 - 40 LPCD is adequate quantity with acceptable quality is available if within 200m from habitation. Then the habitation is under no stress.

Quantification = Population*lpd demand

Patilpada Habitation has a population of 137 and considering 30 LPCD as demand,

Drinking water demand = 137 x 30 LPCD
= 4110 LPCD

- Livestock water demand**

Adequate quantity (20 lpcd) of water available within 500 m from habitation. (No. of cattle/goat are estimated from habitation survey). Patilpada habitation had an average 1 cattle/ household⁴, thus there are 29 cattle/goat.

Quantification = Population*lpd demand

Patilpada Habitation has 29 cattle/goat and 20 LPCD demand,

⁴ An assumption based on a Report on 19th Livestock Census – 2012 Maharashtra State Commissionerate of Animal Husbandry, PUNE

$$\begin{aligned}\text{Drinking water demand} &= 29 \times 20 \text{ LPCD} \\ &= 580 \text{ LPCD}\end{aligned}$$

- **Institutional water demand**

Patilpada habitation has one Z.P. school with 132 students and 4 faculties. Also, it has one Anganwadi, but that lacks a separate building and thus no separate provisions for water are made.

$$\begin{aligned}\text{Quantification} &= \text{Population} \times \text{lpcd demand} \\ \text{Patilpada habitation has 136 institutional population} \\ \text{Institutional demand} &= 136 \times 20 \text{ LPCD} \\ &= 2720 \text{ LPCD}\end{aligned}$$

The total current water demand for Patilpada habitation comes to 7410 LPCD

4.3.2 Forecasted requirement for drinking water

Any ground water structure is designed at least for a duration of 20 years and surface water structure is designed for 30 years, thus before designing any structure population should be forecasted. There are various methods for forecasting such as arithmetic increase, geometric increase or incremental increase.

Due to lack of such data at habitation level, an average of 15% rise in population can be considered (based on average increase)

$$\begin{aligned}\text{Quantification} &= \text{Population} \times \text{lpcd demand} \times 15\% \\ \text{Current population of Patilpada habitation is 7410 LPCD} \\ \text{Institutional demand} &= 7410 \times 15\% \text{ LPCD} \\ &= 8522 \text{ LPCD}\end{aligned}$$

4.4 Intervention Planning Patilpada Habitation

There are a list of interventions that can be considered for providing adequate amount of water for drinking, domestic and institutional purpose. Intervention planning can be four possible ways- repair of existing source/recharge structure, water accessibility, water availability, and improvising the quality of water. The first priority can be given to the repair of existing assets, second is to make available water accessibility, the third can be by making recharge/ storage structures for making water available and lastly if water is accessible and available, priority can be given to quality of water.

4.4.1 Repair work– Source or recharge structure

From Table 9 and Table 10 we can extract the physical conditions of various wells and storage structures. Out of that, the repairable assets should be given priority. Figure 12 and Figure 13 show fragmented condition of a CNB, thus indicating that assets need to be carefully scrutinized before considering for repair works. Not all damaged assets can be revived through repair.



Figure 12: Damaged condition of CNB



Figure 13: Fragmented condition of CNB (PPCB2)

4.4.2 Accessibility

For making available water accessible, pumping can be a possible solution. In case of Patilpada habitation, Well (PPW1) adjacent to Pinjal River, is a perennial source of water and it is already being pumped to the school. Currently water is being pumped using electrical motor, in such cases sustainable pumping solutions can be considered.

4.4.3 Availability

For making water available, either source strengthening in form of recharge structure can be carried out or new assets or structures can be constructed. It is crucial to identify the location of new assets. In case of Patilpada, a perennial source is available at a distance of 500m and with accessibility (pumping) solutions, water can be made available.

4.4.4 Quality

Once the water is available and accessible, quality can be taken care of. Quality of water can be tested by checking biological contamination, rare earth metals, TDS, etc. and based on these suitability of usage of water can be identified.

5. Status assessment of water assets and need analysis of Varchi Pathardi Habitation

Varchi Pathardi is also called Pathardi and it is the main habitation of the village. The habitation is located approx. 20kms away from Mokhada and 10kms from Khodala. It is well connected with Khodala and Mokhada by an all-weather road. According to NRDWP, the total population is 340 and the number of Households are 72

There is a Z.P. school upto 5th standard with 35 students and 2 faculties. There is one Anganwadi in the habitation, but no separate building is provided. For further education students travel to either Khodala (10kms) or Adoshi (6.5kms) villages.

5.1 Baseline data collection

Varchi Pathardi habitation consists of five drinking water assets, and eight storage/ recharge structures.

5.1.1 Drinking water assets (Well, hand pump, PWS, cordon)

The habitation is located at an altitude of 224m. There are four wells and one budka in this habitation. Out of these three well are located in close proximity (within 500m) to habitation and other two assets are 800m to 1500m away from habitation.

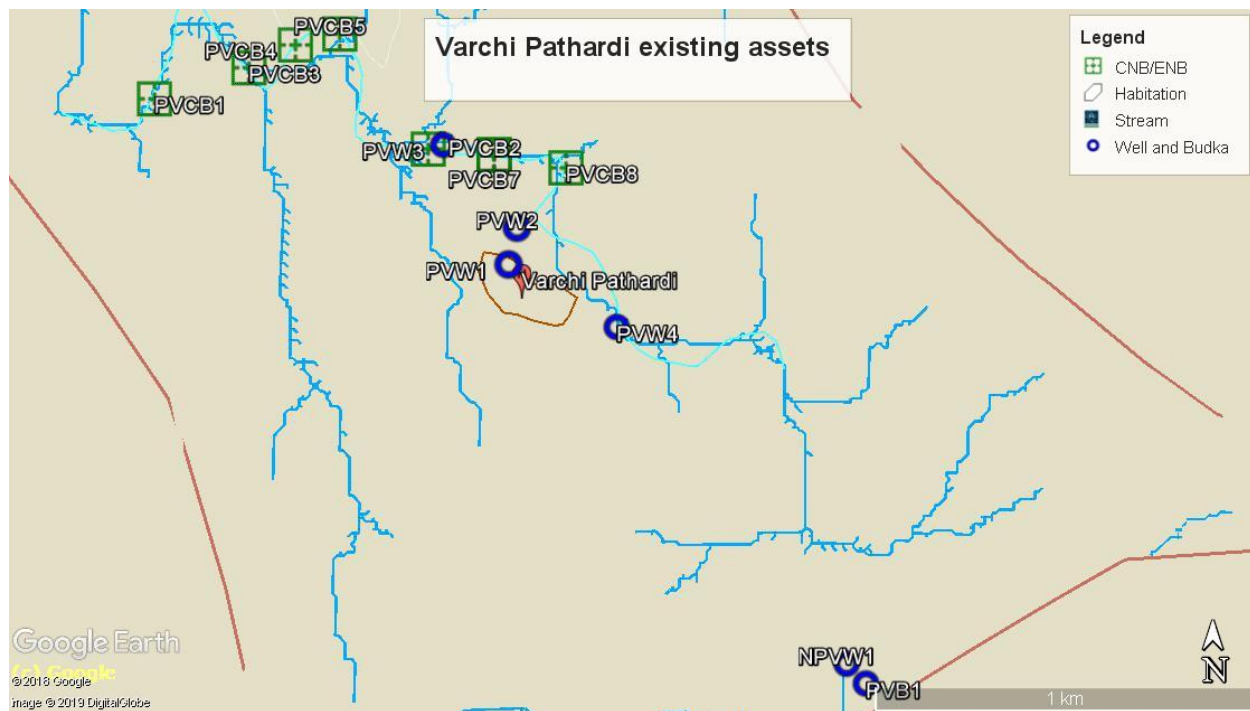


Figure 14: Existing drinking water assets of Varchi Pathardi Habitation

Figure 14 shows all the existing drinking and domestic water assets of the habitation. It also shows the seasonal streams prevailing in the habitation along with an indicative habitation boundary.

Table 12: Existing drinking and domestic water assets of Varchi Pathardi Habitation

Asset Name	Physical condition	Dimension	Water Availability	Current water level	Accessibility			Quality	Usage and Dependency
Popular name & Code-Refer note. Construction Agency and year	(Refer Note below)	(Dia* Depth) in meter	Till which month	Below ground level in meters	Distance from habitation	Elevation	Condition of approach road	Ok/Not ok and people's perception	Usage for drinking/ domestic. Dependency (No. HH)
PVW1	Good	3.0m*5.0m	Till Feb		Within habitation	222m		Okay	Drinking and domestic
PVW2	Good	6.8m*6.2m	Till March		150m	222m		Okay	Drinking water
PVW3	Good	6.1m*4.2m	Till may		800m	215m		Not Okay	
PVW4	Good	3.0M*5.5M	Till March		100m	225m		Okay	Drinking and domestic
PVB1	Good	5.6m*4.1m	12 months		1400m	242m		Okay	Drinking, domestic and agriculture (1 farmer)
Notes:									
Asset Code: Village name (Pathardi) + Habitation Name (Varchi Pathardi) + Asset Name (Well/Budka) + Asset Number (1, 2...)									
Physical condition parameters: A- Parapet wall, B- Waterproofing layer yes/no, C- Platform									

Table 12 gives list of all the existing assets in the Varchi Pathardi habitation along with the distance of each asset, its usage and dependency.

5.1.2 Agriculture water (Storage structures- CNB, ENB, Farm pond, storage tank)

There is one storage structures -Cement Nala Bund in close proximity (160 m) to habitation and the water is used for domestic purpose. The habitation population is dependent only on rain fed agriculture- only one crop a year (Kharif).

Table 13: Existing storage structures in Varchi Pathardi Habitation

Asset Name	Physical condition	Type	Dimension	Water Availability	Max Backwater length	Quality	Usage and Dependency
Popular name & Code-Refer note. Constructi on Agency and year	(Refer Note below)	Vented/ Normal/ KT Wier	(L*H) in meter	Till which month	In meter	Ok/Not ok and people's perception	Usage (domestic/A griculture/ Recharge) and Is there direct use (Nos of Beneficiary)
PVCB1 On mirza stream- Jalyukt Shivar Abhiyan	Good		20.0m*2.0 m	Till March end	50m	Color of water was found reddish during visit, that maybe due to siltation or vegetative decomposi tion	Agriculture
PVCB2 On mirza stream- Jalyukt Shivar Abhiyan	Good		22.40m*2.0m	Till March end	70m		
PVCB3 On mirza stream- MIZP	Broken and Leaking. Damaged- A,B&C		26.8m*3.0 m				
PVCB4	Good		15.5m*2.0 m	Till April	130m		For Agriculture- wadi

On mirza stream- Aroehan							
PVCB5 On mirza stream- MIZP	Moderate	KT Wier with no gates	19.65m*3.3m				
PVCB6 On mirza stream- Aroehan	Good	Vented (4 vents)	20.5m*1.4m	Till March	90m		
PVCB7	Good						
PVCB8	Under construction	Vented (4 vents)	18.15m*3.0m				
Notes:							
Asset Code: Village name (Pathardi)+ Habitation Name(Varchi Pathardi)+ Asset Name(CNB/ENB)+ Asset Number							
Physical condition parameters: A- Main body, B- Flank wall, C- Wing wall							

Table 13 gives list of all the existing storage structures in the Ramwadi habitation along with the distance of each asset, its usage and dependency.

5.1.3 Recharge structures (ENB, SSB)

There are no existing recharge structures like Earthen Nala Bund or Sub Surface bunds in Ramwadi habitation.

According to status assessment of existing assets and field study, Varchi Pathardi habitation consists of four well, one Budka, and eight CNB.

5.2 Validation of PRA data for drinking water

PRA data was collected by team Aroehan in the year 2017-18.

Table 14: PRA data of Varchi Pathardi habitation

Source	Type of well	Water Availability	Water Accessibility	Water Quality	Stress Category
Well 1 (Vahlachi)	Primary	2	1	1	AvM (Moderate stress of Availability)
Well 2 (Pulachi)	Secondary	2	1	1	AvM (Moderate stress of Availability)
Well 3 (Rastyachi)	Tertiary	2	2	2	QAvAc (High stress of Quality, Availability and Accessibility)

Note- 1: Low, 2: Medium, 3: High

Table 14 shows the data collected during PRA. According to PRA data, Varchi Pathardi habitations comes under 'Stress of availability and quality' category

5.3 Need assessment of Varchi Pathardi Habitation

Section 5.1 indicates the available assets in the habitation and its current status. The summary indicates dependency on external sources of water during peak/ summer months.

5.3.1 Current requirement for water

This section is quantification of current water needs for various purposes

- Drinking water demand**

For rural areas, according to NRDWP, 20 - 40 LPCD is adequate quantity with acceptable quality is available if within 200m from habitation. Then the habitation is under no stress.

Quantification = Population*lpcd demand

Varchi Pathardi Habitation has a population of 340 and considering 30 LPCD as demand,

Drinking water demand = 340 x 30 LPCD
= 10200 LPCD

- Livestock water demand**

Adequate quantity (20 lpcd) of water available within 500 m from habitation. (No. of cattle/goat are estimated from habitation survey). Varchi Pathardi habitation had an average 1 cattle/ household⁵, thus there are 72 cattle/goat.

Quantification = Population*lpcd demand

Varchi Pathardi Habitation has 72 cattle/goat and 20 LPCD demand,

Drinking water demand = 72 x 20 LPCD
= 1440 LPCD

- Institutional water demand**

⁵ An assumption based on a Report on 19th Livestock Census – 2012 Maharashtra State Commissionerate of Animal Husbandry, PUNE

Varchi Pathardi habitation has one Z.P. school with 35 students and 2 faculties. Also, it has one Anganwadi, but that lacks a separate building and thus no separate provisions for water are made.

Quantification = Population*lpd demand

Varchi Pathardi habitation has 35 institutional population

Institutional demand = 37×20 LPCD
= 700 LPCD

The total current water demand for Varchi Pathardi habitation comes to 12340 LPCD

5.3.2 Forecasted requirement for drinking water

Any ground water structure is designed at least for a duration of 20 years and surface water structure is designed for 30 years, thus before designing any structure population should be forecasted. There are various methods for forecasting such as arithmetic increase, geometric increase or incremental increase.

Due to lack of such data at habitation level, an average of 15% rise in population can be considered (based on average increase)

Quantification = Population*lpd demand*15%

Current population of Varchi Pathardi habitation is 6070 LPCD

Institutional demand = $12340 \times 15\%$ LPCD
= 14191 LPCD

5.4 Intervention Planning Ramwadi Habitation

There are a list of interventions that can considered for providing adequate amount of water for drinking, domestic and institutional purpose. Intervention planning can be four possible ways- repair of existing source/recharge structure, water accessibility, water availability, and improvising the quality of water. The first priority can be given to the repair of existing assets, second is to make available water accessibility, the third can be by making recharge/ storage structures for making water available and lastly if water is accessible and available, priority can be given to quality of water.

5.4.1 Repair work– Source or recharge structure

From Table 12 and Table 13 we can extract the physical conditions of various wells and storage structures. Out of that, the repairable wells should be given priority.

5.4.2 Accessibility

For making available water accessible, pumping can be a possible solution.

5.4.3 Availability

For making water available, either source strengthening in form of recharge structure can be carried out or new assets or structures can be constructed. It is crucial to identify the location of new assets.

5.4.4 Quality

Once the water is available and accessible, quality can be taken care of. Quality of water can be tested by checking biological contamination, rear earth metals, TDS, etc. and based on these suitability of usage of water can be identified.

6. Summary of Observations and Recommendations

From the discussion with the various villagers and understanding the detailed condition of water availability, accessibility and quality of the Pathardi village, here are some key conclusions that are listed with possible recommendations.

Observations

1. Drinking water need of all habitations is fulfilled by primary wells which are near the habitation that get dry in the month of November- December.
2. After that, the source of the drinking water is secondary well which is at a distance approx. 500m from the habitation and that sustains only till the month of March.
3. For last two summer months which are the most critical, there is an acute shortage of water. This need is mostly fulfilled by tankers, however tankers are also inadequate for habitants.
4. Few perennial wells are located down hills at a distance of more than a kilometer.
5. Presently, only one crop is cultivated (Kharif) and for the other months, people have to migrate to neighboring cities in search of work.
6. There are no public transport facilities available from the habitation to the taluka place and thus limits the access to education, health facilities and market.
7. There is no separate building for the Anganwadi in all habitations. Most of the Anganwadis are now function at either Anganwadi sevika's place or in the samaj mandir.

Recommendations

1. Drinking water source strengthening is the key to extend the water availability. Both the primary and secondary wells require repair, desilting.
2. There are many Cement nala bunds along the Mirza stream which need desilting.
3. CNB's with vents need proper operation and there should be person appointed to close/open the vents at right time.
4. There is a need to generate the secondary source for livelihood within the habitation to reduce migration. This can be done by identifying potential arable land around water storage structures.
5. The recommended list of interventions can be seen in Table 15.

Table 15: List of recommendations for Pathardi village

Habitation name	Possible interventions name	Location	Possible utility
Dongarwadi	CNB	In close proximity to habitation (500mt away) (Lat- 19°46'50.15"N, Long- 73°21'41.47"E)	Can be used for animals and domestic water (washing purpose)

	New well	In periphery of habitation (approx 300mt away) (Lat-19°46'39.77"N, Long-73°21'37.43"E)	Can be used for drinking and domestic purpose
	Cordon	Near Habitation (Lat-19°46'51.01"N, Long-73°21'31.30"E)	Can be used for drinking water
Bhairobhachiwadi	SPV water pumping solution	From wells PBW1 and PBW2	Water is available for 12 month and addition of pumping system can reduce stress
Patilpada	Pumping solution	on PPW1 well near Pinjal river	Can reduce the accessibility stress of habitation and can make water available throughout the year
Varchi Pathardi	New well	Lower elevation of Bhairobhachiwadi 19.79482141 73.35881969	Water is available at very low depth and has numerous Pazar and zara. Thus can be a reliable source for drinking water.

Annexures

Habitation survey form

Date: / / 2019

Habitation:

Village:

Name of Investigator:

Asset directory list

1. General Information

Elevation of gavthan:

2. No. of Households:

3. Is there any sub Centre available in the Village?

a. Within habitation (Yes/ No) _____

b. Distance from HH (in kms) _____

4. Whether located at an easily accessible area? (Yes/ No) The distance of Sub Centre (in Kms.) from the remotest village in the coverage area _____

5. Travel time to reach the Sub Centre from the remotest place in the coverage area _____

6. The distance of Sub Centre (in Kms.) from the PHC _____

7. The distance of Sub Centre (in Kms.) from the CHC _____

8. Land holding in the habitation (Estimated %):

Size of land holding	% of households
Land less	
Less than 1 acre	
1-2 acre	
More than 2 acre	

Note: Consider also Van patta (forest land)

9. Accessibility

	Yes/no	If yes, condition of the road (good/need repairs/ depleted)	If no, distance to the nearest
Access road to the habitation			
Kutchia Road			
Pucca road (please tick)			

Bitumen road	CC road			
Bus stop				
Internal road within the habitation				
		Yes/no	If yes, condition of the road (good/need repairs/depleted)	
Kutcha Road				
Pucca road (please tick)				
Bitumen road	CC road			
Are all the zones of habitation connected to the internal road			Y	N

a) Number of buses per day :

b) Private bus/Para Transit service: Y/N

Origin:

Destination:

10.Education

	Y/N	How many	If no, distance to the nearest
Primary School			
Middle School/ Secondary School			
Anganwadies/balwadies ICDS			
Private Schools			-NA-
Ashramshala			-NA-

11.Health and Sanitation(information from both School and from people)

Parameters			Yes/No
Availability of PHC/CHC/ Sub Centre			
If yes what type			-NA-
Is ASHA worker available			
If yes Name and Contact No			-NA-
Community Waste Disposal System			

Availability of drainage facilities	
Is the habitation Open Defecation Free	

12.Public Facilities and Amenities

	Y/N	How many ?	If no,distance to the nearest
Fair Price Shop (PDS)			
Milk Co-operative, Agricultural Co-operative , Credit Co-operative Society			
Poultry farm			
Bank			
Post Office			
Weekly Market			
Public toilets			
Panchayat office			
Street lights			
Veterinary Hospitals			
Police Station			
Community centre			
Street lights			
Crematorium/Burial Sites			
Parks/Children play area			
Others (specify)			

13.Industrial/ Commercial Establishments.

	Y/N	Type	How many?	If no, distance to the nearest
Mill/Small Scale Industry				

Major Industry				
Household Industry				
Motor/cycle repair shop				
Electrical / mobile /shop				
Market/Kirana Shop				
Tea stalls/ paan shop				
Pharmacy/ Medical stop				

14.Agriculture and related Activities

Main crops (by order of decreasing importance in area and value):

Main crops	Area	Whether irrigated	Number of crops per year	Where is the crop sold (if at all sold)?
1				
2				
3				
4				
5				
6				

a) Irrigation type (canal, tank, ...), , % of village lands

b) Description of most common types of land tenure (ownership, tenure, landless, etc.):

c) Main agricultural seasons and slack season.

d) Whether any labor or produce exchange.

e) Distance to the market place for the main crops

f) Other agro-based activities: plantations, forestry, dairy, poultry, fishing...

g) Husbandry in the village

A. FOREST:

Do you have access to forest resources in the vicinity? If yes,

i) What forest produce do you get/collect from the forest in various seasons of the year?

Produce	Season of collection	Nature of availability*	Hours spent in a day	Use/Purpose	
				H.H consumption	Commercial

*Scarce=1; Abundant=2. Forest Produce: Mahuda, Honey, Herbs, Fruits, Gum, Fuel Wood, Others

15.Other Activities

Handicrafts (pottery, basketry, weaving, biddies, bricks etc.)/ Others (specify):

Type	Age of worker	M/F	Estimated Income

16.Child labour:

Activity	Age	M/F	Estimated Income

17. Women's work,

Worker	Age	Estimated Income	Wage Differential M vs F
Agriculture			
Household			
Industrial			

18. Migration

(a) Migrations to other areas (harvest, labour contracts, etc.):

- i. Main destinations:
- ii. Main activities of migrants:
- iii. Duration of stay:

(b) Daily commuters and short-term mobility to near-by areas: where and who?

19. Social Welfare Program

(List, field of work, beneficiaries, Implementation and Impact) :

20. People Organization / Self Help Groups (SHG) / NGO

(List, field of work, beneficiaries, Implementation and Impact).

Status Assessment of Well

Village Name: Pathardi			Habitation Name: Dongarwadi			Habitation elevation: 386m		Nos of Households: 33			Surveyor's name:			Survey date:22/02/2019			
Asset Name	Location of asset	Along stream line	Physical condition	Dimension	Water Availability	Current water level	Accessibility			Quality	Usage		Existing recharge structure	Remarks			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Popular name & Code-Refer note. Construc tion Agency and year	(Lat & Long)	(Yes/No)	(Refer Note below)	(Dia* Depth) in meter	Till which month	Below ground level in meters	Distance from habitation	Elevation	Conditio n of approach road	Ok/Not ok and people's perceptio n	(drinking/ domestic)	Depend ency (No. HH)	(Yes/No) (If Yes, upstream / downstre am) name of the interventi on	Depth of existing rock bed	No. of zara & its directions (show in sketch form with north direction)	Is desilti ng/ cleani ng requir ed?	When was the last de-siltation done? (refer note)
PDW1 Government	Lat- 19°46'37. 97"N, Long- 73°21'31. 72"E	Yes	Good (Physically intact) Repair- A	6m*6.45m	Till January end	No water	100m	380m	Kuccha road		Both Drinking and Domestic	100%		5.45m	1		
PDW2 Govern ment	Lat- 19°46'38. 54"N, Long- 73°21'33. 75"E	Yes	Good (Physically intact)	6.1m*7.25m	Till February end	6.05m	175m	374m	Kuccha road	Not okay	Domestic and animal (It is used when water is not available in PDW1)	100%		7.25m			
PDW3 Panchay at Samiti-sondhec hivihi	Lat- 19°46'52. 02"N, Long- 73°21'34. 99"E	Yes	Good, Repair-C	6.3m*8.65m	Till February end	6.65m	500m	355m	Kuccha road	Okay	Drinking, Domestic and animal	50%		8.65m			

PDW4 Jalswar ajya	Lat- 19°47'3.9 0"N, Long- 73°21'19. 10"E	Yes	Partially damaged, Repair- A,B&C.	6.3m * 6.75m	12 months	1.75m	900m	321m	Kuccha and sloppy road	Okay	Agricultur e and Drinking water when all other wells dry						
PDB1	Lat- 19°46'51. 04"N, Long- 73°21'31. 21"E		Partially damaged, Repair- A,B&C.	2.9m * 2.0m	Only rainy season	No water	400m away from main habitation, 100 m away from adjacent habitation	367m	Kuccha road		Drinking	100% during rains		2.0m			
Notes:																	
Item 1- Asset Code: Village name+ Habitation Name+ Asset Name+ Asset Number																	
Item 4- Physical condition parameters: A- Parapet wall, B- Waterproofing layer yes/no, C- Platform																	
Item 18-Desiltation: Note last de-siltation month & year and the frequency/rate of desilting																	