

# **TD609: FIELD STAY AT MENDHI, SINNAR**

**By**

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PRA

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# Contents

## Scheme Analysis

1. Pradhan Mantri Awas Yojana- Gramin
2. Swachh Bharat Mission

## DR1

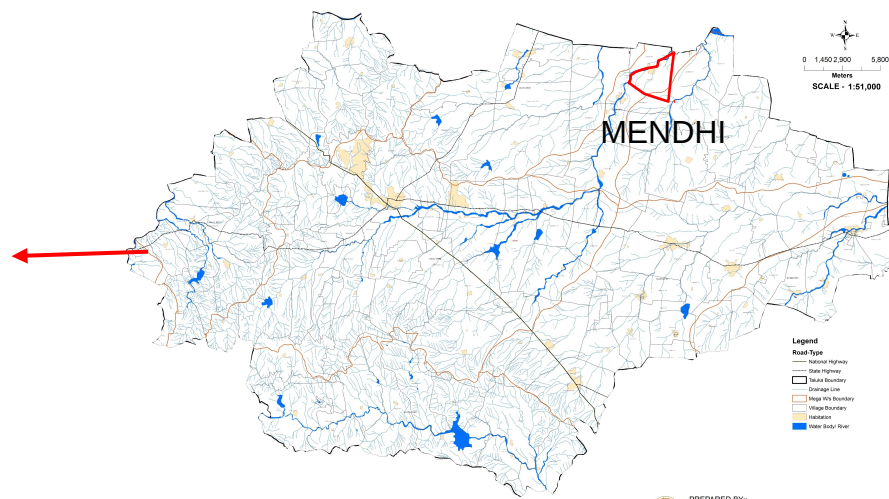
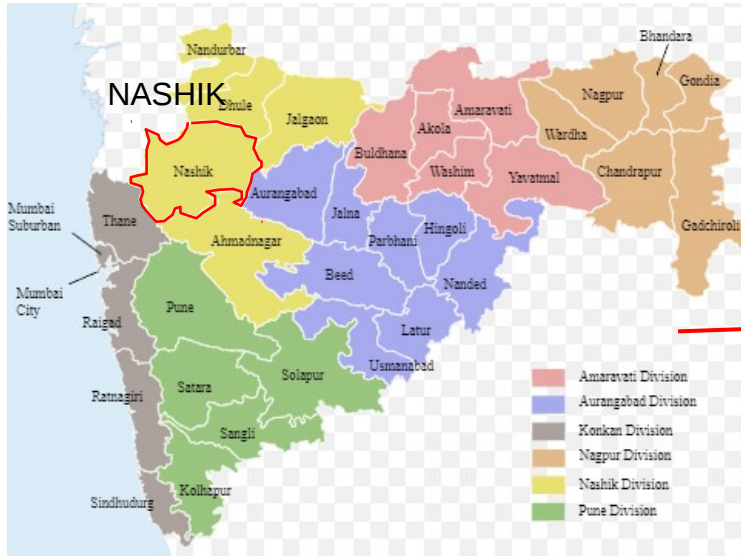
- Analysis of the operation of Kadwa and Nandurmadhyameshwar canal minors and water user association

## DR2

- Analysis of energy consumption based on crop water requirement

## Summary

# Village Profile





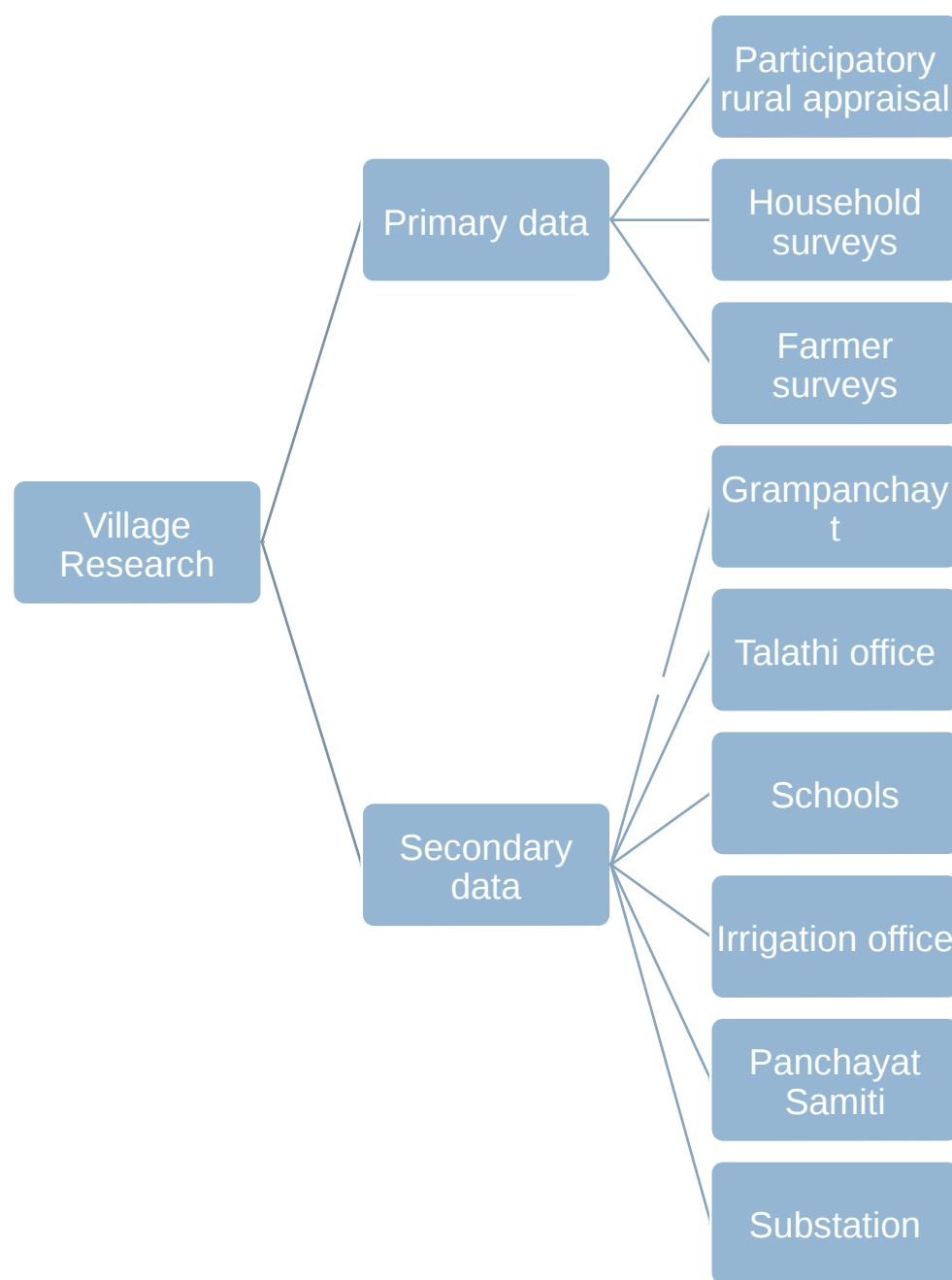
# Demographics

- Sex ratio = 961
- Child sex ratio = 932
- SC population = 5%
- ST population = 12%
- Workforce participation = 59%
- Male workforce participation = 59.57%
- Female workforce participation = 59.83%

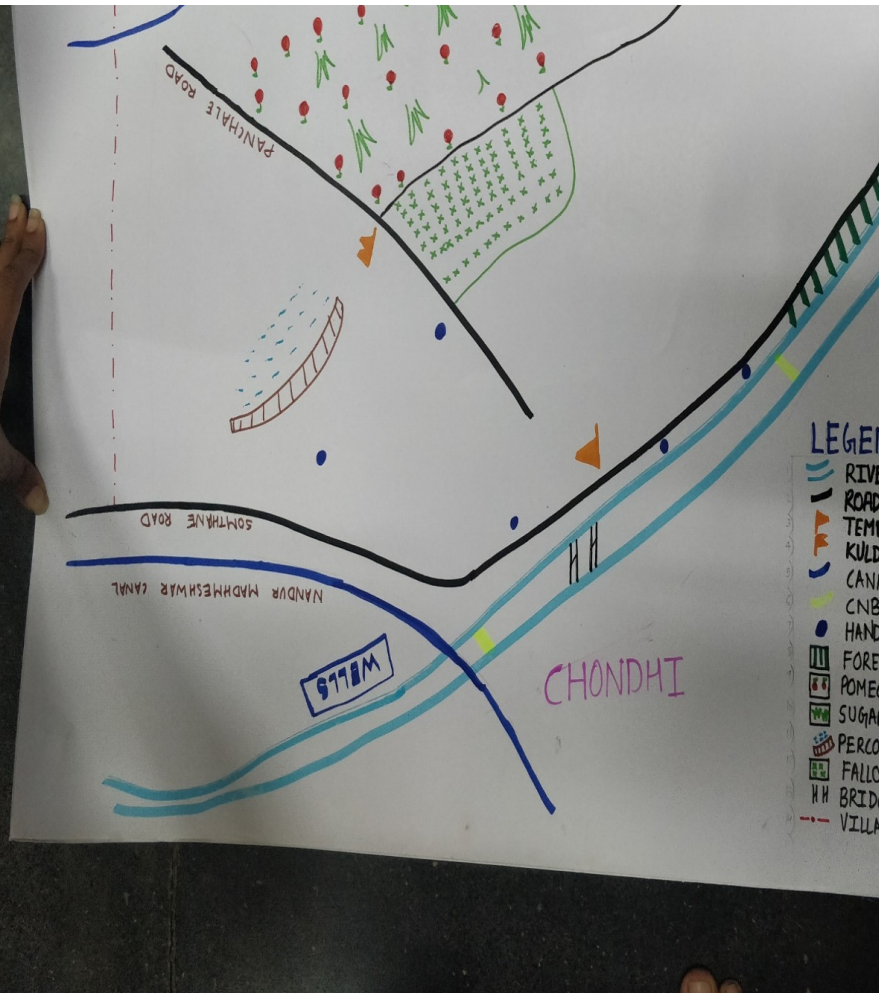
	Main		Marginal	
	Male	Female	Male	Female
Cultivators	274	249	2	10
Agri Labourers	70	87	0	4
Household industry	16	15	0	4
Other	27	6	2	0
Total	744		22	



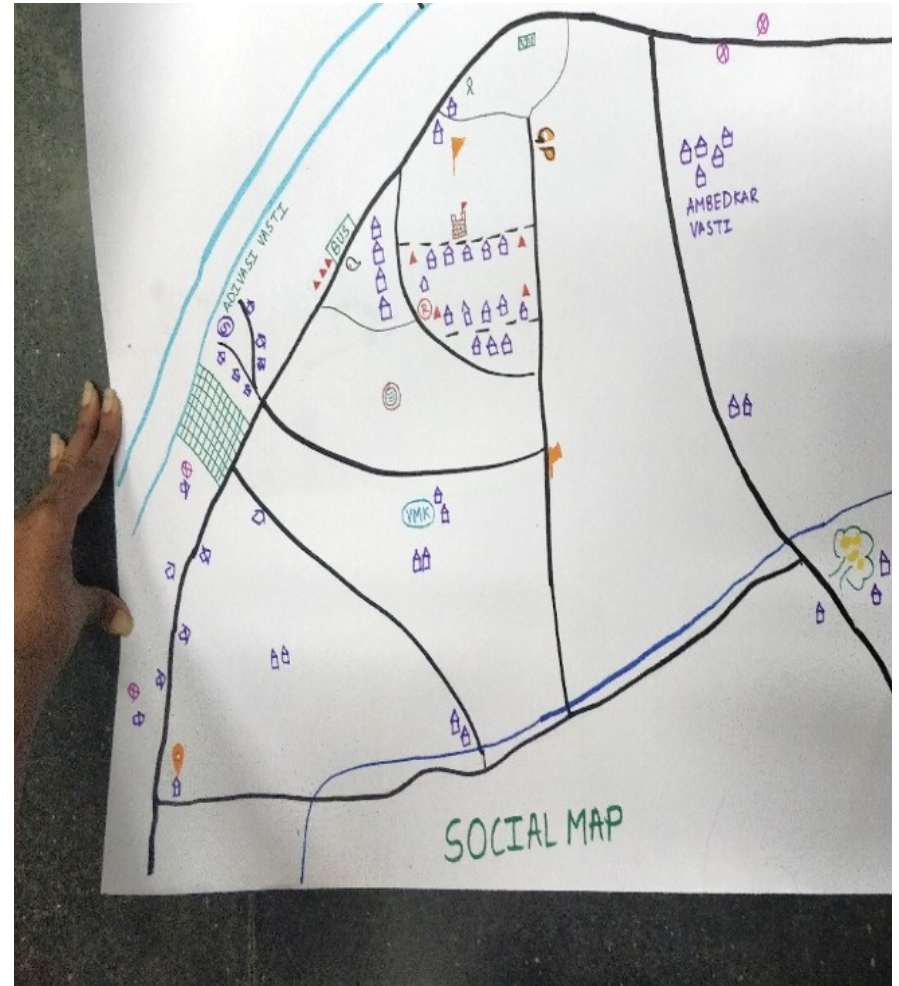
# Method



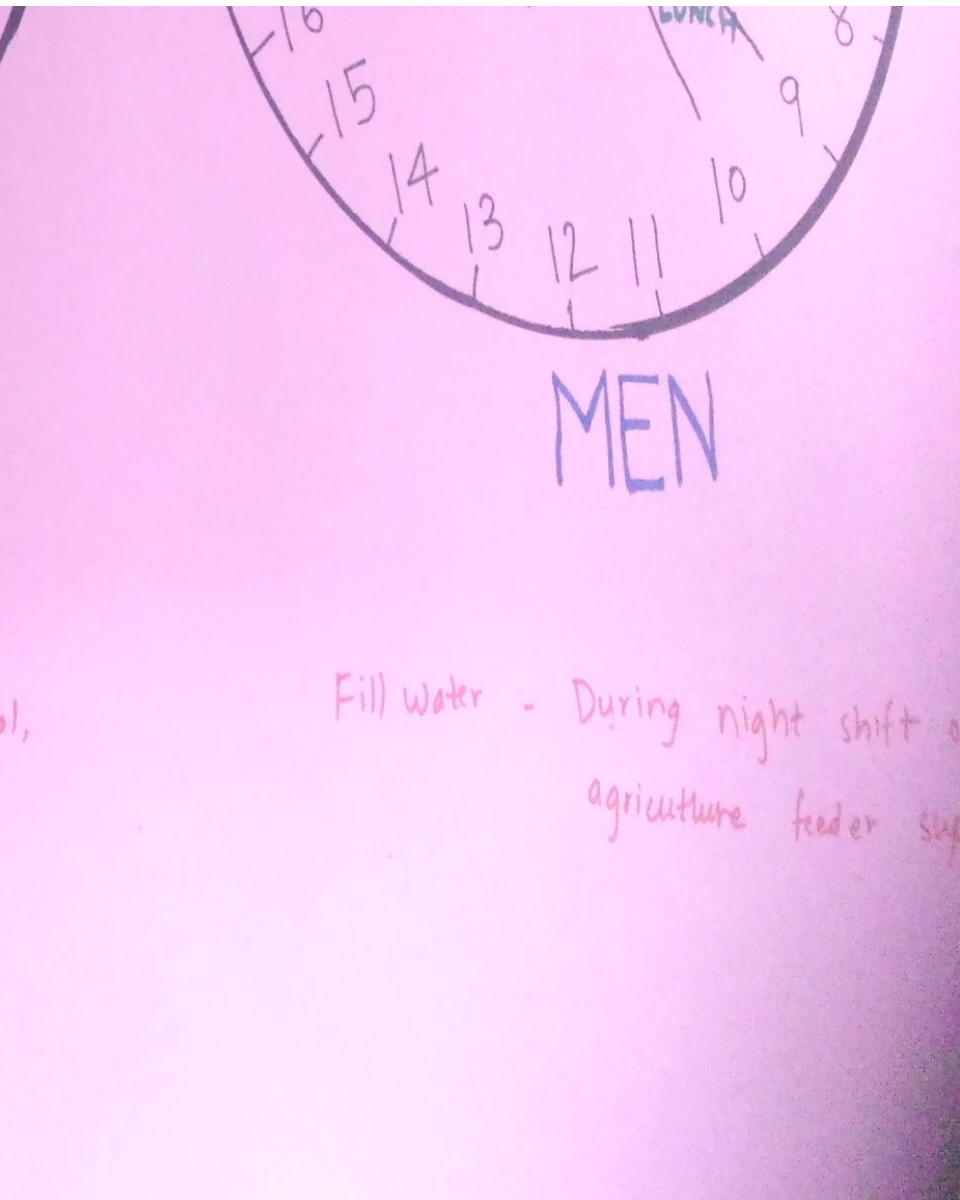
## RESOURCE MAP



## SOCIAL MAP

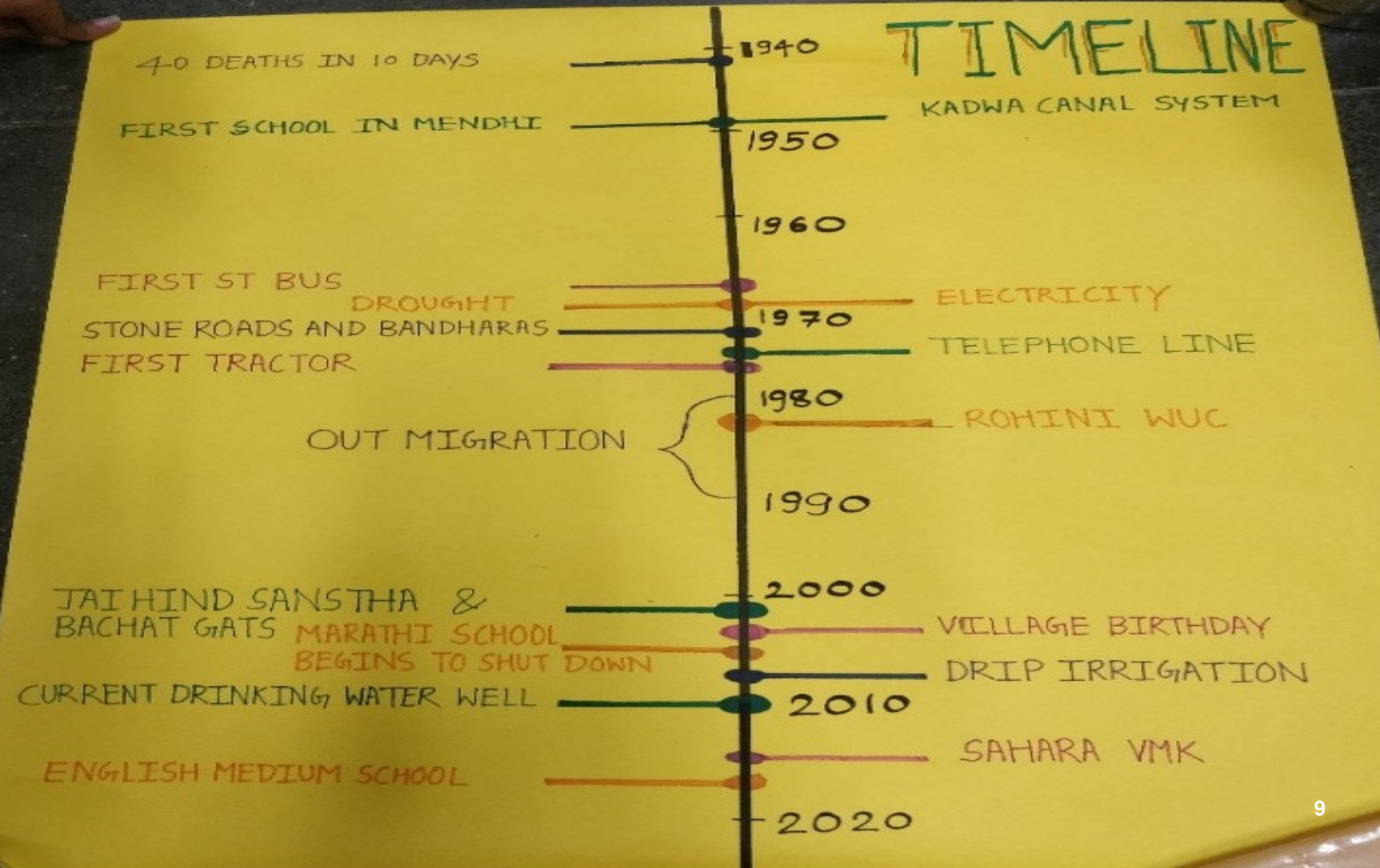


# Daily Activity Clock





# Timeline



# Problem Ranking

## ■ MEN

1. Roads across the village
2. Access to medical facilities
3. Access and quality of education
4. Quality of Drinking Water
5. Electricity
6. Connectivity to government offices

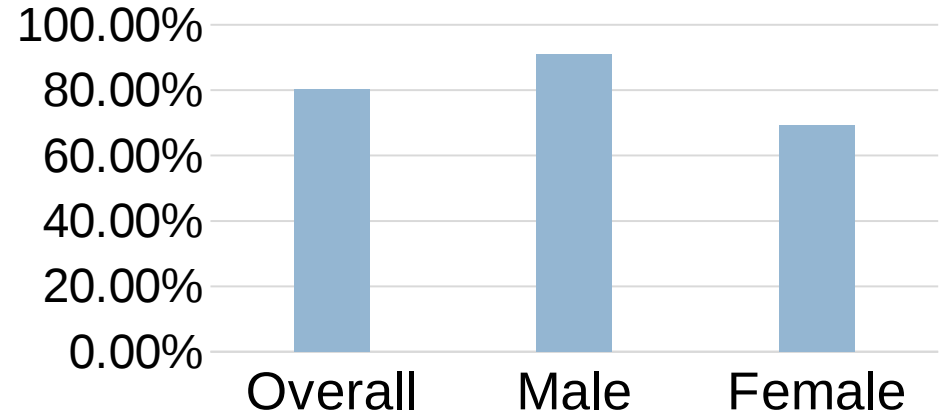
## ■ WOMEN

1. Access and quality of education
2. Uncertainty of market price for crops
3. Continuous Workload
4. Safety of women
5. Access to Toilets
6. Access to medical facilities

# Education

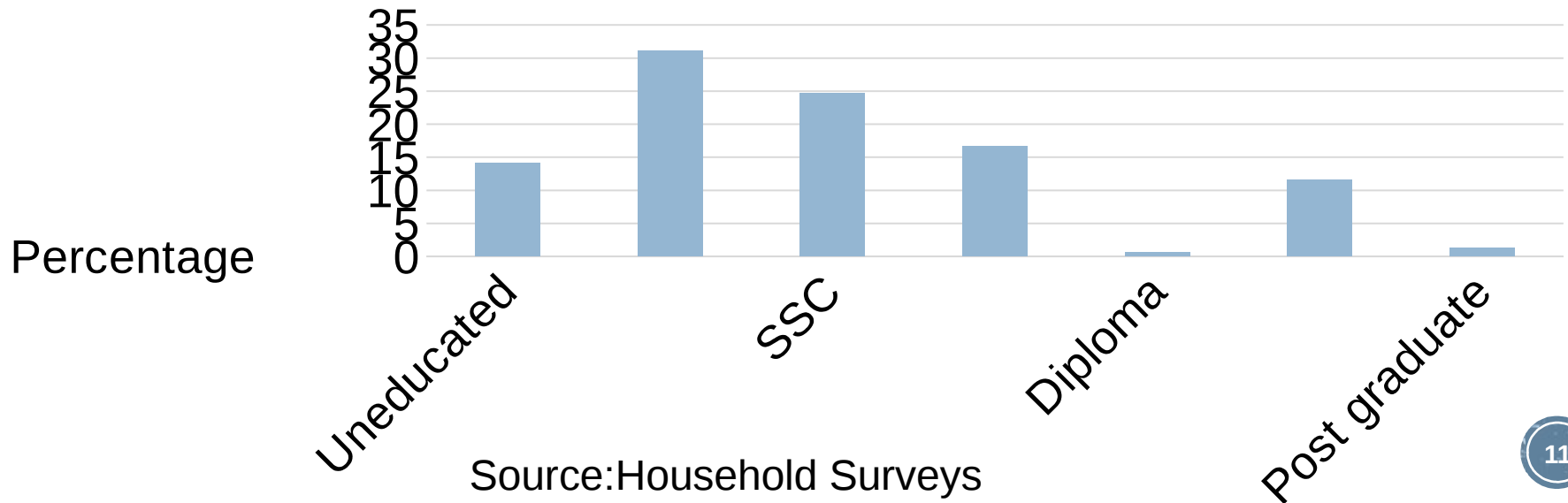


## Literacy Rate



Source: Census 2011

## Education profile

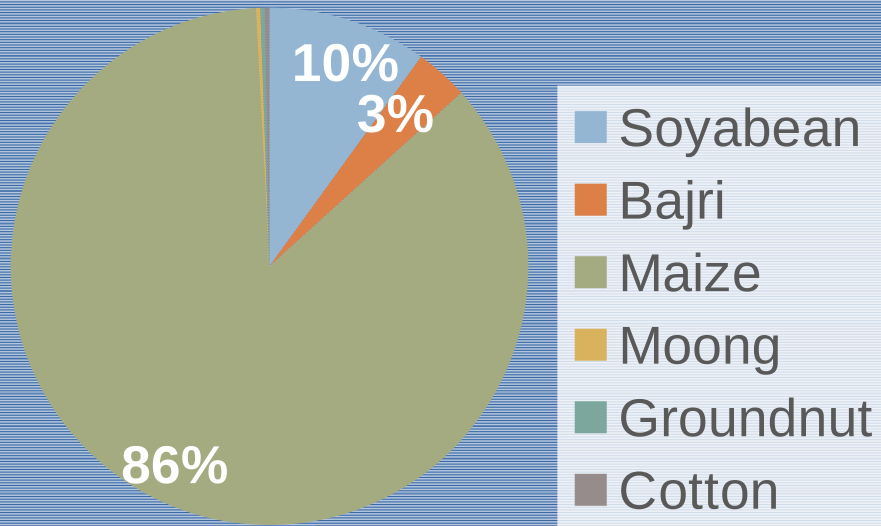


Source: Household Surveys

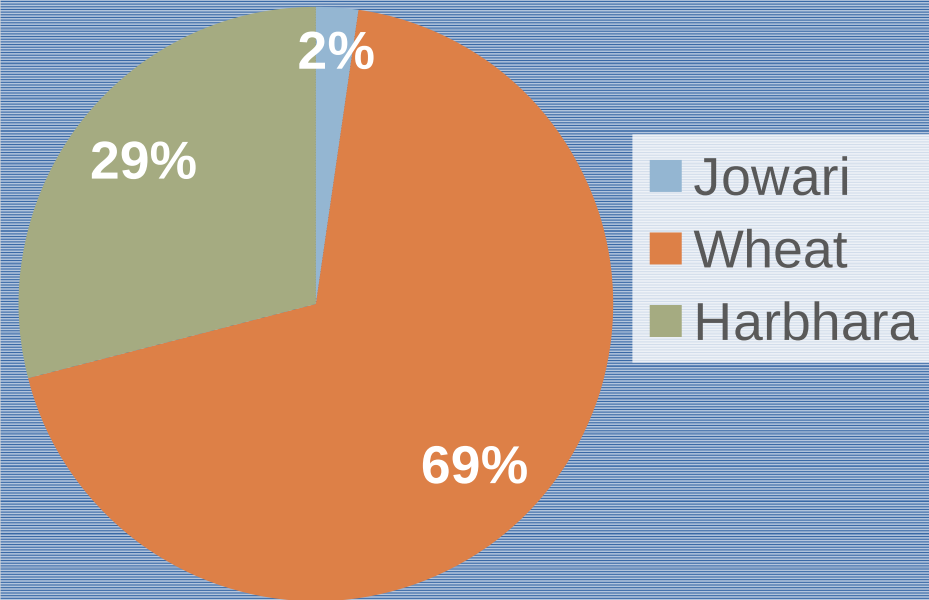


# Agriculture

Major crops-Kharif



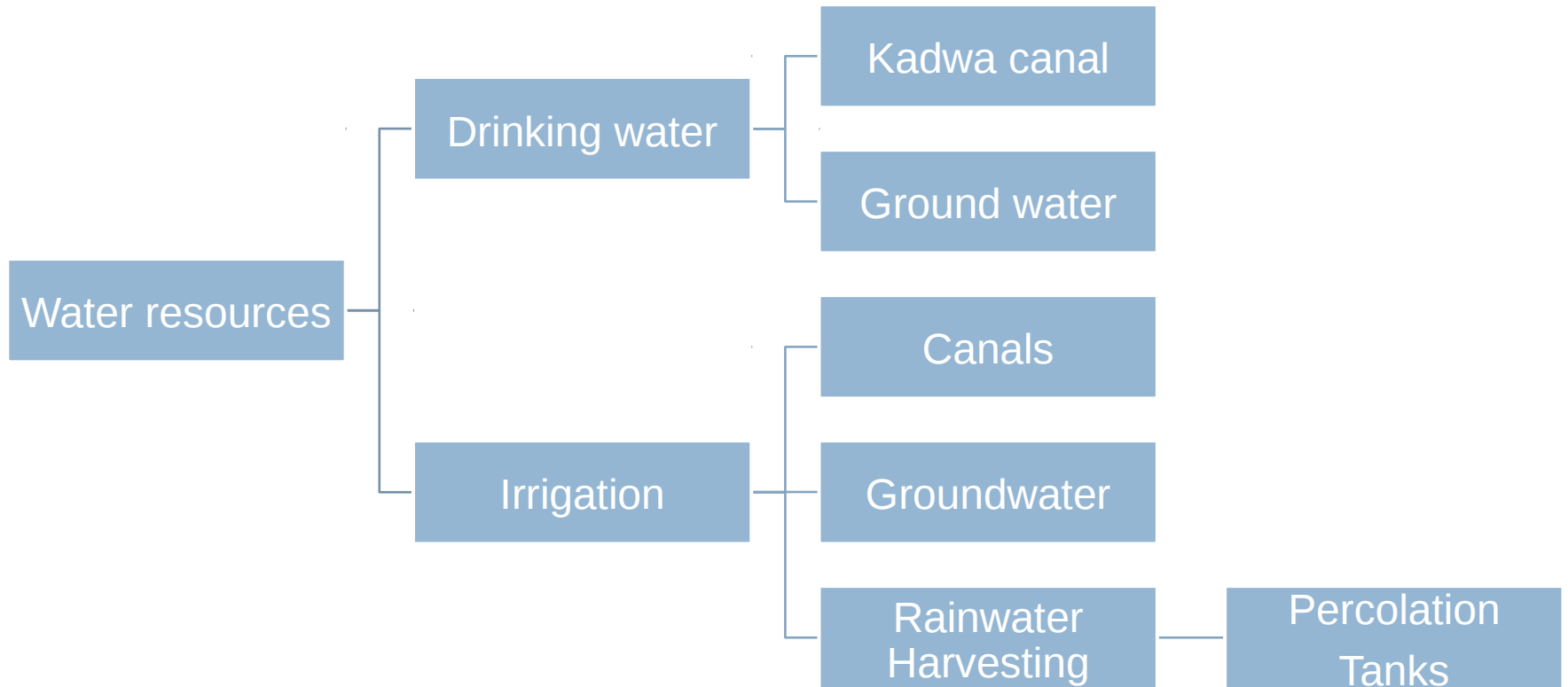
Major crops-Rabbi



Apart from these 8% of cropped area is covered by sugarcane and 2% by fruits

Source: Agriculture office, sinnar

# Water Resources



# Drinking water

## MJP Scheme

- Beneficiaries: Vadangali and 13 other villages
- Source: Kadwa Canal
- Filtration plant: Keertangali
- Quality of water

## Drinking water scenario in village

- Houses in gaathan
- Houses in farms



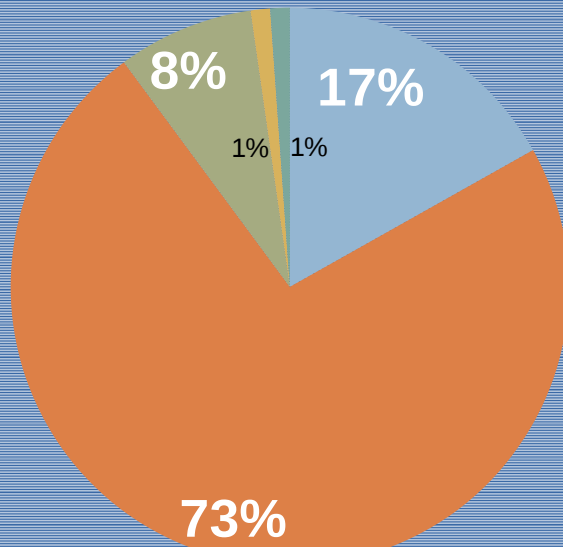
# Energy



## Access to sources

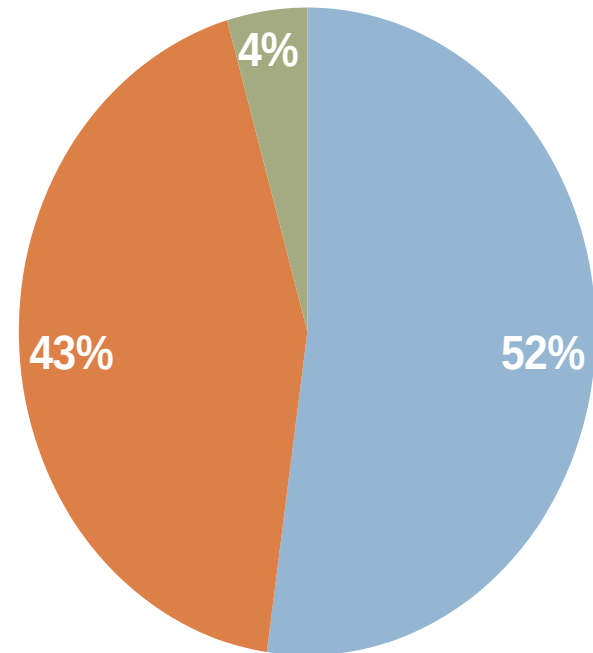
- Firewood- Nearby Farms
- LPG- Gas agency at Vadangali

### Cooking Energy Sources



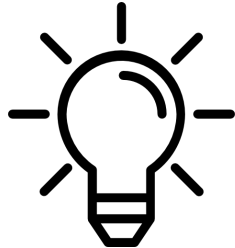
- Firewood
- Firewood+LPG
- LPG
- LPG+Electricity
- LPG+Biogas

### LPG Cylinder Consumption Pattern

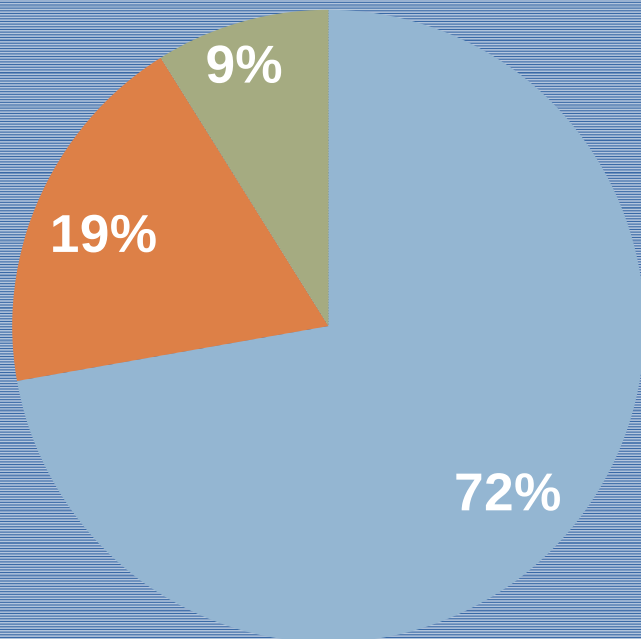


- 1-2 months
- 3-5 months
- 6 months

# Energy

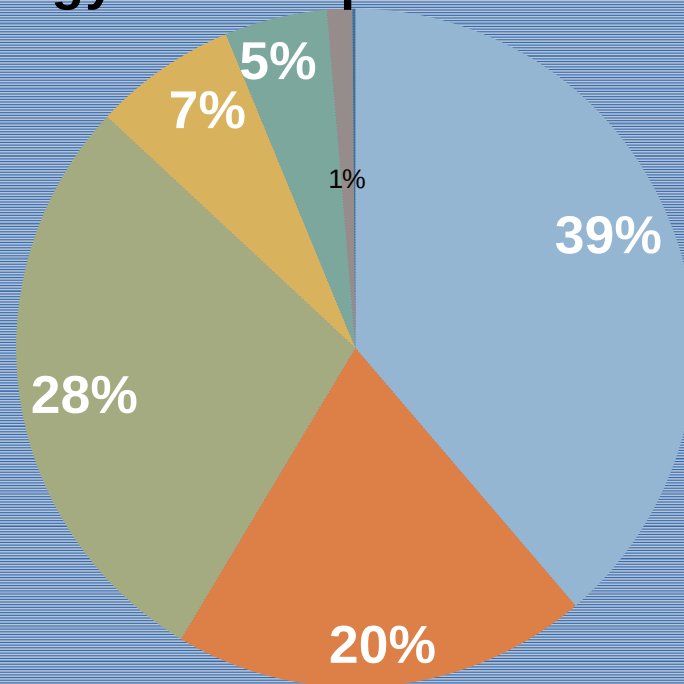


## Status of Electrification



- Electrified households
- Non-electrified households
- Using electricity by hooking

## Energy consumption



- Fan
- TV
- Refrigerator
- LED
- CFL
- Tubelight
- Mixer

Source: Household surveys

# Solar Electrification of VMK

## SIZING

### Assumptions:

1. Average units generated per day = 5kWh
2. Battery efficiency = 85%
3. Depth of Discharge= 65%
4. Battery storage not required for motor loads

Panel Size: 8 kW

Battery size: 47.33 kWh

## FINANCIALS

Without subsidy	Rs.480000
With subsidy of 30%	Rs.336000
Savings annually	Rs.92614.86
Payback period	3.6 years

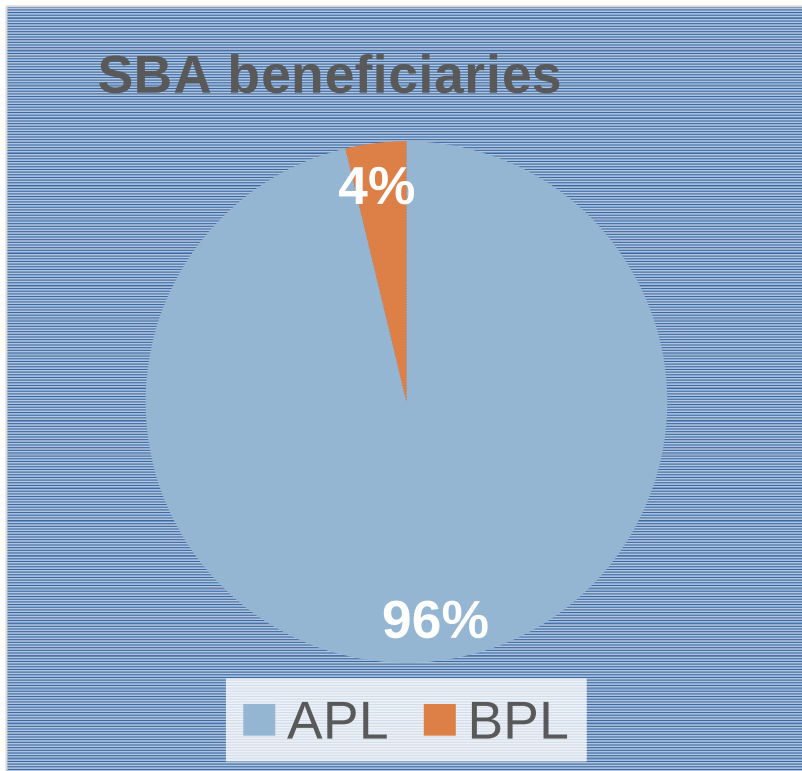
# Committees

Sr. No.	Committee	Level	No. of members	Responsibilities
1	Water supply committee	14 villages	16	Operation and maintenance of the Vadangali and 13 villages multi-village scheme in the villages.
2	Jay Bhavani Water User Association	CCA of Kadwa minor in the village	8	Responsible for the operation and maintenance of the Kadwa minor no. 1 on the distributary no. 37.
3	Rohini Water User Co-operative	CCA of the LIS	6	Operation and maintenance of the LIS on the Nandurmadhyameshwar canal and minor no. 2 on the



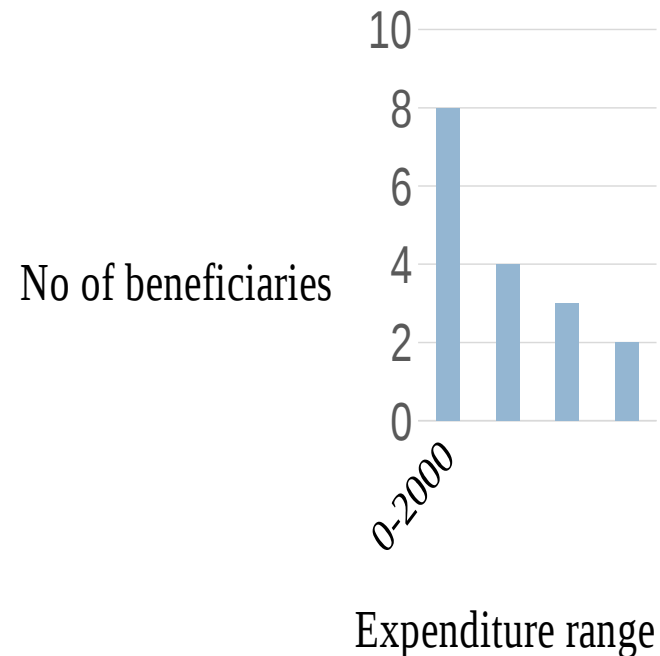
# Swachh Bharat Mission

Panchayat Samiti	Gram Panchayat
129	80



Source: Gram Panchayat

Additional expenditure in construction of toilets



Source : Household surveys of 21 of the 80 beneficiaries

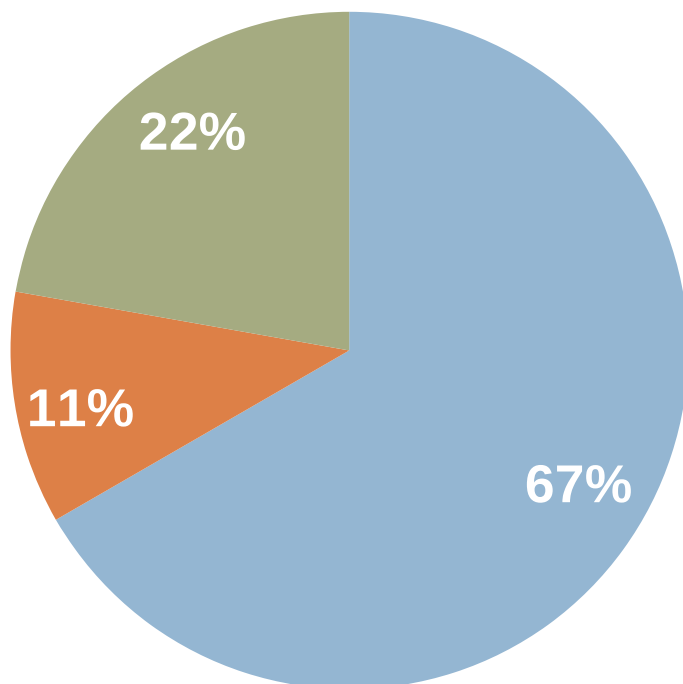
# PMAY-G

Eligible Beneficiaries: 27

Houses constructed: 10

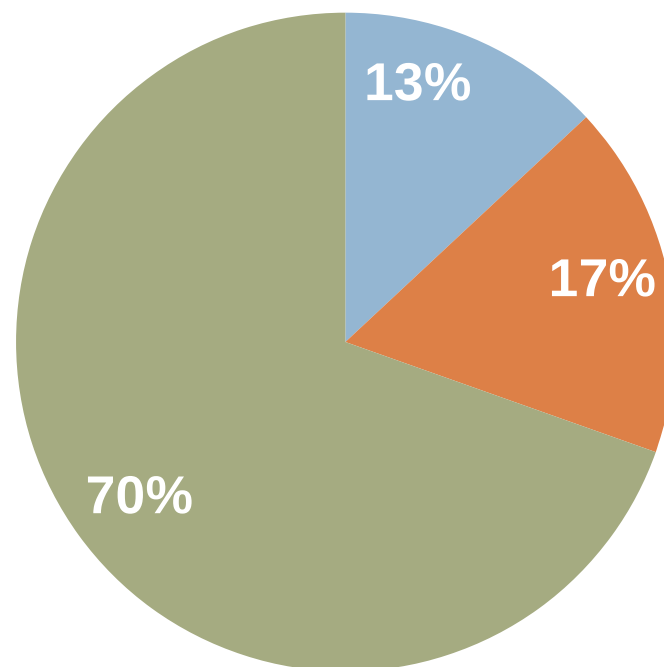
## PMAY-G Beneficiaries 2016-17

General SC ST

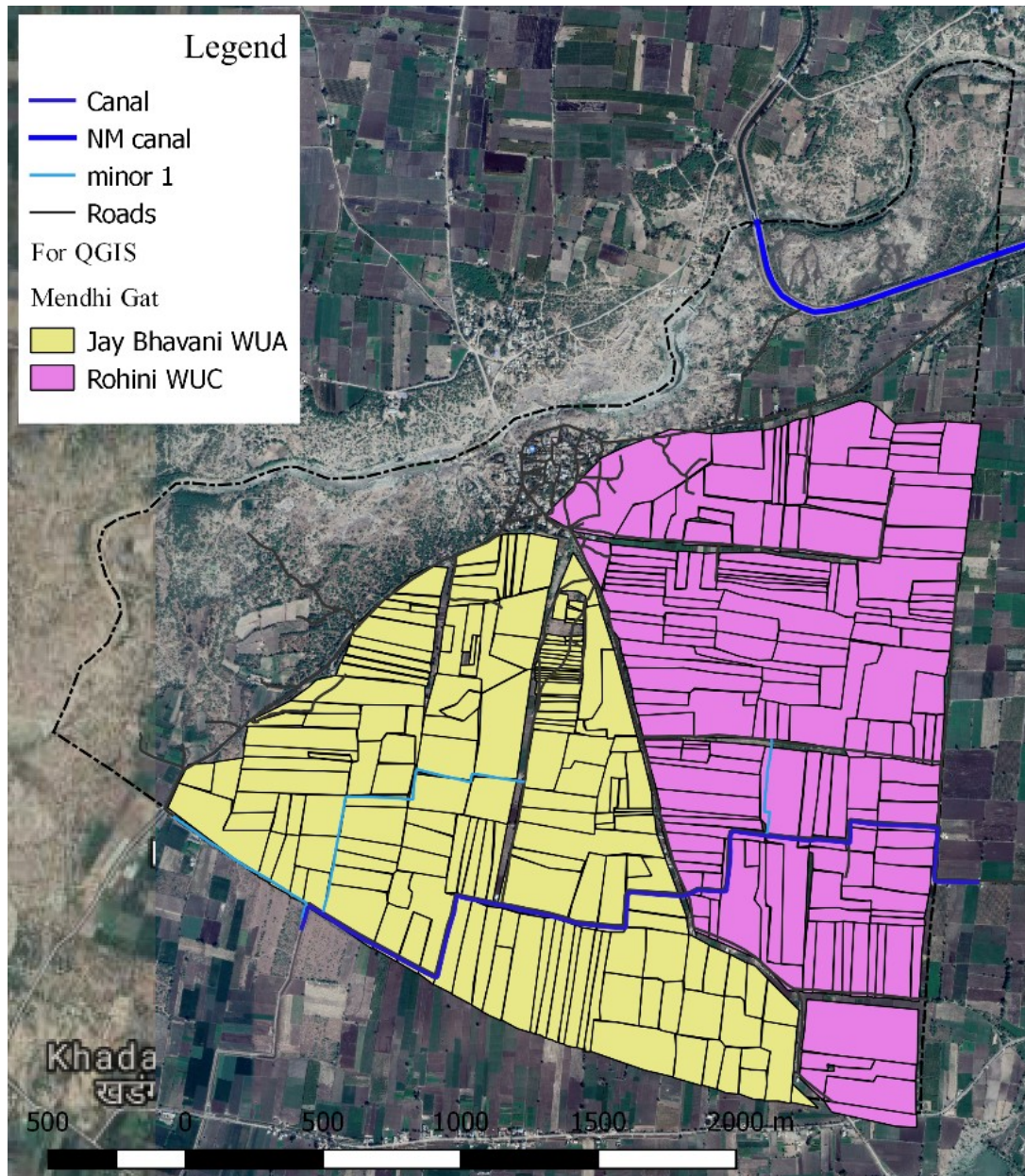


## Type of houses

Kaccha houses Half pucca Pucca houses



# **Directed Research I: Analysis of the operation of Kadwa and Nandurmadhmeshwar canal minors and water user association**



- 1) Kadwa canal
  - Distributary no. 3 of the canal with 3 minors in the village.
- 2) Nandurmadhmeshwar canal
  - Passes through the village
  - LIS by Rohini WUC

Jay Bhavani WUA is responsible for 2 minors and the distributary in its area. Rohini WUC is responsible for 1 minor, the distributary in its area and the LIS.



# Legend

- Canal
- NM canal
- minor 1
- Roads
- Field channels
- minor features
  - Broken DO
  - Broken Fallout structure
  - CFT
  - DO
  - Fallout structure
  - Purpani structure
- Canal features
  - BoundaryMendhi
- Google Hybrid
- Area irrigated
  - Yes

Total area  
under Jay  
Bhavani WUA  
= 648 acres

Area irrigated  
by Jay Bhavani  
WUA = 173  
acres

125      0      125      250      375      500 m



## **Direct outlets:**

Distributary: 14 (Functional: 9)

Minor 1: 0

Minor 2: 7 (Functional: 3)

Minor 3: 3 (Functional: 0)

## **Fallout structure**

Distributary: 4

Minor 1: 0

Minor 2: 3 (Side wall broken: 1)

Minor 3: 0

## **Purpani structure**

The purpani structures were a part of the old British lift irrigation scheme on Dev river. The same canal system has been rehabilitated in the Kadwa system and is used to collect rain water and avoid clogging of fields.



## **CTF:**

- 1) Distributary enters Mendhi
- 2) Minor 2
- 3) Distributary enters Rohini WUC
- 4) Minor 3

As we can see, minor 1 does not have a CFT constructed on it. Technical design characteristics reflect the social differentiation.



The CTF on minor 2 has not followed the basic requirement that the canal should not turn

## **Distributary no. 3:**

The distributary is 2.5 m- 3 m wide and 1 m deep.

## **Minor:**

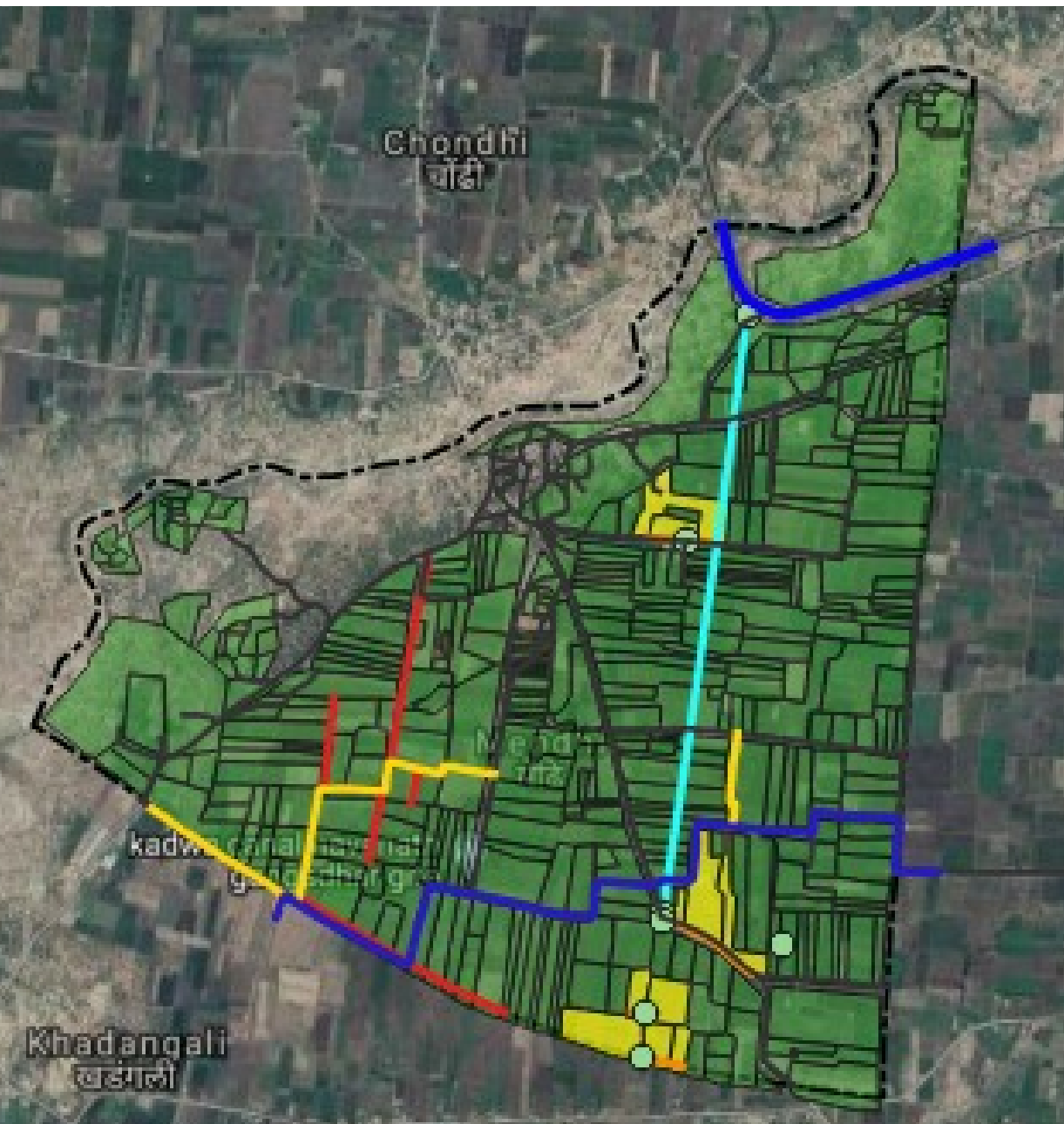
The minor is 1 m wide and 0.5 m deep.

## **Field channels:**

The field channels were 0.5 m wide and 0.4 m deep



# Rohini WUC:



Area irrigated: 32 acres  
No. of rotations: 6 in a year  
Permission to lift water in  
Kharif and Rabbi

- Well with a concrete pipe connecting to canal.
- Two 25 HP motors pump water to the main chamber.
- Water goes by gravity to the 3 sub chambers.

Area irrigated by Rohini  
WUC: 32 acres



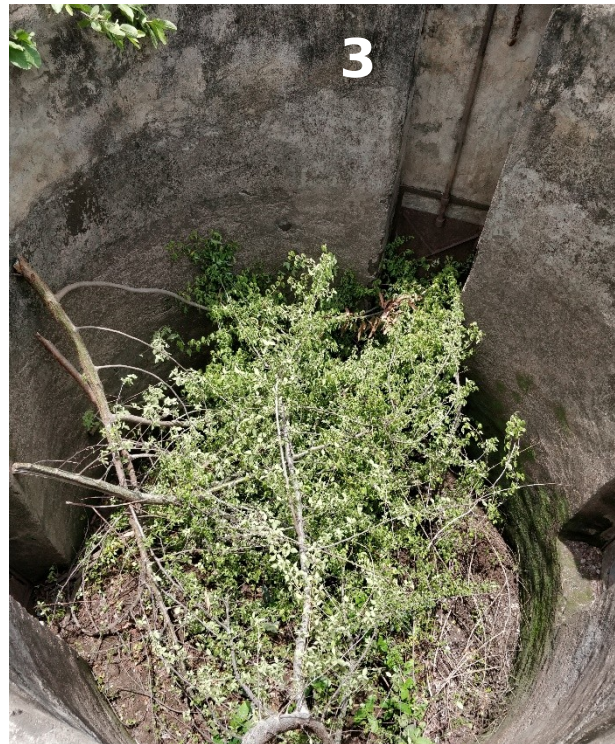
### 1) Well:

Well next to the canal which is connected to the canal by a concrete pipe of 50 cm diameter



### 2) Main-chambers:

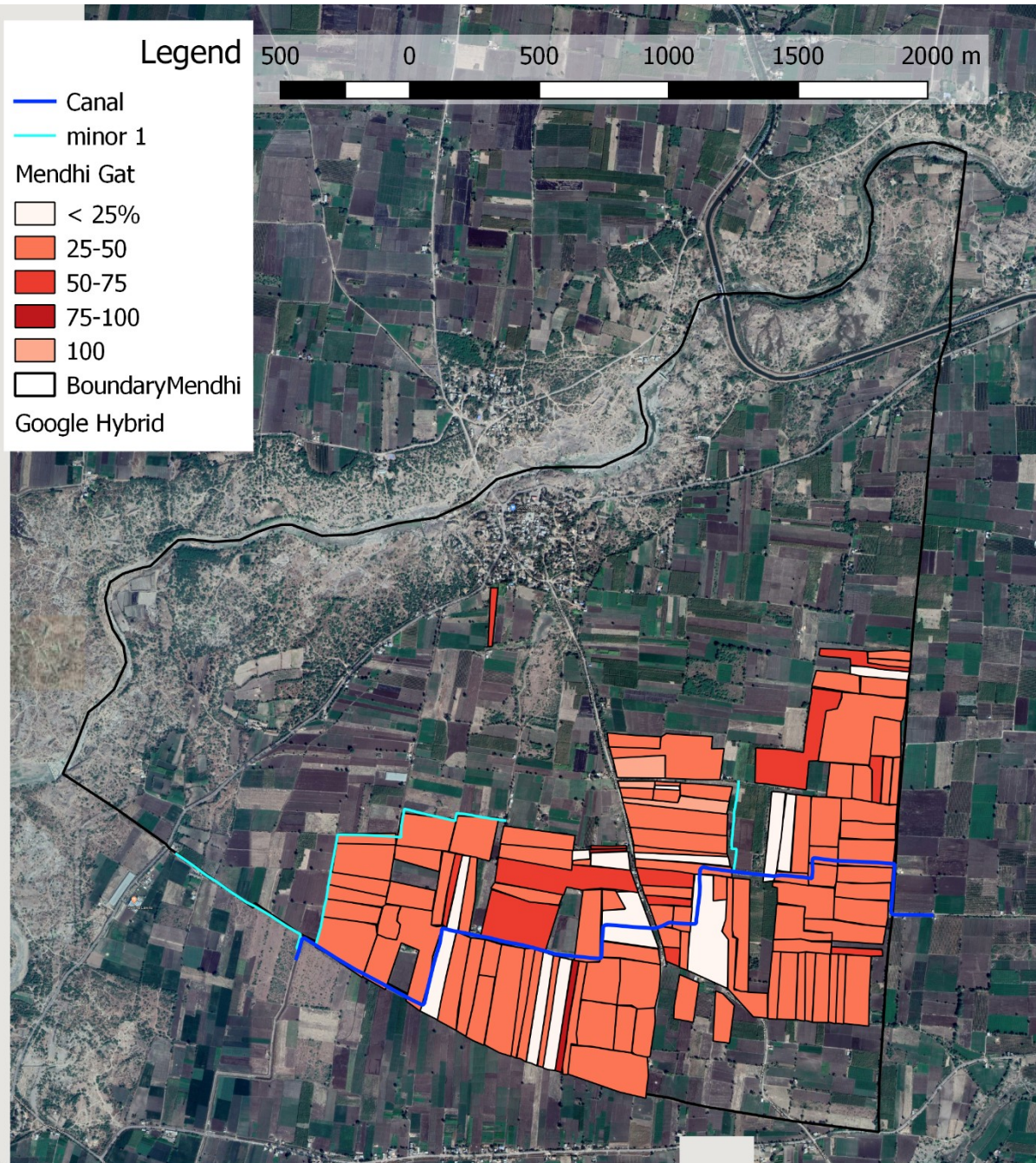
The main chamber has three gates and 3 pipes of 30 cm diameter each which carries the water to the three sub-chambers.



### 3) Sub-chambers:

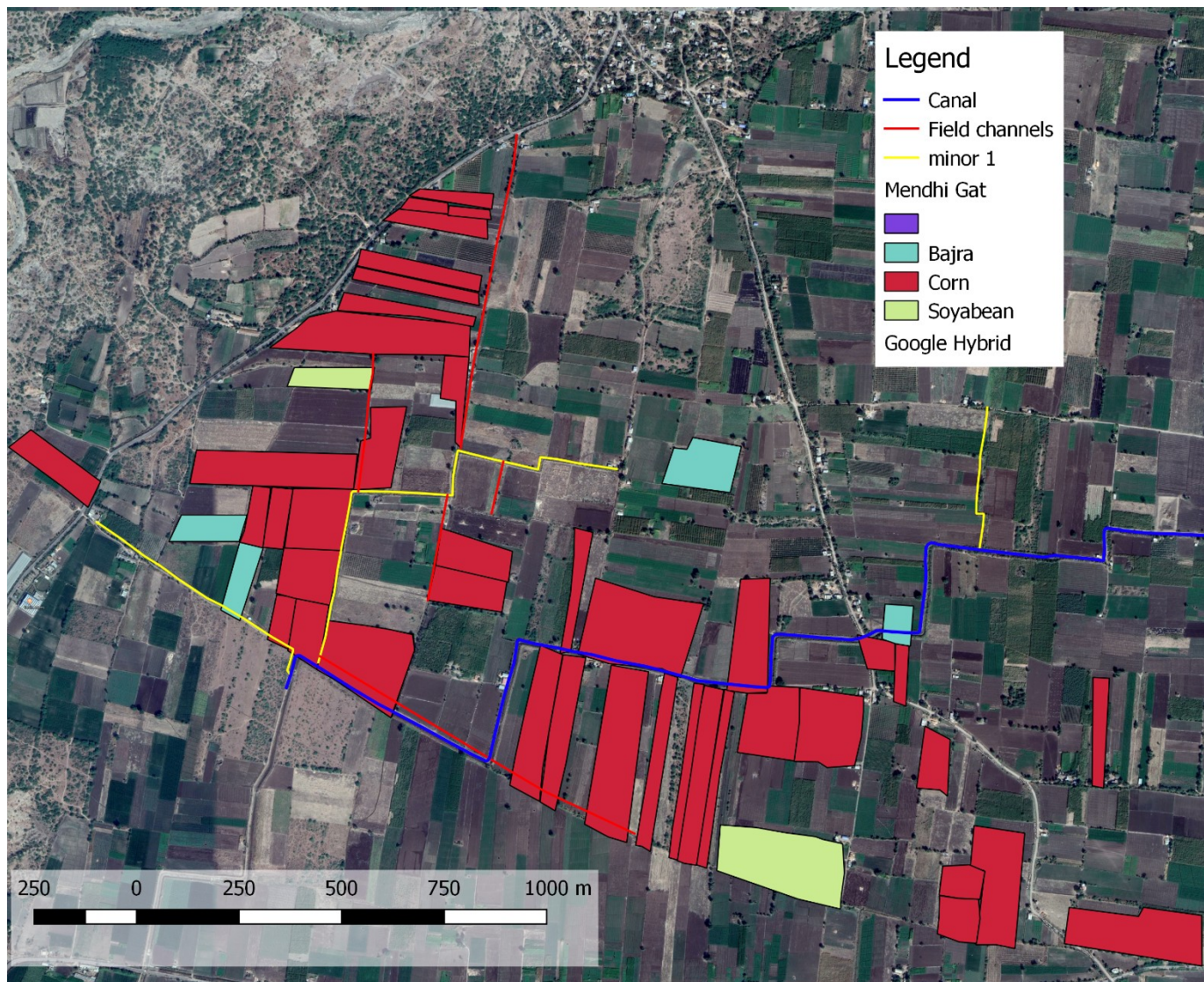
Three gates for field channels. None of these sub-chambers have functioning field channels. Concrete pipes of 30 cm diameter connect the main chamber to the sub-chambers.





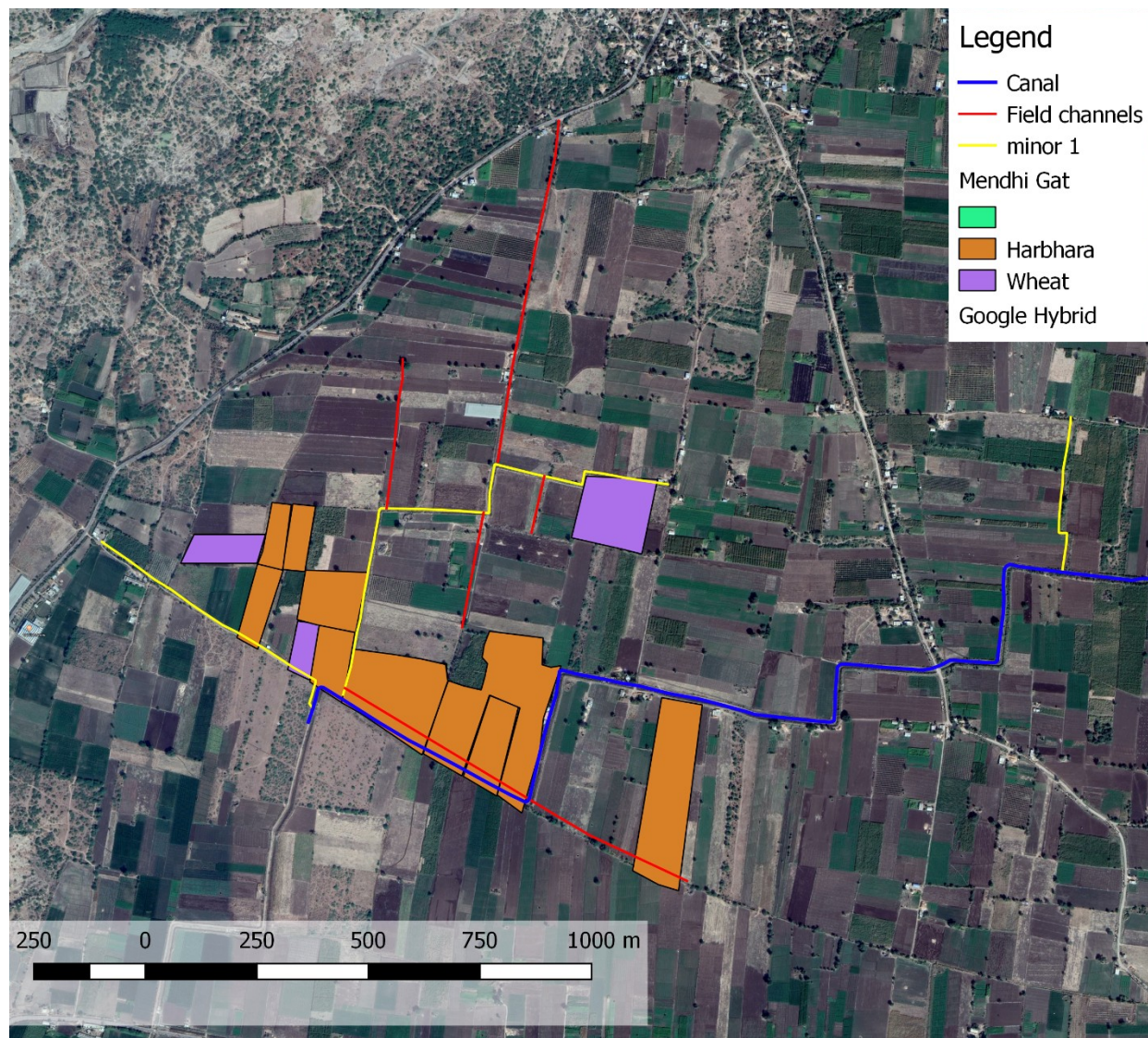
- The identified irrigable command area by the irrigation department.
- We can see that the area intended to be irrigated and the area being irrigated is very different.





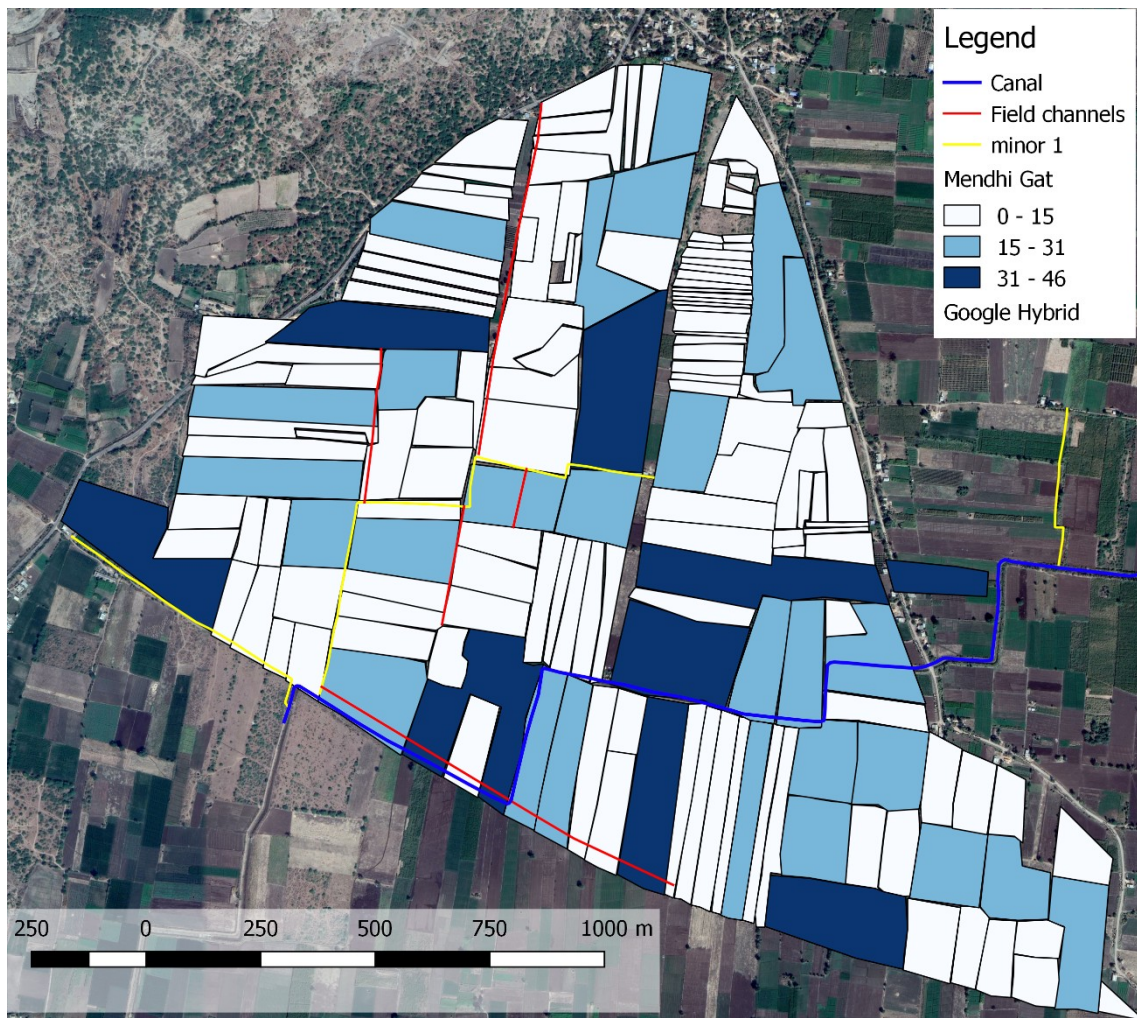
- These were the forms submitted at the irrigation office for kharif rotation.
- We can again see that the farms irrigated and the forms submitted do not match for the farms outside Jay Bhavani WUA.





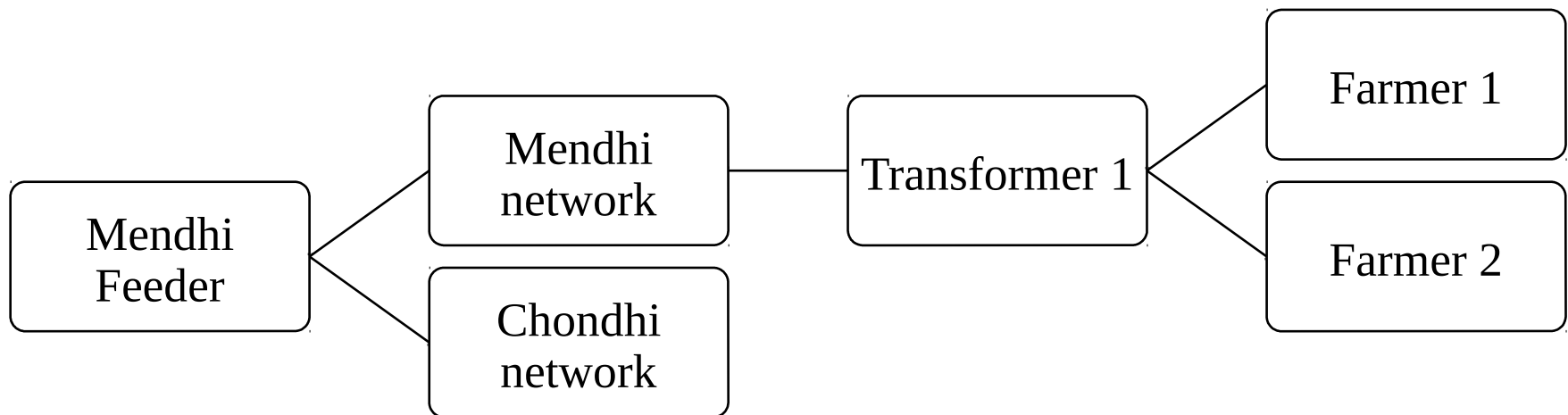
- These were the forms submitted at the irrigation office for rabbi rotation.
- While harbhara is named as the primary crop, many of these farmers have sown sugarcane or wheat





- Based on the Waghad model, we calculated the amount of time each farmer should get water for each kharif rotation.
- We calculated the amount of time on each of the minors

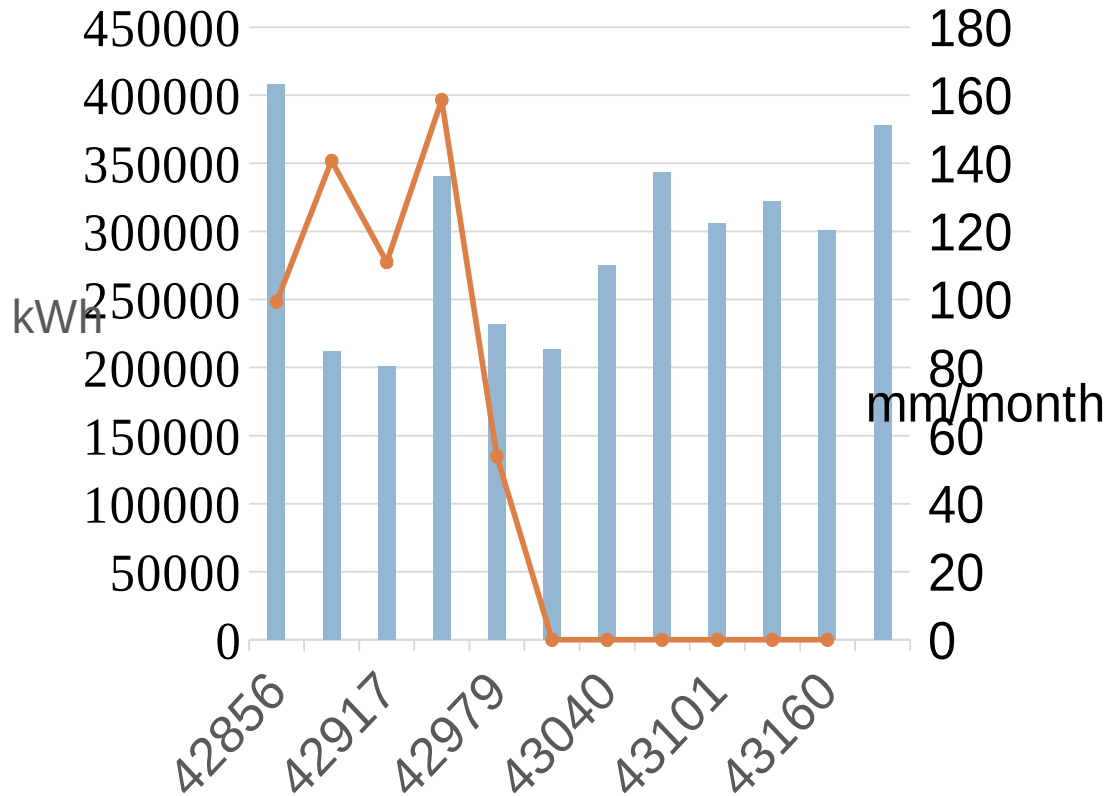
## Directed Research 2: Analysis of energy consumption based on crop water requirement





# Feeder Level Consumption

Energy consumption and rainfall comparison

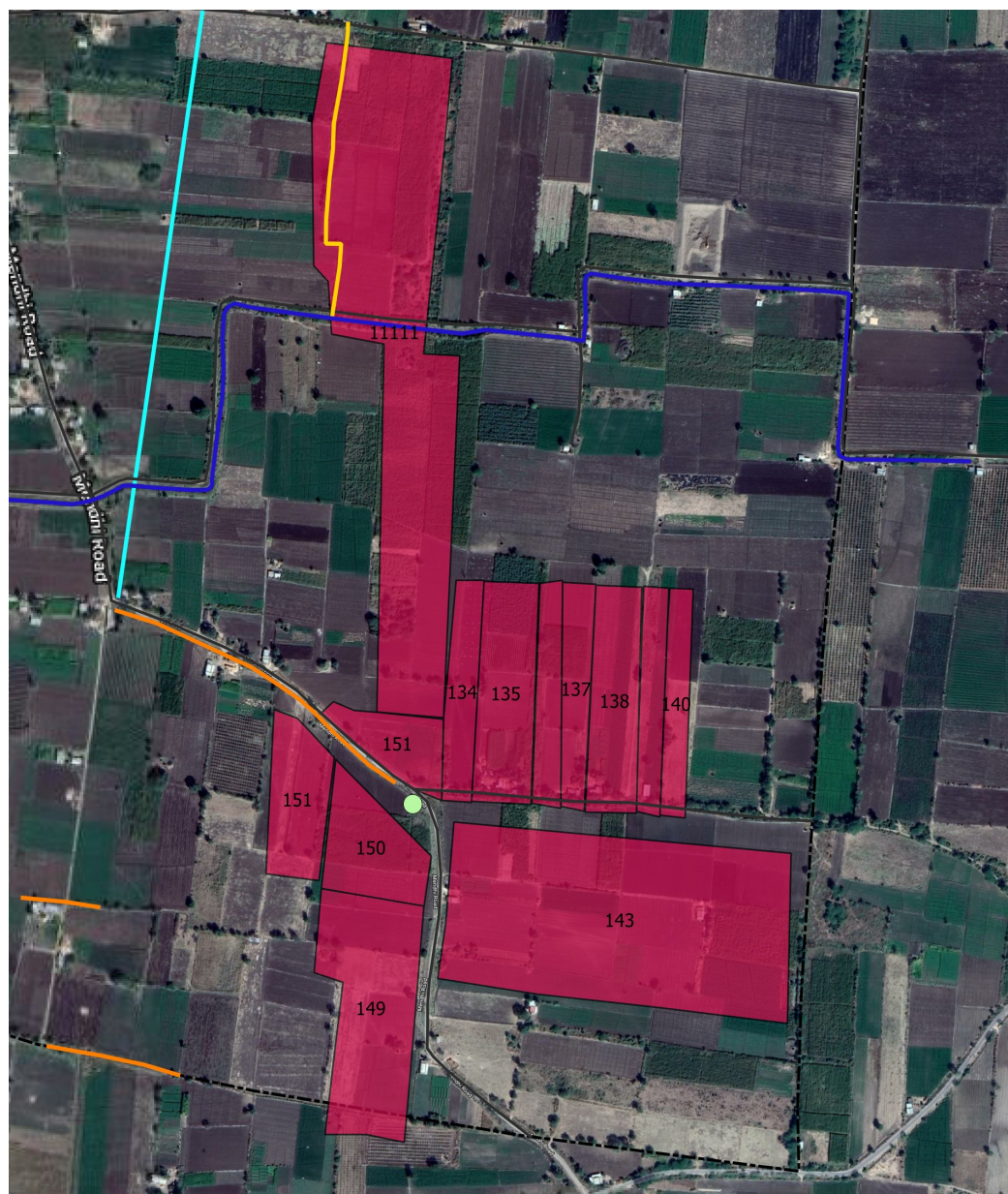


- Energy consumption of that month kWh
- Rainfall for Deopur circle mm/month

Assumptions:

- Technical losses = 15%
- Pump efficiency = 30%
- No of hours of usage = 4 hours

# Transformer level

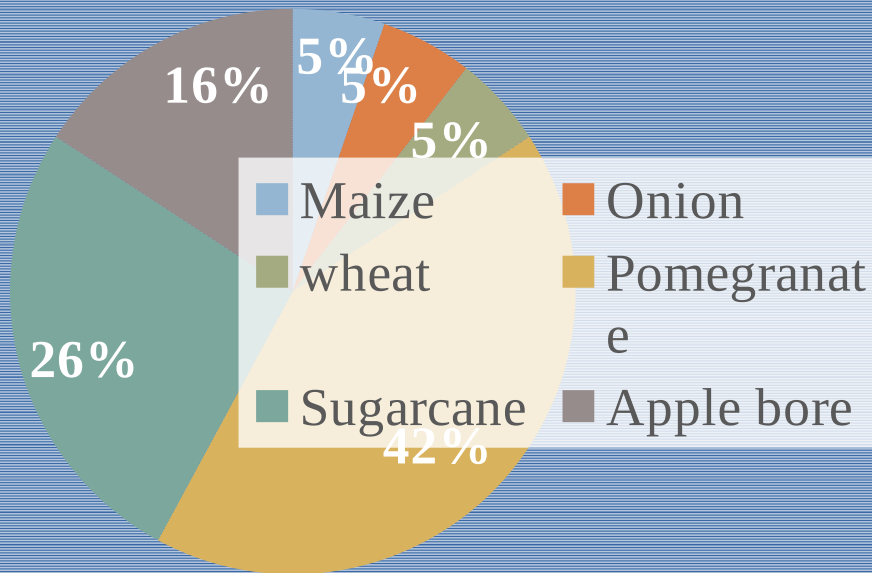


Water required according to crop requirement		Water consumed according to energy consumption	
Water required according to crop requirement	Water consumed according to energy consumption	Water required according to crop requirement	Water consumed according to energy consumption
679751.5 m <sup>3</sup>	258950m <sup>3</sup>	679751.5 m <sup>3</sup>	258950m <sup>3</sup>

	<u>Total Kharif Protective Water Req. (TCM)</u>	<u>76.38</u>
<u>Demand</u>	<u>Rabi crop water Req. (TCM)</u>	<u>182.58</u>
	<u>Irrigation requirement (TCM)</u>	<u>258.95</u>

# Farmer 1 water consumption

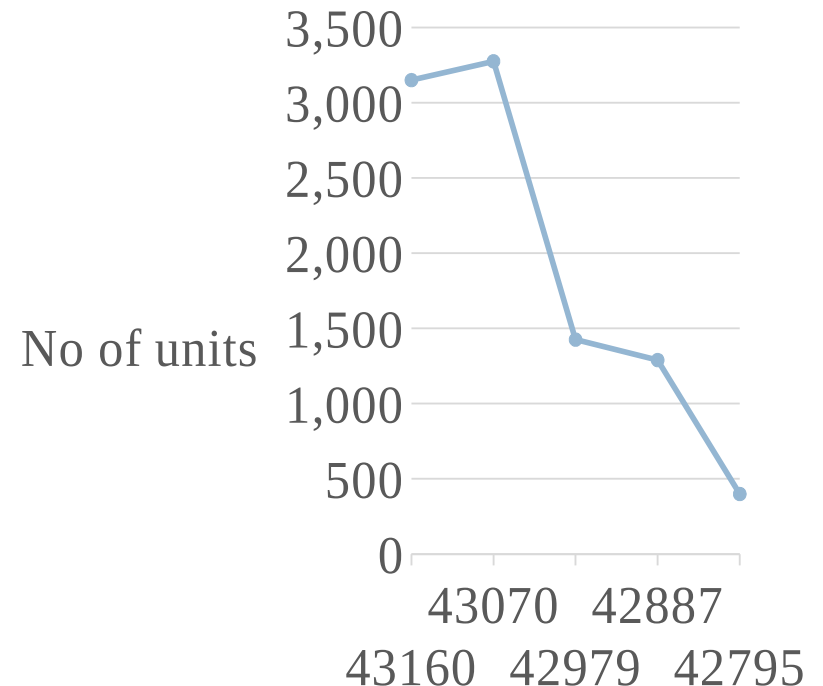
Cropping pattern



Water required = 65155.92 m<sup>3</sup>

For area of 23 acres

Energy consumption at farmer level

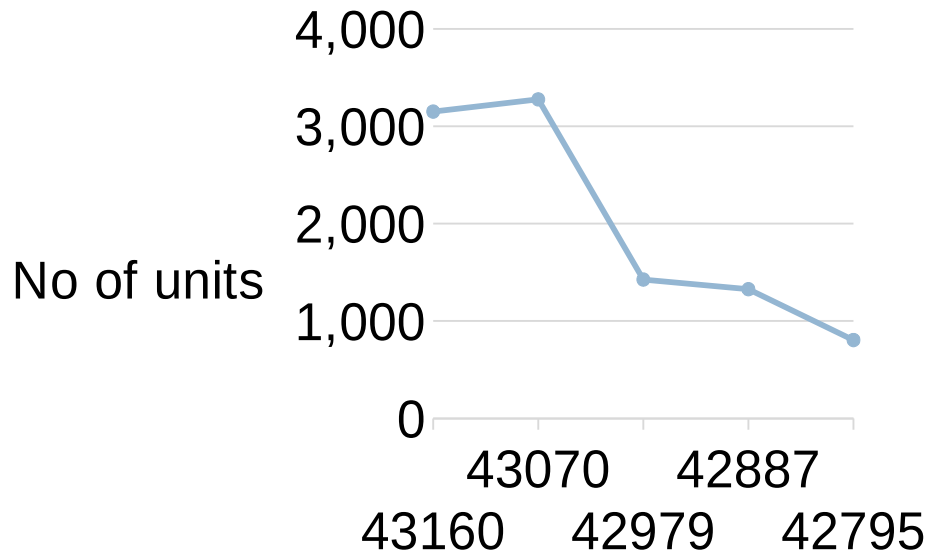


Water required = 51760 m<sup>3</sup>

# Farmer 2 water consumption

- Cropping pattern: 20 acres of pomegranate orchard

Energy consumption for pomegranate orchard



Water required according to crop requirement		Water consumed according to energy consumption	
Water required according to crop requirement	Water consumed according to energy consumption	Water required according to crop requirement	Water consumed according to energy consumption
68175.3 m <sup>3</sup>	81490m <sup>3</sup>	68175.3 m <sup>3</sup>	81490m <sup>3</sup>

Demand	Total Kharif Protective Water Req. (TCM)	12.84
	Rabi crop water Req. (TCM)	68.65
	Irrigation required(TCM)	81.49

# DR2-Summary

Water consumption	Water consumption	Estimated using energy (m <sup>3</sup> )	Estimated using crop water requirement (m <sup>3</sup> )	Ratio of water estimated using energy to crop water requirement	Water consumption	Estimated using energy (m <sup>3</sup> )	Estimated using crop water requirement (m <sup>3</sup> )	Ratio of water estimated using energy to crop water requirement	Ratio of water estimated using energy to crop water requirement
	Feeder Level	24130504.95	2123000	11.36	Feeder Level	24130504.95	2123000	11.36	
	Transformer Level	679751.5	258950	2.62	Transformer Level	679751.5	258950	2.62	
	Farmer 1 (Mixed Cropping)	65155.92	51760	1.25	Farmer 1 (Mixed Cropping)	65155.92	51760	1.25	
	Farmer 2 (Pomegranate orchard)	68175.3	81490	0.84	Farmer 2 (Pomegranate orchard)	68175.3	81490	0.84	
Feeder Level	24130504.95				2123000				11.36
Transformer Level	679751.5				258950				2.62
Farmer 1 (Mixed Cropping)	65155.92				51760				1.25
Farmer 2 (Pomegranate orchard)	68175.3				81490				0.84

- ~~Water consumed estimated using energy~~ Is decreasing from feeder to transformer to individual farmer level
- ~~Water requirement as per crops~~ Is decreasing from feeder to transformer to individual farmer level
- Dependence on other water resources

# Summary

## Village Research

- Overall scenario in village

## Sectors

- Analysis of sectors using primary and secondary data

## DR 1 : Working of canals and WUA

- Operation of Kadwa, Nandur madhyameshwar and WUA

## DR2 : Water requirement for agriculture

- On feeder level the energy consumed is greater than the estimated crop water requirement



**THANK YOU!**

# DR2-Feeder level calculation (energy based)

Total energy consumed annually(kWh)=		3532400
Area under irrigation (sq.m)		7662678.94
Energy per unit area		0.4609876
Considering 15%technical losses energy supplied		0.39183946
Considering 30%efficiency of the pump, energy delivered to the pump		0.11755184
Pressure head(m <sup>3</sup> / sec)		196200
Flow rate		5.9914E-07
Water requirement per day	mm/ day	66110.9725
Water requirement per day	m <sup>3</sup>	24130505

# DR2- calculation (crop water based)

- [https://drive.google.com/drive/folders/1IobO\\_aP4meApBJ5A1ZN\\_bq9L4MT-rpI3?usp=sharing\\_eip&ts=5aec0f9d](https://drive.google.com/drive/folders/1IobO_aP4meApBJ5A1ZN_bq9L4MT-rpI3?usp=sharing_eip&ts=5aec0f9d)