Report TD 609

On

Field Work Report

Submitted in partial fulfilment for the Degree of
M. Tech. in Technology & Development

By

KarishmaBhuyan
(Roll No. 123350008)

Abhiram Sahasrabudhe
(Roll No. 123354002)

Under guidance of
Prof. Narendra Shah

Centre for Technology Alternatives for Rural Areas (CTARA),
Indian Institute of Technology Bombay,
Powai, Mumbai – 400076.

August, 2013

Abstract

Gandhiji emphasized on the concept of Gram Swaraj, which basically means that each and every village should be self-reliant, with the provision of all the basic necessities such as food, water, energy etc. With 69 % of Indians living in the villages(Census of India, 2011), it is pertinent to look in to the different sectors affecting village life and understanding the need, importance and scope of various interventions to be made in the view of enhancing self-reliance.

A 10 weeks field stay was undertaken in Kattanbhavi village of Belgaum District in Karnataka, as a part of the requirement of Technology and Development course of Centre of Technology Alternatives in Rural Areas. Real development stems from understanding the real needs felt (not perceived) by the villagers. To have a proper outlook the study was undertaken in the rural setting while living amongst the villagers. Living with the villagers, according to their norms and beliefs aided in getting a holistic overview of Kattanbhavi. Various tools and methods such as Participatory Rural Appraisal (PRA) and household survey were used.

Kattanbhavi is a water stressed village, with agriculture being the dominant occupation of the villagers. Over 90% of the households had biogas plants at their place. The aim of the study was to analyse the sectors such as Agriculture, Water and Energy and conduct a directed research in rural context. Livelihood opportunities in terms of Cashew and honey processing was analysed along with assessing the conditions leading to thehigher dissemination of biogas plants and the benefits perceived by the people. The various governance institutions, which directly or indirectly affect the people of Kattanbhavi were also identified and studied. The villagers perceived scarcity of water as the most important issue facing them followed by lack of proper road and education facilities.

Certificate

This is to certify that this Field work report prepared by **Karishma Bhuyan** and **Abhiram Sahasrabudhe** is approved for submission at Centre for Technology Alternatives for Rural Areas (CTARA), IIT Bombay, Powai.

Date: August, 2013

Prof. Narendra Shah

Professor,
Centre for Technology Alternatives
for Rural Areas
IITB

Declaration

We hereby declare that the Field work report submitted by us, for the partial fulfilment of the degree of Master of Technology to Centre for Technology Alternatives for Rural Areas, Indian Institute of Technology Bombay is a record of the work carried out by us under the supervision of Prof. Narendra Shah, Professor, Centre for Technology Alternatives for Rural Areas.

We further declare that this written submission represents my ideas in my own words and where other's ideas or words have been included, we have adequately cited and referenced the original sources. We affirm that we have adhered to all principles of academic honesty and integrity and have not misrepresented or falsified any idea/data/fact/source to the best of our knowledge. We understand that any violation of the above will cause for disciplinary action by the Institute and can also evoke penal action from the sources which have not been cited properly.

Place: Mumbai

Date: August2013

KarishmaBhuyan Abhiram Sahasrabudhe

Table of Contents

List of tables

List of images

List of figures

Structure of report

This report is divided into sector wise chapters. The first chapter starts with the general scenario in Kattanbhavi. The demographic analysis of the primary and secondary data collected during the field work is included in this chapter. The further sections in the chapter describe the study area selection, sampling for household surveys and then proceeds with the Participatory Rural Appraisal (PRA) activities carried out in the village.

Chapter 2 describes the agriculture scenario in the village. It gives details about the crops cultivated, the inputs, case studies of economics etc. The next chapter 3 concerns the water scenario with regard to the resources, availability, accessibility and the utilization of water by the sample households. Energy has been dealt with in the chapter 4. The types of energy, devices, durations and allied details are described in this chapter.

The chapter 5 deals with the governance institutions like the Gram Panchayat , NGOs like Jan Jagran and the schemes disseminated in a Kattanbhavi.

These chapters are followed by learning from the field study and the conclusions. The annexure gives a sample of the household survey.

1. Introduction

Kattanbhavi is located near the Maharashtra and Karnataka border in Karnataka, Belgaum district and Taluka. Due to its proximity to the Maharashtra border, it consists of both Marathi and Kannada speaking people.

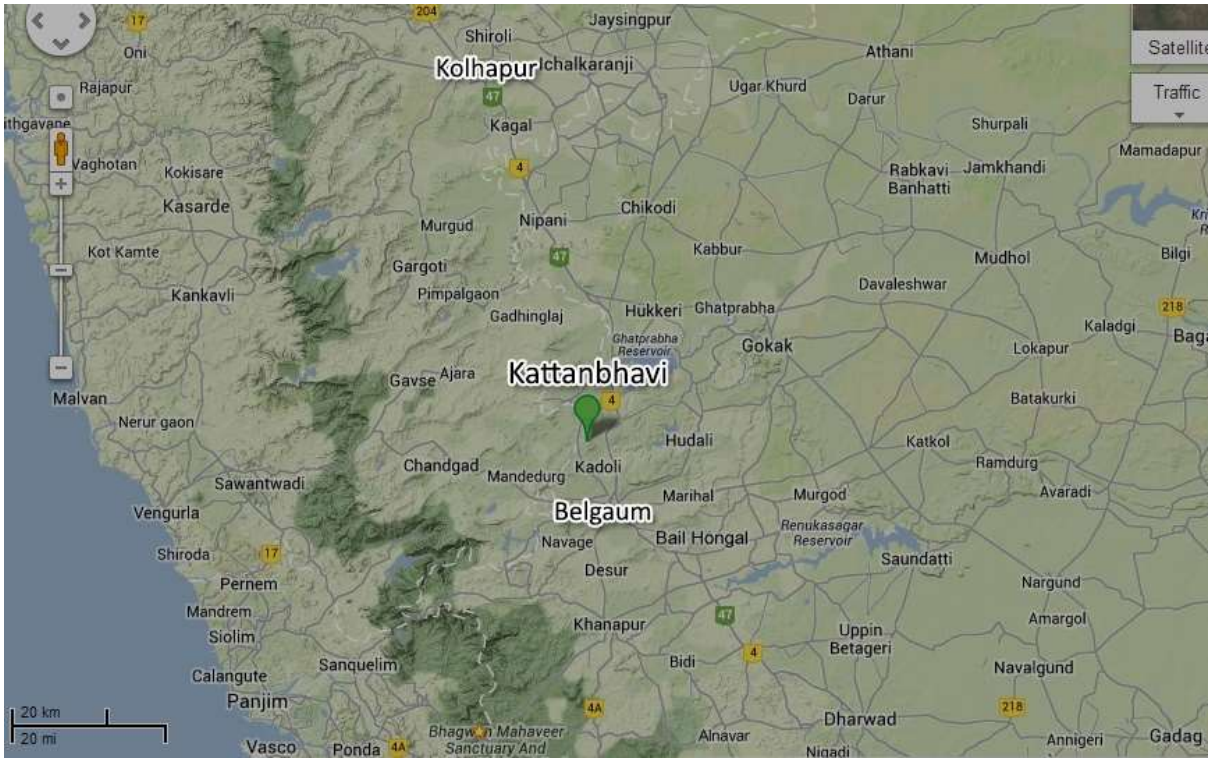


Image 1 Map showing location of Kattanbhavi

Kattanbhavi is a very old village. According to locals, the village is at least 250 years old. Kattanbhavi literally means a built up (*Kattan*) well (*Bhavi*) in Kannada.

1.1.Bambarga Gram Panchayat

Image 2 Bambarga Gram Panchayat

The Bambarga gram Panchayat was established in the year 1993-94. The GP consists of 9 villages from which 14 members are elected. The following table shows the villages and the number of members from each.

Table 1: Villages and the number of elected members in Bambarga Gram Panchayat

Ward	Village	Number of Members
Bambarga	Bambarga	4
Kattanbhavi	Kattanbhavi	3
	Guramhatti	
Gugrenhatti	Gugrenhatti	1
	Hosur	
Ningenhatti	Ningenhatti	1
	Gudihal	1
	Idilond	1
	Shivapur	1
Bambarga Gram Panchayat		**14 Members**

Prior to elections, the Gram Panchayat issues a circular which contains the required criteria such as caste, gender etc. for the selection of the members. There are two ways in which the members can be selected to the Gram Panchayat, that is, either through elections or through consensus amongst the villagers. Hence, it is not compulsory to conduct elections. In the event that a consensus cannot be built election is necessary like in the last elections.

The details of the current elected members from Kattanbhavi are as follows.

Table 2: Details of the elected Gram Panchayat members from Kattanbhavi

Name	Category	Gender
KaryppaLingappa Bhandurge	General	Male
NakkappaKumbargi	ST	Male
Anita Mallappa Bhandurge	General	Female

1.2.Secondary data Analysis

Bambarga Gram Panchayat

The Bambarga Gram Panchayat office did not have any population data records maintained at their office. The data used in this study has been obtained from Karyappa Bhandurge, the elected Gram Panchayat member from Kattanbhavi.

Table 3 Population details, Bambarga Gram Panchayat

Category	Male	Female	Sex ratio	Total
SC	586	623	1063	**1209 (21%)**
ST	150	138	920	**288 (5%)**
Open	2023	1990	984	**4013 (73%)**
Total	**2759**	**2751**	**997**	**5510**

Following highlights can be seen from the table

- 21% of the population belongs to the Scheduled castes and 5% to the Scheduled tribes.
- Sex ratios in the three categories viz. SC (1063), ST (920) and Open (984) vary drastically. The overall sex ratio of Bambarga Gram Panchayat however is 997 as compared to Indian national sex ratio 940 and Karnataka state sex ratio 965 (Census of India, 2011) are much higher.

Kattanbhavi

The Gram Panchayat could not provide us with any more demographic data and the same is not available with the Zilla Parishad. Thus further analysis like sex ratio under 6, education etc. was done with Kattanbhavi as a unit from the data collected during household surveys.

Population

The sample size was 25% of the number of households as 51 out of the 200 households were surveyed. According to Karyappa Bhandurge (the elected Gram Panchayat Members), the population of Kattanbhavi is 1350. The sample was 284 (22%) of this population. The following table shows the population details of the sample.

Table 4 Category wise population in sample

Category	Male	Female	Under 6		Total population	Sex ratio
			Male	Female		
Maratha	108	96	**7**	**3**	**204**	889
Naik	42	38	**5**	**3**	**80**	905
Total	**150**	**134**	**12**	**6**	**284**	**893**
APL	65	52	**5**	**2**	**117**	800
BPL	85	82	**7**	**4**	**167**	965
Total	**150**	**134**	**12**	**6**	**284**	**893**
Maratha-APL	65	52	**5**	**2**	**117**	800
Maratha-BPL	43	44	**2**	**1**	**87**	1023
Naik-APL	0	0	**0**	**0**	**0**	-
Naik-BPL	42	38	**5**	**3**	**80**	905
Total	**150**	**134**	**12**	**6**	**284**	**893**

Highlights from the table are as follows

- In the sample, 28% people belonged to Naik caste and the other 72% were Marathas.
- Sex ratio of the whole sample is 893 as compared to Indian national sex ratio 940 and Karnataka state sex ratio 965(Census of India, 2011) which is much lower.
- Sex ratio in children below 6 is worryingly low, mere 500.

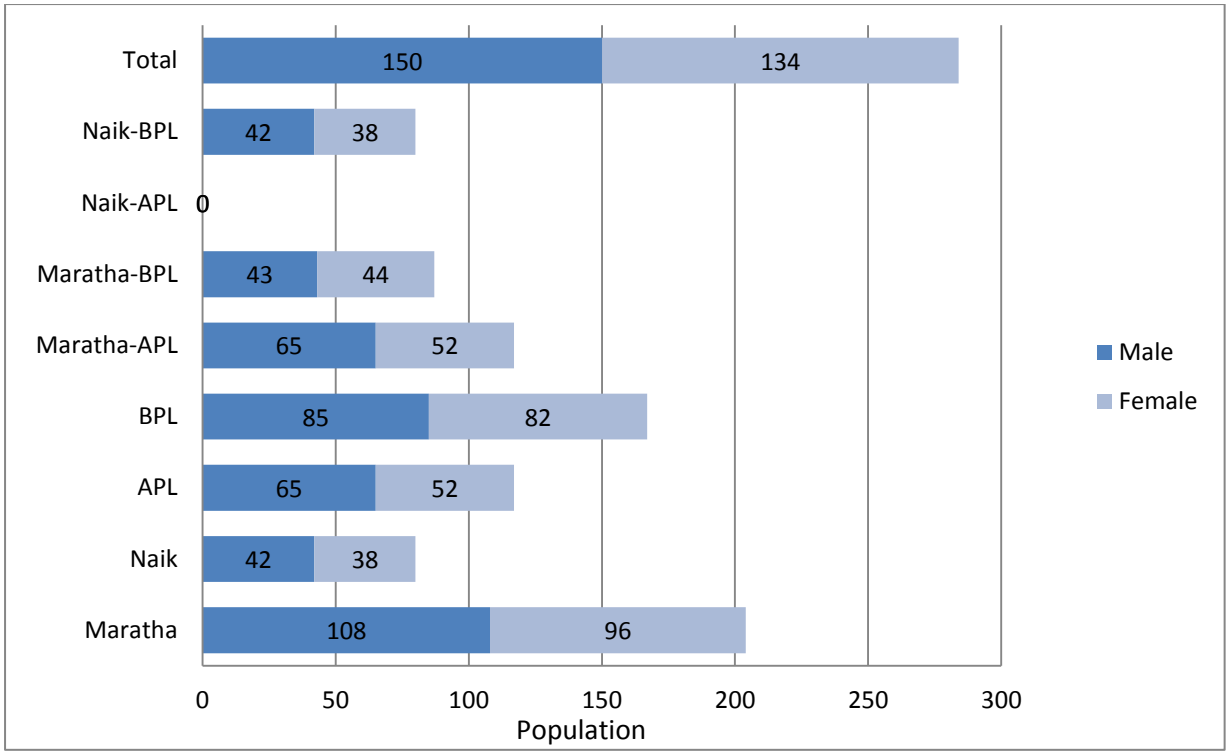


Figure 1Population distribution across categories

Education

The household sample also contained questions about the education of the household members. The education has been divided in this case in 5 categories for analysis viz. Illiterate, up to 4th, up to SSLC which is 10th class, up to PUC which is 12th class and above PUC.

Table 5 Distribution of population in terms of education in sample in Kattanbhavi

Category	Illiterate	Up to 4th	Up to SSLC	Up to PUC	Above PUC	Total
Maratha	64	38	68	22	12	204
Naik	32	15	26	4	3	80

Highlights from the table are as follows

- Literacy 66% as compared to 74% in overall India and 76% in Karnataka (Census of India, 2011).
- Literacy is higher in Marathas (69%) than Naiks (60%).
- Despite the clear cut difference in the economic status between the Naiks and the Marathas, the trends in the education pattern remain similar in both cases.

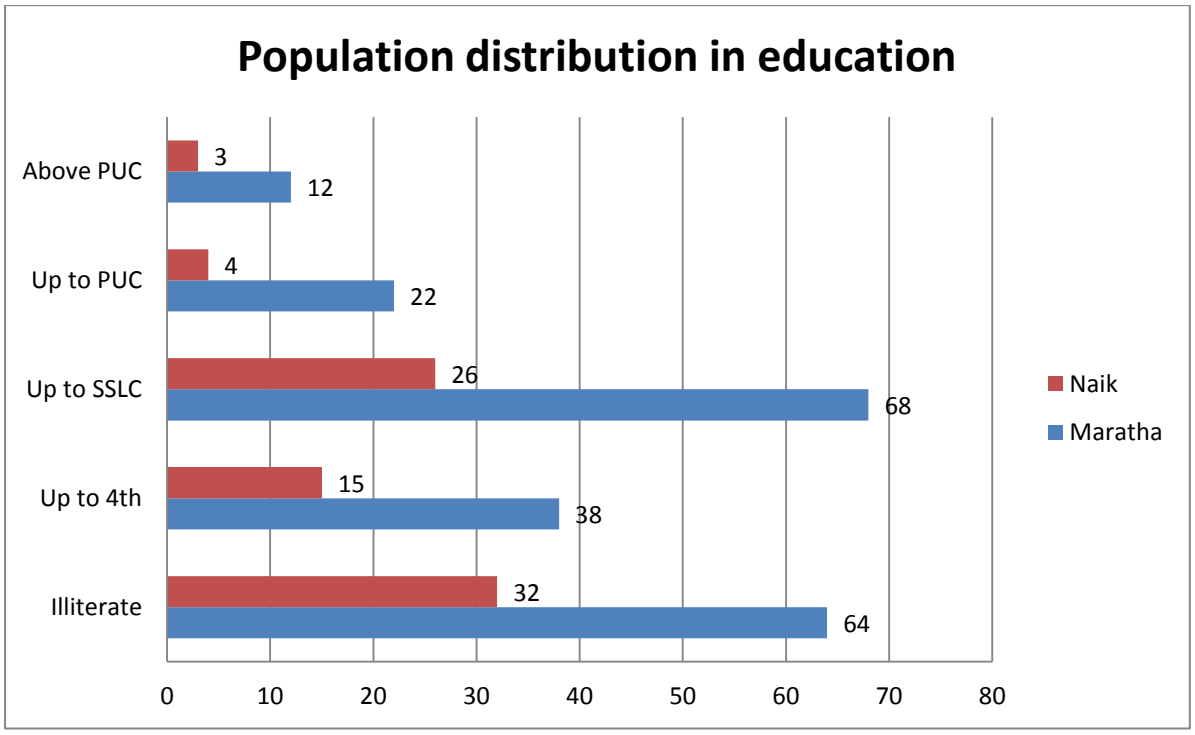


Figure 2 Population distribution in education

Livelihoods

From the sample the major sources of incomes for the households that came up were Agriculture, the main occupation of most of the houses, migration to other places, dairy, labour (both agricultural and non agricultural) and business. The following table shows the households having income from the above sources. Note that the numbers would not add up to the total number of households surveyed as many of the households have more than one source of income e.g. agriculture and dairy, shop (business) and dairy etc.

Table 6 Sources of income for households

Source of income	Households	
	Number	%
Agriculture	49	96
Migration	27	53
Dairy	15	29
Business	7	14
Labour	8	16

1.3.Selection of Study Area

The Bambarga Gram Panchayat comprises of 9 villages as mentioned earlier. Out of the 9, there were many reasons to pick Kattanbhavi as the study area.

Size and population

Kattanbhavi has about 200 households and the population is 1350.Both of these were along the requirements for this field study.

Language and stay arrangements

Ningenhatti was another village with a similar size as Kattanbhavi but the residents are Kannada speakers hence the field work would have been problematic. In addition to that arrangements for accommodation and boarding could not be made there.

Directed research

Our directed research interests and capabilities were considered while selecting the study area. The presence of biogas plants and the need for the assessment of their current status was one of them. Kattanbhavi has about 20,000 cashew trees and the seeds are sold to agents. Cashew nut processing unit in the area could add to the farmers' income and start a new livelihood activity in the area. Both of these were found suitable to our research interests. Thus Kattanbhavi was chosen as the study area.

1.4.Base Map Preparation

The base map was prepared before going on the field to study the general location using Google Earth imagery as the base. This map contained the roads and distances to the nearby villages as available on Google maps. The interior details like the water sources, the temples etc. were added as we came to knowabout them. The details like village boundary, Anganwadi were added after completion of the resource and social maps.

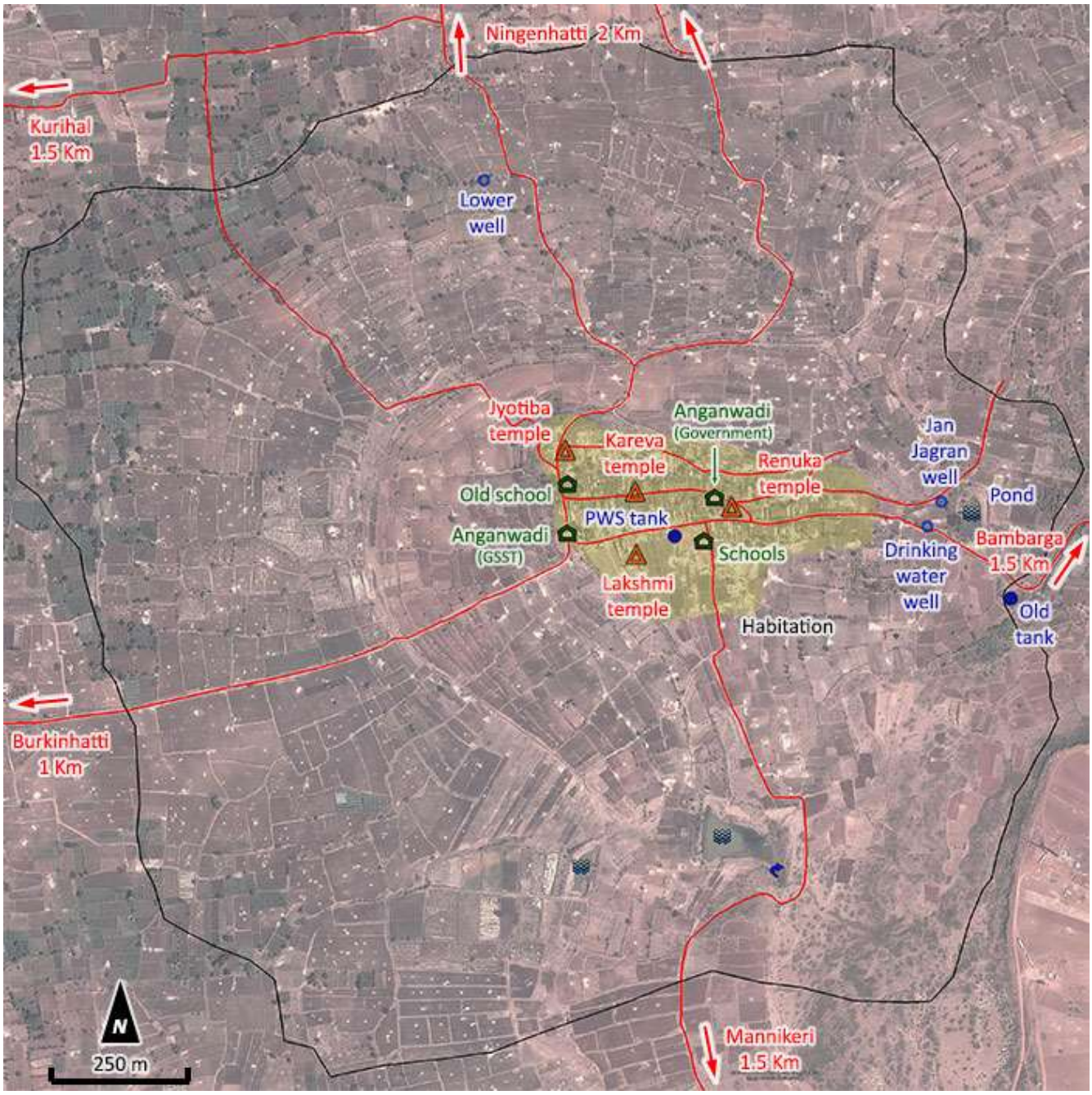


Image 3 Kattanbhavi - Base map

1.5.PRA

PRA was done in the first few days of our field stay, so as to get a detailed understanding of the various aspects of life in Kattanbhavi. In order to reach out to the villagers, we attended an SHG meeting on May, 14th 2013, wherein we discusses about various activities pertaining to PRA and sought an appropriate time to conduct these activities. This served as a good ice breaking session and all the people came to know about the purpose of our visit.

The following sections highlights the result of the PRA activities

1.5.1. Resource Map

We conducted resource map on the May, 15th2013 in the Karevadevi temple,as suggested by the villagers. The participants were

1. AvakkaMarutiBhandurge
2. ShantaSateri More
3. RenukaDattaNesarkar
4. Rajashree Manish Kotekar
5. Lakshmi Narayan Bhandurge
6. Bharathi Yashwant Bhandurge
7. Pornima Yashwant Bhandurge
8. Medha Yashwant Bhandurge
9. AbhayAppajiBhandurge
10. AkshayLakshman Bhandurge
11. Rahul More
12. Mohan More
13. Suraj More
14. Kamal Appaji Bhandurge
15. RakshibaiSantuKurhade
16. VimalMaleshiChaugule
17. Lakshmi Moneshree More
18. KalpanaAnnappaKotekar
19. PhakirabaiHolyappa Bhandurge
20. TorsaPundalik Bhandurge
21. ParvatiParasramKulmache
22. ParvatiBhernathKotekar
23. Lakshmi Parasuram More

The following images show the making of the resource map in the temple. The majority of the participants were women.

Image 4 making the resource map in the temple

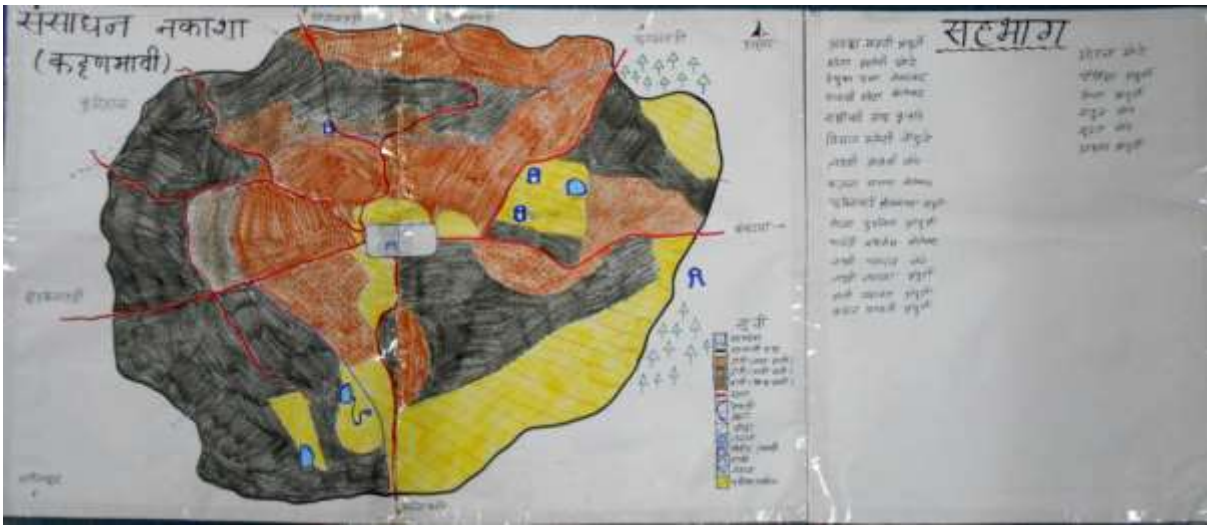


Image 5 Resource map of Kattanbhavi

Following are the inferences from the resource map

Three types of soils are found in the area, Black, red and Masari Mati the sandy red soil. The black soils are on flat lands, red on slopes and Masari is found on low lying flat lands.

Sparse forests are situated in the north east side of the village. Two streams, the perennial one in the south western part and seasonal in north part of the village. Drinking water well is situated near the habitation. Wastelands are present in south east part of the village.

1.5.2. Transect Walk

We did two transect walks across the village. First one was in the East-West direction and the second one in the North-South direction. Mohan More, a youth from the village guided us on both these walks. The change in the slope, soil, vegetation and the presence of different water sources has been shown in the chart.

1.5.2.1. East-West transect walk

We covered the area from the Old tank on the Eastern boundary of the village, along the road to Bambarga to the western boundary towards Burkinhatti. The walk was divided in two sections. The starting point of both these sections was the village office.

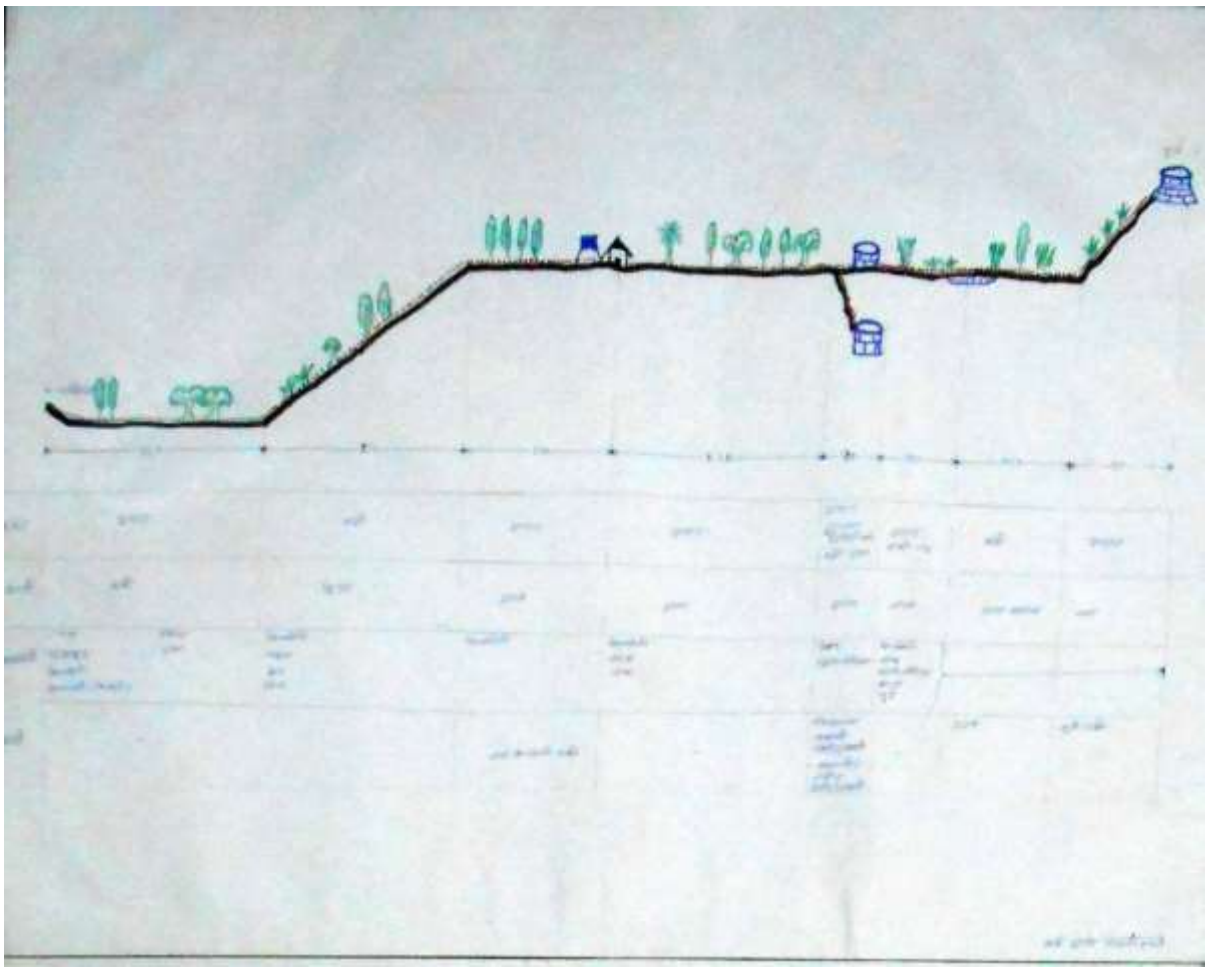


Image 6East-west transect walk

Observations

As mentioned in the chart, following are the observations in terms of the vegetation, soil, slope and water sources. The agriculture season had not started during our transect walk, hence the data on the crops grown is not added.

Vegetation

The vegetation was fairly uniform throughout the transect walk. Trees observed wereSubabhul, Tamirind, Mango, Eucalyptus, Fig, Karanja, Coconut, Pui etc.

Few types of shrubs like Bor, Kamuna, Tumba, Pogostemon sp. Smithis sp. Eriocaulon sp. Etc have been observedalong with 3 kinds of grasses.

Soil

Two kinds of soils were observed during this transect walk. The sloped land had red lateritic soil and the flat lands had black cotton soil.

Slope

Kattanbhavi is located on a plateau. The hill towards the north converges into the plateau the village is situated on. The Eastern boundary thus has a moderate slope facing west. Similarly after the habitation, the gentle slope till the west boundary faces west.

Water sources

The old tank, used for the public stand posts is located just outside the eastern village boundary. It is about 20,000 l capacity. The drinking water well is located in the eastern part of the village. It is used as the primary drinking water source of the village. Another well has been dug at about 100 m from the drinking water well. This well does not have any recharge springs, even in the monsoon. The next water source was the current overhead water tank for the piped water supply scheme which is next to the school.

The following images highlight the terrain and the various water sources

Image 7 the road towards the eastern boundary of the village

Image 8 The Jan Jagaran well

Image 9 the old tank meant for PWS

Image 10 farm ponds

1.5.2.2. North-South transect walk

The starting point of this walk was the village school. This walk was also divided in two sections. We walked till the southern boundary of the village, near the perennial stream in the first section and in the next section, to the northern boundary through the farmlands.

The variations in the slope, soil, vegetation and the water sources have been shown in the chart.

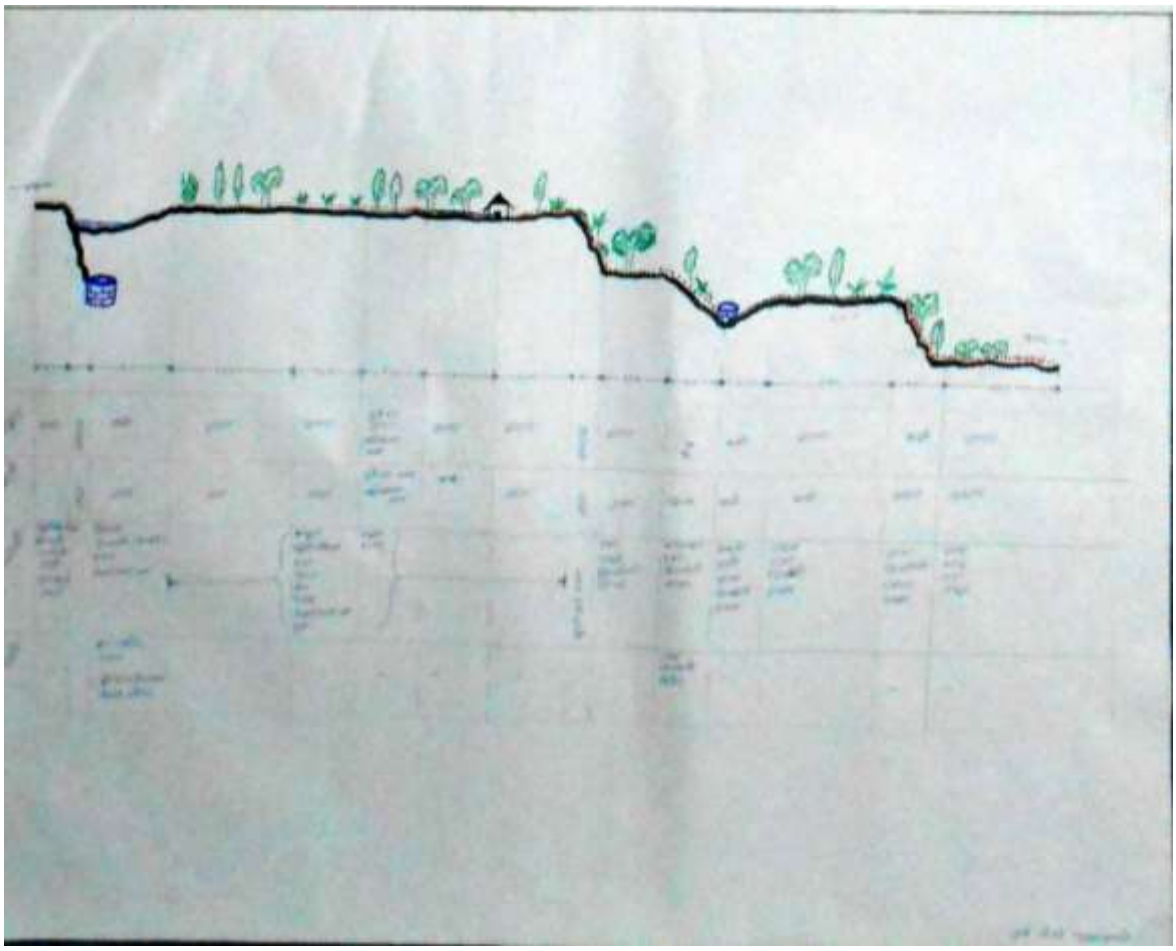


Image 11 North South transect walk

Observations

Following are the observations in terms of the vegetation, soil, slope and water sources as mentioned in the chart.

Vegetation

The north south transect walk also had similar kinds of vegetation throughout the walk. The trees like *Terminalia*, Flame of forest, figs, Eucalyptus, Bombax, Dhamana, Tamirind, Mango, Cashew, and Jamun etc. were observed. Bushes like Bor, Kamuna, Tumba, Karvand etc. were observed. Two types of grasses were observed.

Soil

Three types of soil, Lateritic red soils on the slopes, Black cotton soils on the flat lands and the sandy red soil called *Masarimati*मसारी माती is found towards the northern low lying flat lands, towards Ningenhatti.

Slope

The South side of the village has a downward slope towards the habitation from the Mannikeri side. The habitation is located on the almost flat plateau and towards the north, medium to gentle slopes are found facing the north till the village boundary.

Water sources

Near the southern boundary, there is a perennial spring, used by a few people as a drinking water source. The spring joins the lake nearby, which has been sold to the Burkinhatti Gram Panchayat. The people from Kattanbhavi do use this lake for washing clothes etc. The well, known as Lower well खालची विहीर is located down the hill towards the northern boundary. This is used as the source for the piped water supply scheme in Kattanbhavi.

The following images shows the terrain and the various water sources

Image 12 from the habitation boundary to the southern boundary of the village

Image 13 from the habitation to the northern boundary of the village

Image 14 black soil in farmlands

Image 15 red soil in farmland

Image 16 farm pond

Image 17 Lower well (PWS)

Image 18 perennial stream near the southern boundary of the village

Image 19 pond in the southern boundary of the village sold to Burkinhatti

Image 20*Zizyphusspp* bush

Image 21Tumba bush

Image 22kamuna bush

Image 23*Bombaxceiba* tree

General observations from transect walks

General observations of both the transect walks are as follows

- Kattanbhavi sits on top of a hillock, and the nearby villages like Handiganur, Burkinhatti and Kurihal are visible.
- The village has both flat lands and gentle slopes. Both have farm lands.
- Generally, the slopes have red soil and flat lands have black soil.
- The black soil is more abundant than red soil. The farmlands near the northern boundary of the village have sandy red soil, called मसारी माती.

1.5.3. Social Map

Social map was conducted on May, 19th2013 in the village temple according to the villagers wishes. The participants were as follows

1. Bharathi Yashwant Bhandurge
2. RenukaDattaNesarkar
3. Priyanka Yashwant Bhandurge
4. AvakkaMaruti Bhandurge
5. Rahul More
6. Medha Yashwant Bhandurge
7. Suraj More
8. Pornima Yashwant Bhandurge
9. Mohan More

The map making session began with an introduction to the purpose of the activity. We then explained the requirements and expectation from the social map along with its need. The women of Kattanbhavi were extremely enthusiastic during the whole activity. After the completion of activity we showed the map to other villagers and also marked as many houses as possible. Out of the nearly 200 households in the village, 191 were marked on the map. Following are some images which highlight the map making process

Image 24Making the Social Map in the temple

Image 25 Showing the Social Map to other villagers

Image 26 Finalizing the Social Map

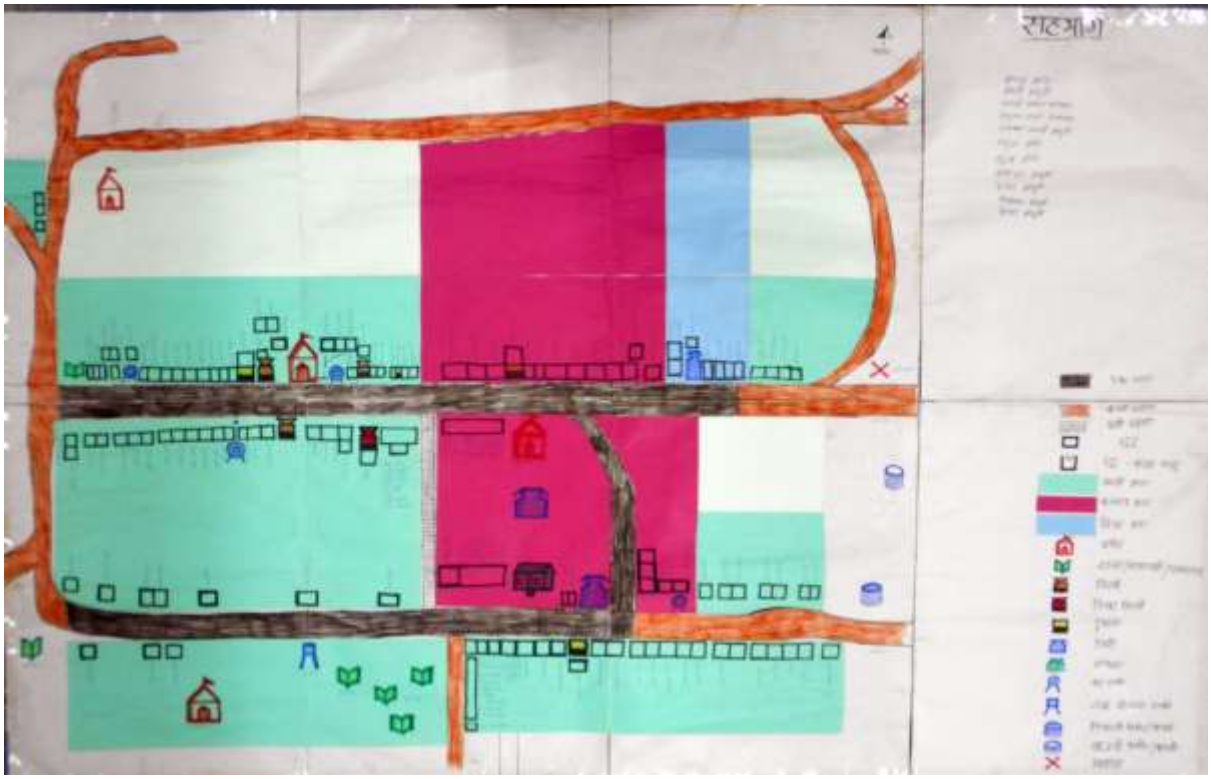


Image 27 Social map of Kattanbhavi

Following are some of the inferences from the social map

1. There are some distinct Naik and Maratha areas in the village and few areas are mixed. As shown in the map, the pink patches represent the Naik areas and the green and blue patches represent the Maratha and mixed areas respectively.
2. There is no spatial demarcation between the APL and BPL families.
3. 191 households are marked in the map along with the names of the heads of the family. Although the villagers said repeatedly that there are more than 200 households, we could not find any house unmarked in the social map. There are no Kaccha houses in the village and one house id under construction.
4. There are many temples in the village viz. the Kareva Devi temple, the Jyotiba temple, the Lakshmi temple and the Renukamata temple.
5. There are two *Anganwadis*, one Marathi and Kannada school respectively. One of the anganwadis is run by the government and the other by the NGO Govind Dham Shikshan Sadhana Trust, also associated with Shivaji Kagnikar.
6. Many economic entities such as two flour mills, one spice mill, 4 shops and 3 milk collection centres are present in the village.
7. The water tanks built as part of the old and new PDS system are also demarcated. The tanks built as a part of the old system are not in use at present.
8. The wells present in the habitation namely the drinking water well and the Jan Jagaran well is also demarcated in the map.
9. The village consists of both tar and Kaccha roads along with a small patch of cobbled stone road.
10. The two graveyards are present in the north-east side of the village. The people of Kattanbhavi bury their dead even though they are Hindus. This is because there is less wood available.

1.5.4. Timeline and Trendline

Timeline was done during the course of the stay with multiple people such as KariappaLingappa Bhandurge, Shivaji Kagnikar, Yashwant Satba Bhandurge and SantuKurhade. The major events and the subsequent trends have been represented in the chart.

Trends	Time	Events
	mid 18th century	Kattanbhavi established
	1940	Drinking water well
	1940	Marathi School
	late 1960s	Chemical farming, Potatoes
Migration increased	1972	Famine
Chemical farming began	1972	first bore well - no water
	1972	Sarvodayis started working in Kattanbhavi
	1973	First biogas - dome - Narayan Bhandurge
	1975	Electrified in
	1975-76	ShramasanskarShibir
	1977	tractor
	1978	Night school
Water scarcity began	1979	Bambarga Kattanbhavi Kachcha road
	1979	Belgaum Kattanbhavi bus service
Increase in deforestation	1980	First shop
	1983	Street light
Increase in milch animals	1984	Karnataka Milk Federation milk collection centre
	1986-87	First three TVs - at the time of Ramayan - Mahabharat on TV
First HIV +ve patient	1987	floor mill - Narayan Bhandurge
	1989	first RCC house
Decrease in migration	1990	bicycle
Increase in joining army	1992	New Marathi School
Increase in branded liquor consumption	1992	Contour trenches for watershed works
	1992	First biogas - deenbandhu
Ban on grazing	1993-94	GP
	1993	Solar lights
	1993	Tempo

	1995-96	Kannad School
	1996	Lake completed
	1996	14 acre pasture reserved, 24 x 7 watchman
	1997	First computer - 75000 - KMF society
	1997	SHG
	1997	anti-liquor*morcha*
	1997	Land line telephone
	1998	Motorcycle
Improvement in sanitation	1998	Old tank near eastern boundary of the village
Reduced occurrence of HIV	1999	Water rationing
Afforestation	2000	mobile
Forest increased	2000	Road till bus stop black topped
	2001	PWS well filled with rubble due to sudden rains
Increase in education	2003	First graduate –RajuKotekar
	2003	Gokul dairy 1
	2003	PWS connections to homes with 700 Rs contribution
	Around 2003	Temple renovated
	2004	Internal roads black topped
	2004	GP elections, two fronts - Congress & BJP 2009
Decrease in local liquor consumption	2005	Gokul dairy 1 closed
	2005	NREGA works started in village- 3 elections before them
	2006	Gokul dairy new
	2006	Shramadan stopped
	2007	Road, storm water drainages in village - NREGA
Organic agriculture resumed	2008	Chikungunia
	2009	New PWS
	2009	First migration abroad
Increase in organic agriculture	2013	Suzlons works - road spoilt - no regular bus in monsoon
	2013	Internet

Figure 3 Kattanbhavi timeline, trend line

The following image shows the timeline and trendline being recorded as per the data given by Shivaji Kagnikar and SantuKurhade

Image 28Noting the Timeline and Trendline with Shivaji Kagnikar and SantuKurhade

1.5.5. Venn diagram

Venn diagram was made on July 9th, 2013. The activity was conducted in Suresh Wagralkar's shop, as it was easier to gather people for the activity. First a list of the institutions was made with the help of the villagers and then they were ranked according to their importance and accessibility. The participants were as follows

1. Maruti Naik
2. Mohan More
3. Balu Naik
4. MarutiSidbache
5. Poonam Bhandurge
6. Ratnakar Naik
7. Suresh Wagralkar
8. Priyanka Bhandurge

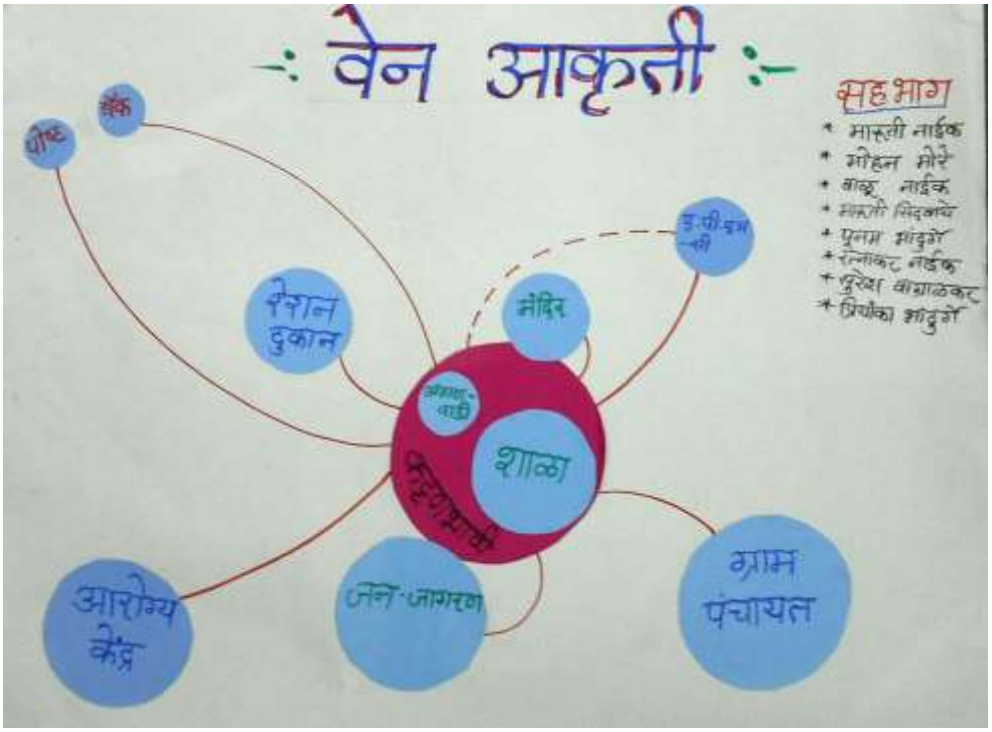


Image 29 Venn Diagram highlighting the institutions in Kattanbhavi

The size of the circles in the diagram relates to the relative importance of each of the chosen institutions. The accessibility to these institutions can be judged by the distance from the village, which is denoted by the pink circle. The lines denote the nature of the relationship between the individual institutions and the village. For instance dotted lines denote an indirect relationship and the continuous lines denote a direct relationship with the village.

Following are the major highlights from the diagram

- According to the people, Gram Panchayat is one of the most important institutions in the village. The reason for this is that all the schemes and subsidies are sanctioned by the Gram Panchayat itself and people have to visit the Gram Panchayat to get NREGA job cards, ration cards etc. Even then, in terms of accessibility it gets really low marks. This may be because, it is generally perceived as being incompetent by the villagers.
- The Jan Jagran was the second most important institution in the village since it is involved in multiple fields such as education, watershed, livelihood and empowering the rural women through the formation of Self Help Groups. It is also very accessible as there are many Jan Jagaran workers in the village.
- The PHC is in Handigunnur which is about 4km from the village. The villagers rarely go to the PHC, as there are two barefoot doctors that visit the village on a regular

basis. Still, the PHC is the second most important institution in the village as perceived by the villagers. This may be the case because the PHC is required in case of emergencies and for people who cannot afford the barefoot doctors.

- Interestingly, according to the participants, the Anganwadi was one of the least important, but the most accessed institution in the village. This is because the villagers regularly send their children to Anganwadis.
- Along with the Anganwadi, the village schools were also frequently accessed by the villagers. The importance of education has grown in the recent times.
- The Post Office and the Bank are the least important and accessible in the list. The post office is located in Bambarga and the bank is situated in Kadoli. Both are nearby villages.
- The PDS shop was accessed once per month and perceived to be fairly important.
- The village temple is the meeting spot of majority of the villagers. The SHG meetings are also held in the temple, once in a month. Hence it is both moderately important and accessed.
- There is a direct and indirect relationship of the village with the APMC as many a times the people access it with the help of middlemen.

1.5.6. Seasonality

This exercise was done with Lakshman Bhandurge, Parashram More, Priyanka Bhandurge, Mohan More and Poonam Bhandurge. In this exercise the intensity of occurrence / availability of resources, agricultural works etc. have been marked according to their variation all round the year.

Particular	January	February	March	April	May	June	July	August	September	October	November	December
Agriculture	2 or 3	2 or 3	2	1	0	4	3	3	4	3	2	2 or 3
Water	1	1	1	1	0	2	3	3	3	3	2	2
Festivities	1	0	4	1	4	1	1	2	4	4	2	0
Income	3	0	1	1	0	0	0	0	1	1	1	3
Expenditure	1	2	3	2	3	4	2	0	2	3	2	2
Diseases	0	0	0	1	2	3	3	3	2	1	1	1
Wage labour	1	1	2	2	3	2	1	1	1	0	1	1
Return migration	0	0	0	1	1	2	2	0	4	4	0	0
Fuel availability	1	2	4	4	1	0	0	0	0	1	2	2

The seasonality chart shows thatfor agriculture, only two months in the summer are less work but all the year is almost packed. The water availability starts going up with monsoon, slowly starts to go down by October and summer is the hardest time for villagers to get water from all possible sources, the drinking water well, bore wells, the stream etc. Festivals are intermittent with Holi in March, weddings in May and Dussera –Diwali in September and October being themost important festivities in the area. Income is only available with harvest of crops. Potato is the cash crop of the region, thus most income comes in December and January when the produce is sold in APMC market. Expenditure is going on all the time, but the most in June, when labour needs to be hired for plantation ofvarious crops.

Most occurrences of diseases are during the monsoon, due to overworked population. Plantation is the time where most of the labours in the village get wages. Most of the people come back home during potato harvest season. This is because getting labour for this task is very expensive. People use fire wood as a secondary fuel, and thus its availability is an important issue. Most of the firewood is gathered from own farms during the summer months.

The following is the image of the seasonality chart made on field

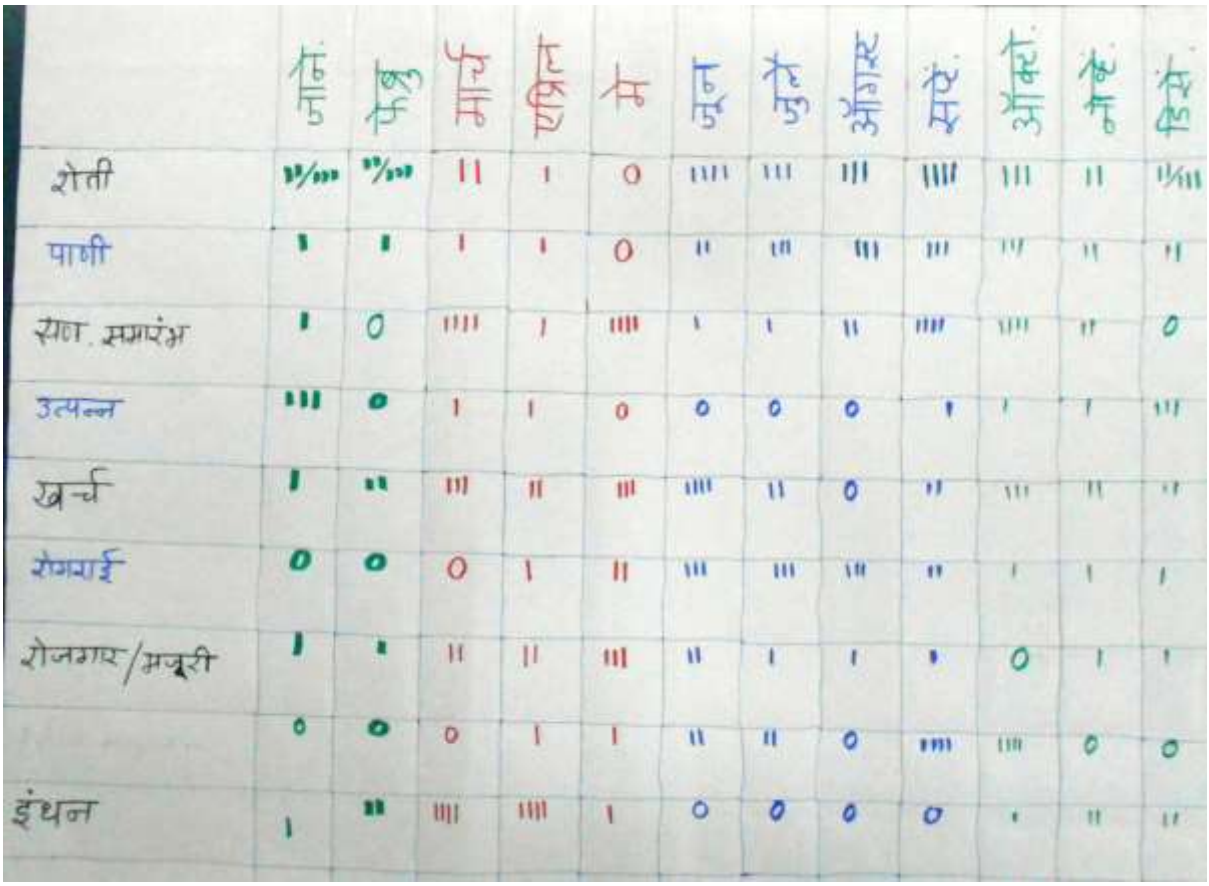


Image 30 Seasonality chart of Kattanbhavi

1.5.7. Focussed Group Discussion

Focussed group discussions were conducted with the villagers many times during the village stay as it was not possible to gather a huge crowd at once. Hence, discussions with small groups of people were carried out frequently to gather as much information as possible. The agenda of these discussions was to get an insight in to their daily activities, their thoughts regarding the village and the issues they face. The results of these discussions are highlighted in the following section

Men

It was very difficult to gather groups of men during our field stay as they were involved in agricultural activities. However, numerous discussions on many occasions helped us to get information on various aspects.

Daily activity

Majority of the men in Kattanbhavi are farmers and hence their daily activities are heavily influenced by the agricultural requirements. As told by the villagers, the major difference between seasons lies in terms of the time allocated for farming, which is usually from 9:30 AM to 6:30 PM. During the months of monsoon, this time is spent in the field for various activities such as ploughing, sowing, weeding etc. In case of summer, less work is done in the fields compared to the monsoon season; hence people also spend their time socializing. However, in the winters the major the time from 9:30 AM to 4:00 PM is spent in activities like bringing fodder and grazing animals and the rest is spent in protecting the crops from birds and also bringing fodder.

Table 7 activity chart of males in the summer

Time		Duration	Activity
6:00 AM -	6:30 AM	30 min	Waking up
6:30 AM -	7:30 AM	1 hour	Feeding and milking the cattle
7:30 AM -	8:30 AM	1 hour	Getting the fodder
8:30 AM -	9:30 AM	1 hour	Eating Breakfast
9:30 AM -	6:30 PM	9 hours	Farming activity / socializing
6:30 PM -	7:30 PM	1 hour	Feeding and milking the cattle; Cleaning the Cowshed
7:30 PM -	9:00 PM	1 hr 30 min	Agricultural activity at home
9:00 PM -	10:00 PM	1 hour	Eating Dinner
10:00 PM -	10:15 PM	15 min	Feeding the cattle
10:15 PM -	6:00 AM	7 hours 45 min	Sleep

No fixed time for bringing water; But men do bring water in cycle or Bullock Cart

Table 8 activity chart of males in monsoon

Time		Duration	Activity
6:00 AM -	6:30 AM	30 min	Waking up
6:30 AM -	7:30 AM	1 hour	Feeding and milking the cattle
7:30 AM -	8:30 AM	1 hour	Getting the fodder
8:30 AM -	9:30 AM	1 hour	Eating Breakfast
9:30 AM -	6:30 PM	9 hours	Going for farming
6:30 PM -	7:30 PM	1 hour	Feeding and milking the cattle; Cleaning the Cowshed
7:30 PM -	9:00 PM	1 hour 30 min	Agricultural activity at home
9:00 PM -	10:00 PM	1 hour	Eating Dinner
10:00 PM -	10:15 PM	15 min	Feeding the cattle
10:15 PM -	6:00 AM	7 hr 45 min	Sleep

No fixed time for bringing water; But men do bring water in cycle or Bullock Cart

Table 9activity chart of males in winter

Time		Duration	Activity
6:00 AM -	6:30 AM	30 min	Waking up
6:30 AM -	7:30 AM	1 hour	Feeding and milking the cattle
7:30 AM -	8:30 AM	1 hour	Getting the fodder
8:30 AM -	9:30 AM	1 hour	Eating Breakfast
9:30 AM -	4:00 PM	6 hr 30 min	Agricultural activity like bringing fodder, grazing animals
4:00 PM -	6:30	2 hr 30 min	Protecting from birds and bringing fodder
6:30 PM -	7:30 PM	1 hour	Feeding and milking the cattle; Cleaning the Cowshed
7:30 PM -	9:00 PM	1 hr 30 min	Agricultural activity at home
9:00 PM -	10:00 PM	1 hour	Eating Dinner
10:00 PM -	10:15 PM	15 min	Feeding the cattle
10:15 PM -	6:00 AM	7 Hr 45 min	Sleep

No fixed time for bringing water; But men do bring water in cycle or Bullock Cart

Issue Ranking

Table 10Issue ranking by young men in Kattanbhavi

Issue	PrakashSanadi	KallappaSanadi	Yashwant Bhandurge	Total
Water	1	1	1	3
Road	2	2	5	9
Educational Facilities	4	5	2	11
Bus	3	3	10	16
Job	5	4	9	18
Electricity	6	7	6	19
Alcoholism	7	6	7	20
PHC			3	3
Profit in agriculture			4	4
MNREGA Payment			8	8

Men in Kattanbhavi ranked Water and lack of an all season road as the top two issues followed by lack of educational facilities like a school till 10^{th} class in the wheel. Alcoholism was the issue they were least concerned about. They also did not mention lack of a Primary Health Sub centre, Profits in agriculture and MNREGA payments as an issue.

Table 11 Issue ranking by young men in Kattanbhavi

Issue	Suresh Naik	Raju Naik	Uttam Naik	Mohan More	Total
Bus	1	1	1	2	5
Road	2	2	2	1	7
MNREGA Payment	3	3	3	9	18
Educational Facilities	4	4	4	7	19
PHC	5	5	5	4	19
Profits in agriculture	7	7	7	5	26
Job	6	6	6	8	26
water				3	3
Electricity				6	6
Alcoholism				10	10

Young men in Kattanbhavi felt the most pressing issue to be lack of a reliable bus service. This could be attributed to the fact that most of them aspire to have jobs in Belgaum or around and thus need good bus connectivity. This was the only group not to mention water scarcity as a problem at all.

Women

The women in Kattanbhavi are fairly empowered. They showed an active interest in our study and were also well informed. A lot of information about the village in general was gathered during the discussions.

Daily activity

Table 12 women activity chart

Time		Duration	Activity
5:00 AM -	5:15 AM	15 min	Waking up
5:15 AM -	5:30 AM	15 min	Drink tea
5:30 AM -	7:00 AM	1 hour 30 min	Cleaning the cowsheds Milking the cattle Other household activites
7:00 AM -	8:00 AM	1 hour	Bringing drinking water
8:00 AM -	9:00 AM	1 hour	Cooking
9:00 AM -	9:30 AM	30 min	Cleaning the utensils Feeding the cattle
9:30 PM -	5:30 PM	8 hour	Going for farming
5:30 PM -	7:00 PM	1 hr 30 min	Cleaning the cowshed Milking the cattle Other household activities
7:00 PM -	9:00 PM	2 hour	Making Dinner
9:00 PM -	10:30 PM	1 hr 30 min	Eating dinner and watching TV
10:30 PM -	5:00 AM	6 hrs 30 min	Sleep

Issue ranking

The women ranked water scarcity as the top priority issue followed by the lack of an all season road. Irregularity of the MNREGA payments and lack of educational facilities like school till the 10th class were ranked afterwards.

Table 13 Issue ranking by women in Kattanbhavi

Issue	LagmavvaBasvani Naik	Lakshmi Narayan Wagralkar	BharataKamaniSidbache	RatnabaiBaswant Bhandurge	VijetaBhavkuPatil	LakshmiMarutiPatil	SangitaParashramWarpe	Gita Shivaji Kotekar	Bharati Yashwant Bhandurge	Total
Water	1	4	2	2	1	5	1	1	1	18
Road	2	8	1	4	2	3	9	2	4	35
MNREGA Payment	6	2	6	7	7	1	5	5	2	41
Educational Facilities	4	6	3	8	3	8	2	4	5	43
Bus	7	3	8	3	6	2	6	7	3	45
PHC	3	1	4	1	9	9	7	9	7	50
Profit in agriculture		5	5	6	8	7	8	8	6	53
Electricity	8	7	7	9	4	4	3	3	9	54
Alcoholism	5	9	7	5	5	6	4	6	8	55

The young women ranked water as the first issue, lack of an all season road and lack of educational facilities as the second important issues.

Table 14 Issue ranking by young women in Kattanbhavi

Issue	SapanaBasvani Naik	Poonam Yashwant Bhandurge	PriyankaChandrakantChavan	Priyanka Yashwant Bhandurge	Total
Water	1	1	1	1	4
Road	2	4	3	4	13
Educational Facilities	6	2	2	3	13
Bus	4	6	4	9	23
Electricity	8	5	5	5	23
PHC	3	9	6	7	25
Profit in agriculture	9	3	10	6	28
Alcoholism	5	8	8	8	29
MNREGA Payment	7	7	7	10	31
Job			9	2	11

1.5.8. Sampling Criteria

After the transect walks, resource and the social map, we got a brief idea about the village. In order to do the sampling for the household surveys, we met with Shivaji Kagnikar and Yashwant Bhandurge to get further informationonthevillage profile. Following were the information given

1. There is no spatial demarcation in the village with respect to APL and BPL families
2. One-fourth people in the village are from the Naik community
3. The social map shows and the village elders validated that there is a spatial demarcation with respect to Maratha and Naik community
4. The economic status of households owning additional economic entities can be higher than the other villagers. These economic entities such as shop, mill etc. has been denoted in the social map.

Following were the sampling criteria based on the above information

1. Spatially uniform distributed sampling
2. 25% Kannada people in the sample
3. Sampling consisting the economic entities (mill, shop)

2. Agriculture

2.1.Introduction

Agriculture is the most prevalent and main occupation of the people of Kattanbhavi. The household survey revealed that for 90 per cent of the households the primary source of income was agriculture. The following chapter describes the agricultural practices in Kattanbhavi along with highlighting the perception of the farmers towards agriculture.

2.1.1. Climate

Kattanbhavi has a moderate climate with temperatures ranging from 18°C to 35°C. The average rainfall in Kattanbhavi is about 950mm. The south west monsoon provides rain in the months of June, July and September. These months are the lifeline of Kattanbhavi as much of the agriculture is rainfed. According to the people, rainfall has decreased over the years.

2.1.2. Soil

There are three types of soil in Kattanbhavi viz. Black soil, red soil and sandy red soil known as *Masarimati* in the local language.

Black soil

Black soil is fertile and needs less water than red soil. It is suitable for growing rice and is present in abundance in Kattanbhavi.

Image 31Field with Black cotton soil

Image 32Field with red soil

Red soil

Red soil is rich an iron and the fields are used for groundnut and potato cultivation by most of the farmers.

Sandy red soil

Sandy red soil is has the least water holding capacity and is present in small parts of the village. It is also used for growing potato and other vegetables.

Image 33 French beans growing in *Masari*soil

2.1.3. Land holdings

The average land holdings of the sampled 51 households came up to be 2.3 acres. The average number of land parcels is 4.4. Three major groups were identified in the village according to their economic status, APL Maratha, BPL Maratha and BPL Naik. There are no APL Naik categories in the village. The following table shows land distribution amongst these three major groups

Caste	Economic Status	Number of Households	Average Land Holding (acres)	Average number of land parcels
Maratha	APL	20	3.5	5.5
	BPL	16	1.8	4.4
Naik	BPL	15	1.3	2.8
Overall		51	2.3	4.4

The above table clearly highlights that there is a difference between the land holdings under all the three categories with the APL Maratha having a higher average land holding of 3.4 acres and the BPL Naik having the least average land holding of 1.2 acres.

2.2.Inputs for agriculture

The various inputs to agriculture, observed in Kattanbhavi are as follows

2.2.1. Water

Majority of the agriculture in Kattanbhavi is rain fed. The monsoon rains in Kattanbhavi commences in the month of June and carries on till September. Very few villagers use pumps viz 6 households. The average pump usage is 4 hours a week.

2.2.2. Fertilizers

Both chemical and organic fertilizers are used in Kattanbhavi. Household survey indicated that 36 out of the 49 households engaged in farming use chemical fertilizers, 2 use organic fertilizers only and the rest use both chemical and organic fertilizers. The slurry from the biogas plants are also put into the farmlands after mixing it with rice stalk. The details of the fertilizers used are given in the section describing the crops grown in Kattanbhavi

Image 34Organic fertilizer mixed with chemical fertilizer for a potato crop

2.2.3. Pesticides and insecticides:

Various pesticides and insecticides are used in Kattanbhavi such Virat, Mangate, Soytan, rodomill etc. Potato is one of the major crops demanding the use of pesticide and insecticide as it is prone to diseases. The crop wise details of the usage of pesticides and insecticides are discussed in the subsequent sections.

Image 35Pesticides used in Kattanbhavi

2.2.4. Agricultural Labour

According to the discussions with the villagers, it is difficult to find agricultural labour in Kattanbhavi. The common practice is that people work in each other farms as a form of barter system. It is a not uncommon in Kattanbhavi to see relatives working together in each other's farmlands. The rate of labour in Kattanbhavi varies from 50 to 150 Rs with the average amount paid being close to 100 Rs. Out of the 49 sampled households engaged in agriculture, only 37 were employing labourers in their farm in the range of 5 to 340 per year. However, the number of labourers employed is dependent on multiple factors such as the land holding, type of crops grown and the number of people per household.

2.2.5. Machinery

There are 4 tractors in the village. These are used by almost all the farmers in the village once a year or once in two year to till their farms. Tractors are rented to other farmers for400 Rs/hour. An acre of land requires 8 hours of tilling.

2.2.6. Animal

Field observations suggest that majority of households in Kattanbhavi use bulls for tilling their farmlands. According to the household survey, 32 households own bulls, out of which 23 use it for tilling the farmlands. This may seem like a small number, however similar to labour, animals are also shared amongst the villagers.

Image 36Bulls being used with *Kulav*

2.3.Crops grown in Kattanbhavi

The climate and the soil in Kattanbhavi support a variety of crops. Traditionally these crops were grown together as mixed crops. However, after the advent of the Green revolution, monocropping system has been followed predominantly. Currently, intercropping between certain crops is also observed. The crops grown in Kattanbhavi are as follows

- Major crops: Paddy, Jowar, Potato, Groundnut
- Minor crops: ridgegourd, tomato, cabbage, cucumber, mustard, Chilli, French Beans
- Fodder crops: Bajri (not bajra), Corn

The following section gives a detailed description of some of the crops grown here

2.3.1. Cereals

The black and red soil, wet monsoons and availability of groundwater in dry seasons makes Kattanbhavi a suitable place for cultivation of cereals such as Rice, Jowar and Corn.

Rice (भात)

Rice is one of the staple foods here. It is also used to make Jowar-Rice mixed flour roti (भाकरी), Kheer like sweet (पिठी). It was observed in the household survey that 46 out of 49 households engaged in agriculture were cultivating rice, which is about 93 per cent of the sample. Two practices of cultivation, i.e. with or without transplanting are present. When a drier season is anticipated, for a land without alternate water source, transplantation is not practised.

Image 37A non-transplanted Paddy field in Kattanbhavi

Inputs

Fertilizers

Most of the farmers use chemical fertilizers for the cultivation of rice. The household survey suggests that out of the 46 households cultivating rice, 36 of them were using chemical fertilizers, which is 78 per cent. Fertilizers like IFCO (NPK: 20 20 0) and IFCO (NPK: 18 18 10) are currently being used at approximately 350 Kg per acre.

Pesticides

The rice crop is sprayed with pesticides once or twice depending on the farmer. The first dose is given about one and a half month after transplanting and then as the rice grains start to develop, second dose is given. The first dose is given only by some farmers. Insecticides like Virat (210 ml x 2 doses), Mangate (250 g x 2 doses), Soytan (250 ml x 2 doses) are currently being used.

Labour

Cultivation of rice is labour intensive and requires 119 man days of hired labour per acre for transplanted rice and 73 man days for an acre of non-transplanted rice. The most dominant (~35% in transplanted rice) requirement is during transplantation and harvesting.

Animal power

Bullocks are used to plough the land. Ploughing an acre of land for rice cultivation takes about 6 hours for a pair of bullocks.

Machinery

Power tiller is used for ploughing the soil. Usage of tractor is same for both transplanted and non-transplanted rice. Ploughing an acre of land for rice cultivation takes about 5 hours for a tractor.

Water

Rice crop is in Kattanbhavi is a rain fed crop.

Economics

We studied a case to understand the economics of rice cultivation. Following table gives the details.

Table 15: Economics of transplanted rice cultivation - case study

Operation	Requirement	Unit	Rate (Rs/ unit)	Amount
Seed	20	Kg	37	**740**
Fertilizer	7	50 Kg bags	1000	**7000**
Pesticides				
Virat	0.42	Liter (in 2 doses)	350	**147**
Mangate	0.5	Kg (in 2 doses)	300	**150**
Soytan	0.5	Liter (in 2 doses)	700	**350**
Machinery				
Power tiller for making mud	5	Hours	300	**1500**
Bullocks	1	times, rate / acre	500	**500**
Irrigation				
Pump (5 HP = 4 KW)	18	Hours (1 dose)	Free	**-**
Labour				
Sowing	2	Man days	100	**200**
Transplantation	35	Man days	110	**3850**
Weeding	25	Man days	100	**2500**
Spraying	5	Man days	125	**625**
Fertilizer application	2	Man days	125	**250**
Harvesting	15	Man days	125	**1875**
Gather	15	Man days	125	**1875**
Threshing tractor	1	rate / acre	400	**400**
Threshing labour	20	Man days	125	**2500**
Bag	35	80-90 kg Bags	30	**1050**
Weighing charges at APMC	35	Bags	5	**175**
Transport to Market (Belgaum)	35	Bags	35	**1225**
Total input cost				**26912**
Produce	30	Qt	1100	**33000**
	30	Qt	1800	**54000**
Worst case scenario				**6088 Profit**
Best case scenario				**27088 Profit**

Table 16: Economics of non-transplanted rice cultivation - case study

Operation	Requirement	Unit	Rate (Rs/ unit)	Amount
Seed	40	Kg	20	**800**
Fertilizer	3	50 Kg/ bag	1000	**3000**
Pesticides				
Virat	0.42	Liter (in 2 doses)	350	**147**
Mangate	0.5	Kg (in 2 doses)	300	**150**
Soytan	0.5	Liter (in 2 doses)	700	**350**
Machinery				
Power tiller for making mud	5	Hours	300	**1500**
Bullocks	1	times, rate / acre	500	**500**
Irrigation				
Pump (5 HP = 4 KW)	18	Hours (1 dose)		
Labour				
Sowing	2	Man days	100	**200**
Weeding	25	Man days	100	**2500**
Spraying	2	Man days	125	**250**
Fertilizer application	2	Man days	125	**250**
Harvesting	15	Man days	125	**1875**
Gather	15	Man days	125	**1875**
Threshing tractor	1	rate / acre	400	**400**
Threshing labour	12	Man days	125	**1500**
Bag	20	80-90 kg Bags	30	**600**
Weighing charges at APMC	20	Bags	5	**100**
Transport to Market (Belgaum)	20	Bags	35	**700**
Total input cost				**16697**
Produce	16	Qt	900	**14400**
	16	Qt	1500	**24000**
Worst case scenario				**2297 Loss**
Best case scenario				**7303 Profit**

In case of transplanted rice, the farmer generally does not suffer from losses but in the worst case scenario, there is less profit (~6000 Rs) but in cultivation of non-transplanted rice there is barely any profit (~2000 Rs). In case of the non-transplanted rice, the profit (~ 7000 Rs) in the best case scenario is far lesser than transplanted rice (~27,000 Rs). The stalk of rice known as *Pinjar* in the local language is used as fodder for the household animals; this increases the benefits of rice cultivation. The stalk is also mixed with the biogas slurry so as to increase its fertilizer value, before being added to the farmlands.

Productivity of Rice

The average per acre production of rice in Kattanbhavi, from the household survey is 13 Qt. However, it is not clear if the output given is for transplanted rice or non transplanted rice, since field observation shows that the productivity of transplanted rice can go up to 30 Qt per acre.

Expenditure

According to the household survey, the average per acre expenditure on Rice is approximately 10200.

Selling rates

The selling rates in case of rice crop vary from 1200 to 2000 Rs per quintal.

Jowar (जोंधळा, ज्वारी)

Jowar along with Rice is another staple food in Kattanbhavi. It is used to make roti (भाकरी) by mixing the Jowar floor with rice floor. 33 out of 49 households engaged in agriculture are cultivating Jowar, which is about 67 per cent. Jowar requires less water, and favours drier climate. Usually it is grown in the months of September to January. In Kattanbhavi, many of the farmers take Jowar as the second crop in the same fields after Potato cultivation. The reasons being, by the time Potato crop is harvested, the remaining soil moisture is suitable for Jowar and it also uses the fertilizers left in the soil.

Inputs

Fertilizers

Jowar requires fewer amounts of fertilizers in this soil. In addition, it utilizes the residual fertilizers if grown after potato in the same farm. Similar to rice, fertilizers like IFCO (NPK: 20 20 0) and IFCO (NPK: 18 18 10) are currently being used, but the dose is far less, approximately 50 Kg per acre.

Pesticides

Jowar is fairly hardy crop in dry conditions. Hence, it needs very less amount of pesticides. Many of the farmers don't even use pesticides for Jowar. Chandrika (300 ml x 1 dose) is the preferredpesticide.

Labour

Cultivation of Jowar is not labour intensive. It requires about 43 man days of hired labour per acre, for operations like sowing, land preparation, harvesting, tying the plants into heaps, drying, separating the ears from plants.

Animal power

Bullocks are used to plough the land twice in case of Jowar. The operation on an acre of land, takes about 4 hours for a pair of bullocks each time.

Machinery

Machinery is not used for cultivation of Jowar.

Water

Similar to rice, Jowar is also a rain fed crop in Kattanbhavi.

Economics

Following table gives the economic details of a case of Jowar cultivation in Kattanbhavi.

Table 17: Economics of Jowar cultivation - case study

Operation	Requirement	Unit	Rate (Rs/ unit)	Amount
Seed	25	Kg	35	**875**
Fertilizer	1	50 Kg/ bag	1200	**1200**
Pesticides				
Chandrika	0.3	Litre (in 1 dose)	350	**105**
Machinery				
Bullocks	2	times, rate / acre	300	**600**
Irrigation				
Pump (5 HP = 4 KW)	18	Hours (1 dose)		
Labour				
Sowing	5	Man days	90	**450**
Land preparation	8	Man days	70	**560**
Harvesting	8	Man days	100	**800**
Tie into heap	6	Man days	80	**480**
Drying	8	Man days	80	**640**
Separate ear from plant	8	Man days	80	**640**
Ear to grain machine	8	qt	50	**400**
Bag	8	Bags	30	**240**
Weighing charges at APMC	8	Bags	5	**40**
Transport to Market (Belgaum)	8	Bags	35	**280**
Total input cost				**7310**
Produce	6	Qt	1800	**10800**
	10	Qt	1800	**18000**
	6	Qt	2800	**16800**
	10	Qt	2800	**28000**
Worst case scenario				**3490 Profit**
Best case scenario				**20690 Profit**

Cultivation of Jowar gives a small profit (~3500 Rs) in the worst case but a better yield and price could generate a better profit (~20000 Rs). The added advantage of Jowar is that it is not capital intensive and the stalk is a valuable fodder, produced in any case.

Productivity of Jowar

The average per acre production of Jowar in Kattanbhavi, from the household survey is 4.4 Qt.

Expenditure

According to the household surveys, the average per acre expenditure on a Jowar crop is close to 1900 Rs. But the range may vary from 1000 to 3000 Rs.

Selling rates

According to the survey the market rates in case of Jowar varies from 1800 to 2800 Rs per quintal.

2.3.2. Vegetables

A variety of vegetables are grown in Kattanbhavi, both for self-consumption and for revenue. The vegetables cultivated in Kattanbhaviinclude French beans, cucumber, Cabbage, Chillies, Potato, Cauliflower and sweet potato. The major vegetables are as follows:

Potato (बटाटा)

Potato is not a traditional crop in this region. It is sown in the Kharif season (June to August) and matures in three months. Similar to Jowar, 38 households out of the 49 households engaged in agriculture are cultivating potato, which is 77 per cent.

Image 38Potato Crop in Kattanbhavi

Image 39Sowing Potatoes

Inputs

Fertilizers

The soil in Kattanbhaviis not suitable for potato, thus the use of chemical fertilizers is inevitable. Out of the 38 households cultivating potato, 33 use only chemical fertilizers and the rest mix it with organic fertilizer too. An acre of potato requires about 500 Kg of fertilizerviz. IFCO (NPK: 10 26 26).

Insecticides and pesticides

Potato crop requires the application of pesticides such as Chandrika (0.5 x 3 doses), Mangate (0.5 x 3 doses), Soytan (0.4 x 2 doses), and Rodomill (0.6 x 1 dose). Rogar is another pesticide that can be used for potato but it is not preferred as the results are not comparable to the aforementioned pesticides.

Labour

Potato is also a labour intensive crop like rice. Labour is required for operations such as Sowing, land preparation, harvesting, and loading the plants onto to tractor. An acre of potato crop requires about 170 man days in total.

Machinery

Tractor is required for ploughing the land in case of a potato crop. A tractor takes about 8 hours to plough an acre of land under potato cultivation.

Water

In Kattanbhavi potato is a rain fed crop.

Economics

Following table gives the economic details of a case of potato cultivation in Kattanbhavi.

Table 18 Economics of Potato cultivation - case study

Operation	Requirement	Unit	Rate (Rs/ unit)	Amount
Seed	700	Kg	18	**12600**
Fertilizer	10	50 Kg/ bag	1200	**12000**
Pesticides				
Chandrika	1.5	Litre (in 3 doses)	350	**525**
Mangate	1.5	Kg (in 3 doses)	350	**525**
Soytan	0.8	Litre (in 2 doses)	700	**560**
Rodomill	0.6	Kg (in 1 dose)	1200	**720**
Machinery				
Tractor	8	Hours	400	**3200**
Tiller	-	Hours	-	**-**
Irrigation				
Pump (5 HP = 4 KW)	162	Hours (9 doses; 18hrs a dose)		
Labour				
Sowing	30	Man days	90	**2700**
Land preparation	90	Man days	70	**6300**
Harvesting	40	Man days	100	**4000**
Loading into tractor	10	Man days	100	**1000**
Bag	100	Bags	20	**2000**
Weighing charges at APMC	100	Bags	5	**500**
Transport to Market (Belgaum)	100	Bags	20	**2000**
Total input cost				**48630**
Produce	25	Qt	250	**6250**
	50	Qt	250	**12500**
	25	Qt	1500	**37500**
	50	Qt	1500	**75000**
Worst case scenario				**42880 Loss**
Best case scenario				**20370 Profit**

The above table highlights that the profits in the best case scenario is approximately 20370 Rs, however the loss in the worst case scenario is substantial, about 42880 Rs.

Productivity of Potato

The household survey indicates that the average per acre productivity of a potato crop is 45 Qt.

Expenditure

The average per acre expenditure on a potato crop is approximately 42000 Rs, according to the data collected from the households.

Selling rates

The selling rates range from 400 to 2200 Rs per Quintal, and the average selling rate comes up to 1200 Rs per quintal.

Cabbage

Cabbage is a rarely grown vegetable in Kattanbhavi. It is usually grown in the winter season. Out of the 49 households engaged in agriculture only 1 was growing cabbage.

Image 40 Cabbage Field in Kattanbhavi

Inputs

Fertilizers

Fertilizers used for cabbage in Kattanbhavi are urea (350 kg in 3 doses) and NPK (20 20 0 13) (300 kg in 3 doses).

Pesticides

Pesticides such as Chandrika (1 litre x 4 doses), Mangate (1 kg x 1 dose) and Rodomill (1 kg x 2 doses) are required in case of cabbage.

Labour

Cultivation of cabbage is not labour intensive. It requires about 64 man days of hired labour per acre. Operations for which labour is required are Sowing, weeding, harvesting.

Machinery

Similar to a potato crop, tractor is required for ploughing the land under cabbage cultivation. Ploughing an acre of land for cabbage takes about 8 hours for a tractor.

Water

A typical cabbage farm needs to be watered once in three days for duration of 4 hours. However, the above figures are dependent on the rainfall and the availability of water.

Economics

Following table gives the economic details of a case of cabbage cultivation in Kattanbhavi.

Table 19Economics of Potato cultivation - case study

Operation	Requirement	Unit	Rate (Rs/ unit)	Amount
Seed	0.2	Kg	42000	8400
Fertilizer				
Urea	7	50 Kg/ bag (in 3 doses)	350	2450
NPK 20 20 0 13	6	50 Kg/ bag (in 3 doses)	920	5520
Pesticides				
Chandrika	4	Litre (in 4 doses)	350	1400
Mangate	1	Kg (1 dose)	350	350
Rodomill	2	Kg (in 2 dose)	1200	2400
Machinery				
Tractor	8	Hours	400	3200
Irrigation				
Pump (5 HP = 4 KW)	56	Hours (14 doses 4 hrs a dose)		
Labour				
Sowing	4	Man days	80	320
Weeding	20	Man days	60	1200
Harvesting	40	Man days	80	3200
Bag	350	Bags	12	4200
Weighing charges at APMC	350	Bags	5	1750
Transport to Market (Belgaum)	350	Bags	20	7000
Total input cost				41390
Produce	150	Qt	300	45000
	245	Qt	300	73500
	150	Qt	700	105000
	245	Qt	700	171500
Worst case scenario				**50130 Loss**
Best case scenario				**13120 Profit**

The above table indicates that the profit in case of the best case scenario is 13120 and there is a loss of 50,130 accrued in the worst case scenario.

Chilly

Chilly is also a rarely grown vegetable in Kattanbhavi as cabbage. Similar to cabbage, chilli is also cultivated in the winter season. Out of the 49 households engaged in agriculture only 4 were cultivating chilli.

Image 41 Chilli crop in Kattanbhavi

Inputs

Fertilizers

A chilli crop utilizes fertilizers having NPK amounts of 20 20 0. Jaikisan is one of the brands used by the farmers of Kattanbhavi for NPK. Apart from this cow dung is also used as a fertilizer for the chilli crop.

Pesticides

A single pesticide namely Chandrika (1 litre x 1 dose) is enough in case of chilli as it is a hardy crop.

Labour

Chilli is a labour intensive crop as harvesting chillies from the plant is an extremely tedious task. Other operations for which labour is required are sowing, weeding and application of fertilizers. It requires a total of approximately300 man days of hired labour per acre.

Animal power

Bullocks are used to plough the land for chilli cultivation. An acre of land, takes about 8 hours for a pair of bullocks.

Machinery

In addition to bullocks, tractor is needed for ploughing the land under chilli cultivation. Ploughing an acre of land for chilli takes about 4 hours for a tractor.

Water

A typical cabbage farm needs to be watered once in three days for duration of 4 hours. However, the above figures are dependent on the rainfall and the availability of water.

Economics

Following table gives the economic details of a case of chilli cultivation in Kattanbhavi.

Operation	Requirement	Unit	Rate (Rs/ unit)	Amount
Seed	0.16	Kg	22000	3520
Fertilizer (chemical	12	50 Kg/ bag	920	11040
Manure	2	Tractor trolleys	2100	4200
Pesticides				
Chandrika	1	Litre (1 dose)	350	350
Machinery				
Bullock tilling	1	day	600	600
Tractor	4	Hours	400	1600
Irrigation				
Pump (5 HP = 4 KW)	72	Hours (20 doses 6 hrs a dose)		
Labour				
Sowing	10	Man days	80	800
Fertilizer application	8	Man days	80	640
Weeding	20	Man days	60	1200
Harvesting	270	Man days	60	16200
Bag	210	60 kg Bags	20	4200
Weighing charges at APMC	210	Bags	5	1050
Transport to Market (Belgaum)	210	Bags	20	4200
Total input cost				49600
Produce	100	Qt	1800	180000
	126	Qt	1800	226800
	100	Qt	3600	360000
	126	Qt	3600	453600
Worst case scenario				**130400 Profit**
Best case scenario				**404000 Profit**

The table shows that even in the worst case scenario the profit is huge (~130400 Rs). Similarly, in the best case scenario the profit is substantial (~404000).

Productivity of Chilli

The average per acre production of Chilli in Kattanbhavi, from the household survey is 36 Qt.

Expenditure

The average per acre expenditure on a Chilli crop is close to 23500 Rs.

Selling rates

According to the survey the market rates in case of Chilli varies from 500 to 3000 Rs per quintal.

2.3.3. Oil seeds

Ground nut is the only oil seed grown here. Earlier, the farmers used to sell these seeds to a local merchant, but the returns were low. After the intervention by Jan Jagaran, farmers starting extracting oil from groundnut themselves from the nearby village. The residual cake is used as cattle feed. This served as a dual benefit as they don't have to buy oil or feed for the cattle anymore. Out of the 49 households surveyed only 29 were cultivating groundnut, which is 59 per cent.

Productivity of Groundnut

The average per acre production of groundnut is 4.9 Qt.

Expenditure

The per acre expenditure for groundnut, according to the household surveys varies from 1000 to 5000 Rs and the average is close to 2600 Rs.

2.3.4. Fruits

There are about 20,000 cashew trees in Kattanbhavi and the expected yield per tree is about 5kg. These trees were grown with the efforts of Shivaji Kagnikar, a social worker. The farmers In Kattanbhavi as of now do not spend much time and efforts on the cashew trees. Apart from this banana is being cultivated on experimental basis this year.

Image 42 Cashew plantation

2.3.5. Distribution of land under different crops

The following graph shows the distribution of land under different crops.

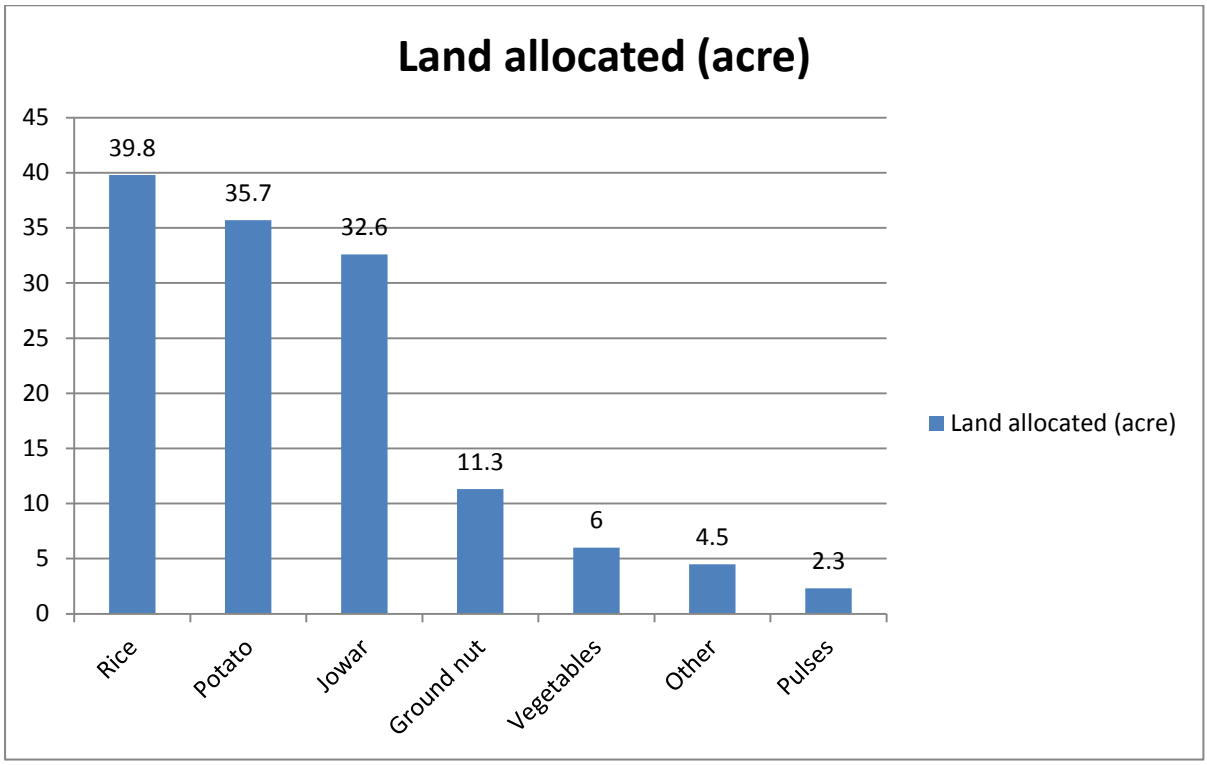


Figure 4Cropwise land allocations in the sample

Rice and Jowar are the staple food in the area and Potato is the cash crop. These three dominate the land allocations.

2.4.Innovative agricultural practices

Lakshman Bhandurge's farm is located in the Kurihal village and is 1 km away from the village. His great grandfather had bought land in the Kurihal village and Laxman Bhandurge is the current owner of this land. He owns a total of 3 acres of land from which 0.5 acres is fallows .Annexure # gives the details of the household survey conducted for him. The survey includes the details of the type of crops along with other details related to the cultivation of crops.

He has introduced drip irrigation and sprinklers in his farm, where he is cultivating banana along with chilli as an intercrop in 30 gunthas of land. He is the only person in Kattanbhavi to practice drip irrigation, however his brother, Appaji is also inspired to do the same.Lakshman Bhandurge has spent about 40000 per acre to install the system. The water for the system comes from a bore well which is 1700 feet deep and is present at a distance of 600m. Following are some of the of images from his farm.

Image 43Experimental Banana Chilli Intercrop

Image 44Drip Irrigation for Chilli

2.5.Issues faced

1. Diseases: One of the most common diseases in Kattanbhavi is *Karpa.* It affects two of the major crops grown in Kattanbhavi namely, rice and Potato. In the household survey 13 people complained that karpa is one of most prevalent issues in agriculture.
2. Decrease in rainfall
3. Young generation not interested in farming
4. Increase in incidences of pest and insect attack
5. Low selling rates
6. High rates of chemical fertilizers
7. Expenditure more than revenue as input fixed and output variable
8. Less availability of labour
9. Wild animals
10. Unavailability of capital for investment
11. Seed failure
12. No electricity (complains of people with pumps)
13. 67% (34 in 51 households) of the farmers do not wish that their next generation shall continue with farming.

2.6.Effect of the green revolution

Green revolution took place in India in the sixties, but for its effects on the agricultural practices and crops to trickle down to Kattanbhavi, it took another 10 years. Potato is not a traditional crop of Kattanbhavi, but its cultivation started in the 1970's as a direct result of green revolution. The soil is not suitable and needs large amounts of fertilizers to sustain. Hence, majority of the farmers growing potato are practicing chemical farming. The rates in case of potato vary from 400 to 2200 Rs and hence the returns are highly dependent on the market. Hence, it is deemed as a very risky crop in Kattanbhavi. Even then, the farmers feel that the economic status of the farmers has improved, after the introduction of potatoes.

On the downside, the quality of soil has deteriorated after the introduction of various chemicals. During our stay in the village, the villagers routinely complained that the productivity of the soil has reduced, over the years.

2.7.Dairy

People in Kattanbhavi have always owned cattle. The number of milch animals has increased since last 20 years, after the establishment of milk collection centre in the village. Thepresence of biogas and the convenience of it over the use of firewood also promote the people to continue having cattle.

Milk collection centres

The first milk collection centre was established by the Karnataka Milk Federation in 1984. Following is the image of the dairy

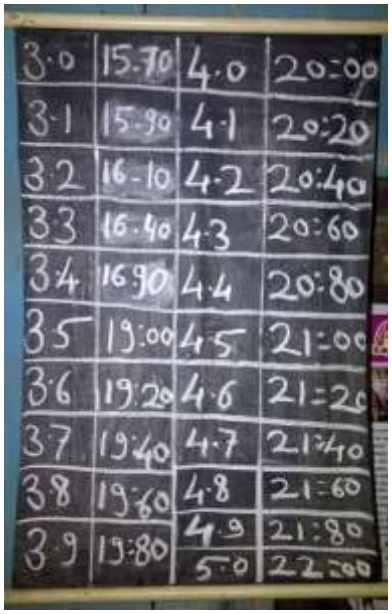
Image 45 K.M.F Dairy

Today there are three milk collection centres in the village. Two collection centres are allied to the Gokul Co-operative Dairy in Kolhapur, Maharashtra and one is associated to Karnataka Milk Federation. The collection at the centres is about 500 to 700 L daily, depending on the season. The following table gives the details about the collection of milk at these three centres. In all the centres, the buffalo milk is about 20% only as there are very less buffalos in Kattanbhavi.

Table 20 Seasonal variation in milk collection centers at Kattanbhavi

Collection centre	No.of members	Association	Collection (L)		
			Monsoon	Winter	Summer
JijamataDoodhUtpadakSangh	~50	Gokul	100-120	80-90	60-70
Holi KamannaDoodhUtpadakSangh	~80	Gokul	300	300	200
Karnataka Milk Federation	~80	KMF	300	250	200
Total daily collection			**700-720**	**630-640**	**460-470**

Image 46Discussions at Holi KamannaDoodhUtpadakSangh milk collection center



3·0	15·70	4·0	20:00
3·1	15·90	4·1	20:20
3·2	16·10	4·2	20:40
3·3	16·40	4·3	20:60
3·4	16·90	4·4	20:80
3·5	19:00	4·5	21:00
3·6	19:20	4·6	21:20
3·7	19:40	4·7	21:40
3·8	19:60	4·8	21:60
3·9	19:80	4·9	21:80
		5·0	22:00

Image 47 Differential rates for cow milk, paid by Gokul dairy depending on the fat percentage

Image 48Differential rates for buffalo milk, paid by Gokul dairy depending on the fat percentage

In the above chart, the first and the third column contain the fat percentage and the second and the fourth column represent the price paid by the Gokul Dairy. KMF dairy pays slightly less per litre. The reason why the people have still stuck with them is that the KMF veterinary doctor makes regular visits to the members and is also available on call within an hour in case of emergencies.

The fat percentage in milk remains fairly constant for the given animal as the factors responsible like animal feed, water quality, age do not change drastically. As a result, in Kattanbhavi the average fat percentage of cow milk lies between 3.5% and 4% and that for buffalo it is between 5% and 6%.

Livelihoods through dairy

The milk collection at Kattanbhavi is about 500 to 700 L daily. As told by Holyappa Bhandurge, manager at Holi Kamanna Doodh Utpadak Sangh, in the village about 20% milk is buffalo and 80% cow. The following table gives the calculations to get an idea about the cash flow coming in the village as a whole through the dairy business.

Table 21 Seasonal variation in the daily revenue from dairy business in Kattanbhavi

Season	Daily collection(L)	Cow (L)	Rate (Rs/L)	Amount (Rs/Day)	Buffalo (L)	Rate (Rs/L)	Amount (Rs/Day)	Total (Rs/Day)
Monsoon	710	142	19.5	2769	568	26	14768	17537
Summer	635	127	19.5	2477	508	26	13208	15685
Winter	465	93	19.5	1814	372	26	9672	11486

It can be seen that the daily revenue from the dairy business is about 11,000 to 17,000 Rs. Although the number of members of the dairies is close to 200, i.e. almost every household in the village is a member of one of the dairies, the households who actually have production of milk enough to sell at the centre is less than that. The proportion is about 30% (15 households out of the 51 surveyed sold the milk at the dairy currently). Thus assuming that this pattern continues throughout the village, about 70 households must be the stakeholders in this revenue. The revenue thus comes to about 160 to 250 Rs a day. It shall be noted that this is only the revenue and not the net income to these households.

3. Water

3.1.Introduction

Kattanbhavi is a water stressed area. As mentioned in the previous chapters, people of Kattanbhavi feel that water scarcity is the biggest problem facing them. According to village survey people on an average spend 2 hours per day to fetch water. The following chapter highlights the water scenario in Kattanbhavi in detail.

3.1.1. Rainfall

The average rainfall in Kattanbhavi is about 1000mm. The south west monsoon provides rain in the months of June, July and September. These months are the lifeline of Kattanbhavi as much of the agriculture is rainfed. According to the people, rainfall has decreased over the years.

3.2.Water sources

Kattanbhavi has been a water scarce area but there are multiple water sources available. The major water sources in Kattanbhavi consist of wells, bore wells, ponds and streams. The following table lists the water sources in Kattanbhavi along with their use.

Table 22 Water sources in Kattanbhavi and their use

Water Source	Use
Drinking water well	Drinking water
Lower Well	PWS
Jan Jagaran well	Not in use
Pond	Bathing the cattle Washing clothes
Drinking water stream	Drinking water
Bore wells	Irrigation Water for household purpose
Private ponds	Irrigation Bathing the cattle Washing clothes

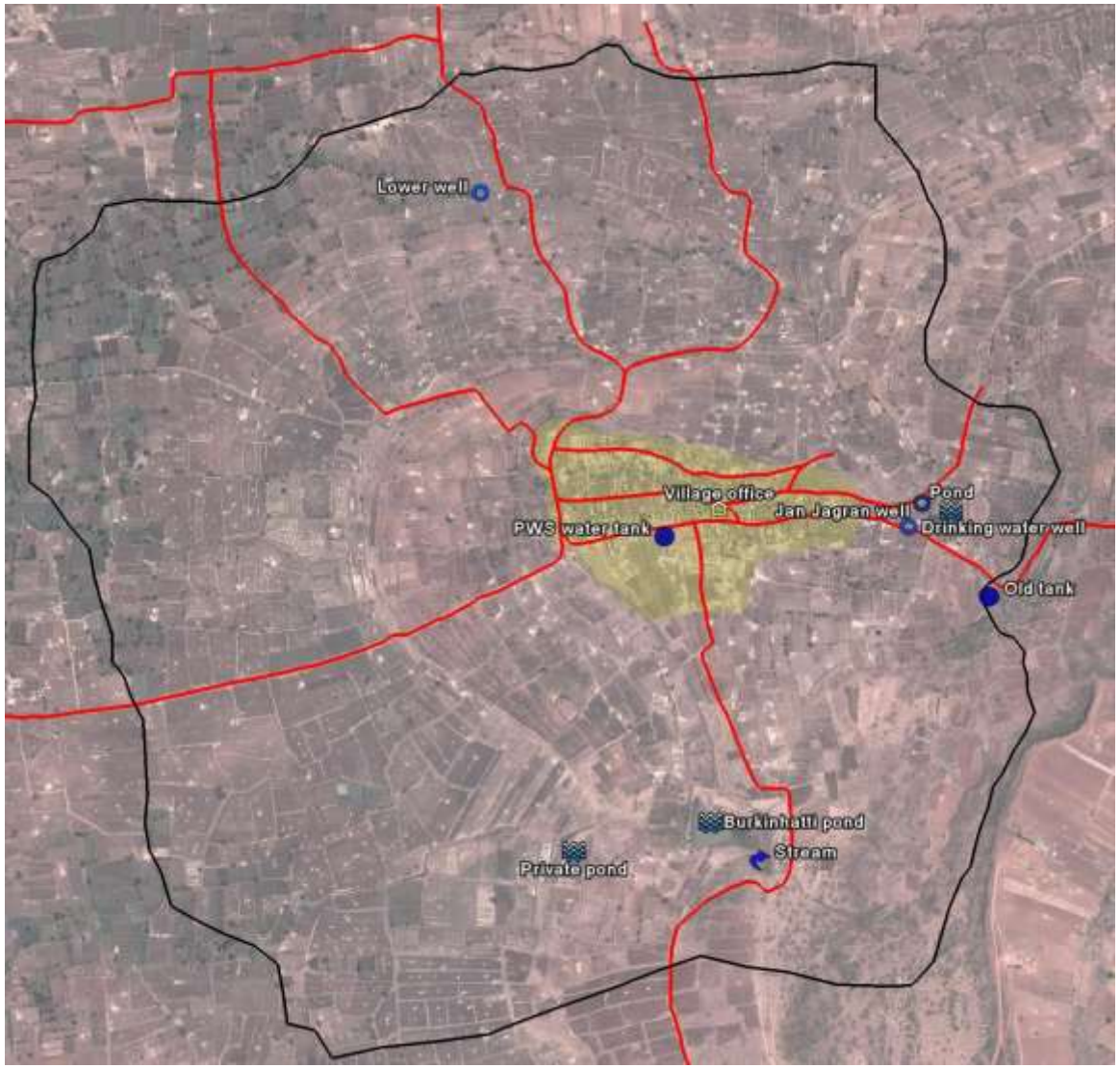


Image 49 Water sources in Kattanbhavi

3.2.1. Drinking water well

There is only one drinking water well in the village which is located towards the eastern boundary. It is 15 feet deep and has 20 feet diameter and was built in the year 1940. It is one of the oldest water sources of the village. It is mainly used for drinking water during the summer months but when abundant water is available, some of the people also draw water from the well for other household purposes. There is no pump system installed in the well and people draw water using ropes and pulleys. The sample shows that the average amount of water drawn from the well is around 6400 litres daily which is about 22 LPCD.

During the summer months the water level in the well sinks very low. People have to wait for hours to collect water when the well recharges. The following image shows the water level during summer month.

Image 50 Water level in drinking water well during mid summer

Earlier people used to climb down the well to collect water. However, this practice led to the water being contaminated. The women of the village lead by Bharati Bhandurge, a social worker banned this practiced by imposing a fine on people who still continued to do so. According to the villagers, after this system was put into place the occurrence of water borne diseases reduced drastically. They also started a water rationing system wherein each household was allocated a fixed quantity of water based on the number of people per household.

3.2.2. Lower well

The lower well is present in the northern side of the village in middle of the farms. It is the source for the piped water supply scheme operational in the village. It was built in the year 1986 by the villagers through *Shramdaan*. The well has a diameter of 20 feet and it is 51 feet deep. It is cleaned twice every year by the villagers to remove the silt. However, the Gram Panchayat has not paid the villagers for this effort in the past. The following image shows the well in the summer months.

Image 51The lower well in Kattanbhavi

3.2.3. Jan Jagaran well

A third well was dug near the drinking water well in the year 2000 using funds provided by Jan Jagaran. It is 20 feet in diameter and has a depth of 57 feet. The well has no recharge springs, thus it was an effort in vain. In order to make use of it, the water from the lower well was put in this well and then subsequently was pumped to the old tank. However, now this well is not in use as a new piped water supply system is in place. Following is the image of the Jan Jagaran well.

Image 52 Jan Jagaran well in Kattanbhavi

3.2.4. PWS

In the year 2010, a new piped water supply system was constructed under the SwajalDhara Scheme. The budget for the same was 4.77 Lakhs. This system consists of an Elevated storage reservoir (ESR) of 50000 litre capacity and was initially intended to serve 180 household connections. However, currently many new connections have been added to the system. The villagers have to pay 300 Rs per year as water duty for using the PWS connection.

The PWS supplies water for 15 minutes to each stand post in every two days. However, the amount of water available at each of the connection varies from 30 to 320 litres in 15 minutes. Moreover, one of the valves in the system is faulty because of which certain households get water for extended hours. The Jan Jagaran well and the old tank are not in use after the setting up of this new system.

The electricity bill for the pump used in the PWS system is paid by the Gram Panchayat, but the details like the pump make, capacity and the electricity consumption and the bill were not disclosed by the Gram Panchayat. The pump operator, who is from the village, could not give the details either.

The following image shows the PWS connection at the household level and people taking water from the same.

Image 53 PWS connections at households and people taking out waters

3.2.5. Ponds

There are a few private ponds in the village including a village pond made by the villagers under the leadership of Shivaji Kagnikar. Majority of these ponds are located in farmlands and used for irrigation by the owners. These ponds are also used for washing clothes and cattle. However, these ponds are not perennial and the usable stock of water dries up by summer. Following is the image of the village pond in the summer. The visible water level is just 6-8 inches as the pond is heavily silted.

Image 54 Village pond in summer

The pond towards the southern boundary of the village is an interesting case as it has been sold to the next village called Burkinhatti by the Gram Panchayat. A pipeline has been laid from this pond to the Burkinhatti village. However, it is still used by the villagers in Kattanbhavi for washing clothes. The following image shows the dried up pond in the summer.

Image 55 Village pond sold to Burkinhatti by the Gram Panchayat

3.2.6. Bore well

Kattanbhavi is situated on a rocky hill. There have been a few attempts to drill bore wells near the habitation (Plateau), but only one has been successful. The bore well with water in the habitation is located near the bus stop. Its hand pump is broken, thus villagers cannot draw water from it.

3.2.7. Stream

A perennial stream is located near the southern boundary of the village about 700m from the habitation. The stream is used by a few villagers living close by as a drinking water source. The stream drains to the pond sold to Burkinhatti.

Image 56 Stream towards the southern boundary

Image 57 Goats drinking at the stream

3.3.Availability

The survey shows that the people draw / use water from all the sources available in the village viz. the wells, ponds, bore wells and the stream. The following table gives some details about the amount of water drawn from each of these sources by the 51 households in the sample.

Table 23 Details of the water extracted from water sources in Kattanbhavi

Source	Ownership	Distance from habitation (m)	Use	Amount of water drawn daily by sample (l)	No. of user households
Drinking water well	Public	500	Drinking, household	6469	51
Lower Well	Public	700	Household	2838	43 (PWS)
Stream	Public	800	Drinking	450	1
Bore wells	Private	1200,1800	Household	4495	19

3.4.Water quality

While doing the survey, the people mentioned another problem with drinking water, except for the obvious scarcity during the summer. The water gets a bit murky for a few days following the first monsoon rains. The people did not mention the occurrence of any waterborne diseases. This can be attributed to the place where the drinking water well is located. It is outside the habitation and at a slightly higher elevation. Hence, sewage does not flow in the vicinity of the well.

3.5.Access to Water

The water sources in the village are accessible to all the people, i.e. there are no social barriers for the either of the casts to take water from these sources. In spite of this, the sample shows differences in the amount of water drawn by the different groups in the community. The water drawn for household purpose is utilized for humans as well as animals as the cattle are stall fed. The water required for per cattle daily was taken as 20L (World Bank, 2008).By subtracting this, there are three social groups in the village, the APL-Marathas, BPL-

Marathas and BPL-Naiks. There are no APL-Naik people in the village. The following table shows the differences in the amount of water drawn from different sources by these groups.

Table 24 Water drawn by the three major socio-economic groups of Kattanbhavi

Source	APL-Maratha			BPL-Maratha			BPL-Naik		
	Water drawn	Dependents		Water drawn	Dependents		Water drawn	Dependents	
	LPCD	Population	HH	LPCD	Population	HH	LPCD	Population	HH
DW Well	18	119	20	29	87	16	22	80	15
Bore well	39	82	12	41	47	9	33	9	1
PWS	27	83	15	23	71	13	25	73	14
Total	69	119	20	71	87	16	45	80	15

As mentioned earlier, the habitation of Kattanbhavi is situated on a plateau. The sources of water are at least 500 m away from the habitation. The drinking water well and the stream, where people bring the drinking water from, are almost on the same elevation as the habitation. These three groups draw 18, 29 and 22 LPCD from the drinking water well, which is not far off from each other. The difference is seen in case of bore wells.

The bore wells used by the people to bring water during summer are at a lower elevation, and are far away, 1.2 to 1.8 km from the habitation. This has restricted the access to the bore well water for the Naik people, who are poorer. Most of them do not have bullock carts and this prevents them from going to the bore wells to bring water. People from only one household in the 15 Naik households surveyed go to the bore well.

The average water utilization for the whole sample is 62 LPCD. The most notable highlight of the table is however the total usability of water by the different groups. The figures are 69 and 71 LPCD for the APL and BPL Marathas but the number drops to 45 LPCD in case of the Naiks (all of whom are BPL).

Rainwater Harvesting

Necessity is the mother of all inventions. In Kattanbhavi, necessity has led to good practices in water conservation. Almost every household has means to do rainwater harvesting.

Whenever it rains, water from the roof comes down through attached pipes, which is collected either in barrels or in pots, nothing is wasted.

Image 58 Rainwater harvesting in Kattanbhavi

4. Energy

The household survey conducted in Kattanbhavi gathered data about energy usage in the household, agricultural and commercial activities. This was done through asking the people about the energy utilizing devices like lamps, Gas stoves, appliances that they have and their use. The following table lists the types of applications and the energy consuming devices used by the households in the sample.

Table 25Various energy consuming devices in the households in the sample

Application	Device	Energy source	Wattage	Source Of assumption	Typical duration (hour)
Cooking	Gas stove	Biogas			1.5 to 3
		LPG			2 to 3
	Chulha	Firewood			2 to 4.5
Water heating	Gas stove	Biogas			0.5
	Chulha	Firewood			0.5 to 1
Lighting	Incandescent bulb	Electricity	40	Observation	2 to 4
	CFL	Electricity	8, 11, 15	Observation	2 to 4
	Tube light	Electricity	55	PEG Manual	2 to 4
	Kerosene lamp	Kerosene			2 to 4
Appliances	Ceiling fan	Electricity	50	PEG Manual	0.5 to 1
	Computer	Electricity	400	Observation	2
	DVD player	Electricity	50	PEG Manual	0.5
	Fan	Electricity	50	PEG Manual	0.66
	TV	Electricity	60, 120	PEG Manual	2
	Mill motor	Electricity	7 HP	Observation	3
	Mixer	Electricity	450	PEG Manual	5 min
	Cell phone charger	Electricity	2.5	Observation	1
	Refrigerator	Electricity	105	PEG Manual	6
Water pump	Diesel pump	Diesel	4 HP	Observation	0.5 to 1
	Motor	Electricity	0.5,5 HP	Observation	0.5

The energy in four forms, Firewood, Biogas, Electricity and fossil fuels is utilized in the village. Sun drying is also practised for rice and ground nut yield, but the current study has not focussed on it.

4.1.Biogas

In Kattanbhavi, more than 90% of the households have biogas plants at their place. Many of these are in a working condition, and thus substituting at least a part of the firewood which would have been utilized for cooking. 48 households out of 51 surveyed have a biogas plant. 34 households out of the 48 get enough biogas for cooking every day. 7 out of the above 34 even use biogas for water heating. The typical time of cooking is from 1 hour 30 min to 3 hours in case of biogas.

Cooking for a person needs 0.175 m^3/person/day (Bhat P. R.)biogas per day. The assumption was made that for people partially dependent on biogas for cooking, half of the need was satisfied through biogas and half through firewood. Thus for them, the requirement was taken as 0.0875 m3/person/day. The calorific value of biogas is 21 MJ/Kg (Bond, 2011)and density is 1.2 Kg/m3(Venkateswara Rao P. V., 2010)thus the requirements come to 0.21 Kg biogas /person/day for people completely dependent and 0.11 Kg biogas /person/day for the people partially dependent on biogas. The following table shows the

Table 26 Biogas requirement for the sample

Particular	People	Rate (Kg/Person/Day)	Quantity (Tonne/Year)	Energy (GJ/Year)
Biogas for cooking (Fully dependent)	189	0.21	14.5	304.2
Biogas for cooking (Partially dependent)	61	0.11	2.5	51.4
Total			**17**	**355.6**

4.2.Firewood

Firewood is the second source used by the people for cooking as well as water heating. In the sample of 51 households, 17 have to use firewood for cooking. Out of these 17, 14 people have a biogas plant at their place but the gas output is not enough. 44 households out of the 51, use firewood for water heating. This is the major activity that consumes firewood.

Image 59 Stack of firewood in Kattanbhavi

Procurement of firewood

Kattanbhavi does not have dense forest nearby. The forest towards the north east of the village is a source of firewood for many people. Another source is the trees in and around their own farms. The availability of wood is not abundant, but neither is the demand high as most of the people have biogas plants at their house. Another option for the people is to buy wood from some of the neighbouring villages. The average rate of wood is 2 Rs/Kg in the area.

Utilization of firewood

Estimation of firewood consumed in the village was very difficult as the people do not gather the firewood at one go. The requirement for most of the people is not major due to the presence of biogas. Thus the firewood collection pattern is to collect it in the dry seasons. The pre monsoon time is spent in this activity to some extent, but quantification of the wood collected was not possible through this activity. The approximate amount of wood used for water heating was deduced from the information gathered from some of the people.

As told by Lakshmi Nesarkar, her family of 10 people needs to buy almost all of the firewood for water heating, as they do not have any trees in their farms. The supply enough for a year costs them 3000 Rs. The wood is 2 Rs/Kg in the market, and thus the number comes to 1.5 tonnes of firewood for 10 people per year, thus 410 g wood per person per day. This figure was used to estimate the amount of wood required by the sample for the whole year. The 266 people in the sample thus require 39.8 tonnes of wood per year for water heating alone.

For firewood for cooking, the cooking duration is about 3.5 hours for the people using only firewood and 1.7 hours on Chulha in addition to the cooking on biogas. The quantity of firewood used by the people was estimated using 1 kg/person/day as standard consumption. That gives 12.4 tonnes of firewood for the 34 people completely dependent on firewood for cooking fuel.

The problem was however to estimate the quantity of firewood required for the people partially dependent on biogas for cooking. 61 people in the sample are partially dependent on biogas for cooking. It is assumed for calculation purpose that half of their cooking fuel need is satisfied through biogas and half through firewood. Thus the calculation comes from 1 kg firewood /person/day, an assumption used before to 0.5 kg firewood/person/day. The 61 people depending on biogas thus need 11.1 Tonnes of firewood annually. These calculations have been shown in the following table.

Table 27 Calculations for utilization of firewood in Kattanbhavi

Particular	People	Rate (Kg/Person/Day)	Quantity (Tonnes/Year)	Energy (GJ/Year)
Water heating	266	0.41	39.8	597.1
Cooking (Completely dependent)	34	1	12.4	186
Cooking (Partially dependent)	61	0.5	11.1	166.5
Total			**63.3**	**949.5**

4.3.Electricity

Kattanbhavi is almost 100% electrified, with only one house in the sample without electricity. The first electricity connection was given in 1975. This particular family had shifted to the newly built house recently and their older house does have a connection. The village suffers from daily load shedding for 14 hours. The load shedding time is variable, however usually from 8 pm to 12 am, there is electricity supply. This has almost eliminated the need for kerosene lamp and other such lighting devices. The major activities that need electricity are lighting and other household appliances like fans, television and cellphone chargers. The following table lists the presence of these devices in the households in the sample.

Table 28Various appliances owned by the households in the sample

Device	No. of households	% of households
Ceiling fan	12	24
Computer	1	2
DVD player	1	2
TV	32	63
Mixer	17	33
Cellphone charger	48	94
Refrigerator	1	2

The single largest consumer of electricity in the sample is the mill motor, which consumes 15 KWh daily. The rest of the consumption in the village is 13 KWh for lighting and 7 KWh for appliances. The irrigation pumps consume another 9 units daily, but the power for them is free through agricultural connections as per the Karnataka State Government policy. The total daily electricity consumption is 44 KWh which is 13,140 KWh annually. So the total annual electricity consumption by the households in the sample is 16,060 KWh.

Table 29 Electricity consumption by the households in the sample

Application	Consumption (KWh/Day)	Consumption (KWh/Year)
Appliances	7	2,555
Lighting	13	4,745
Irrigation	9	3,285
Mill motor	15	5,475
Total	44	**16,060**

The Karnataka Electricity Board distributes the bills every month in the first week and the representative comes to the Kareva temple on 14th of every month to collect the money and give the receipt. The cost of electricity in the bills is 2.2 Rs/KWh.

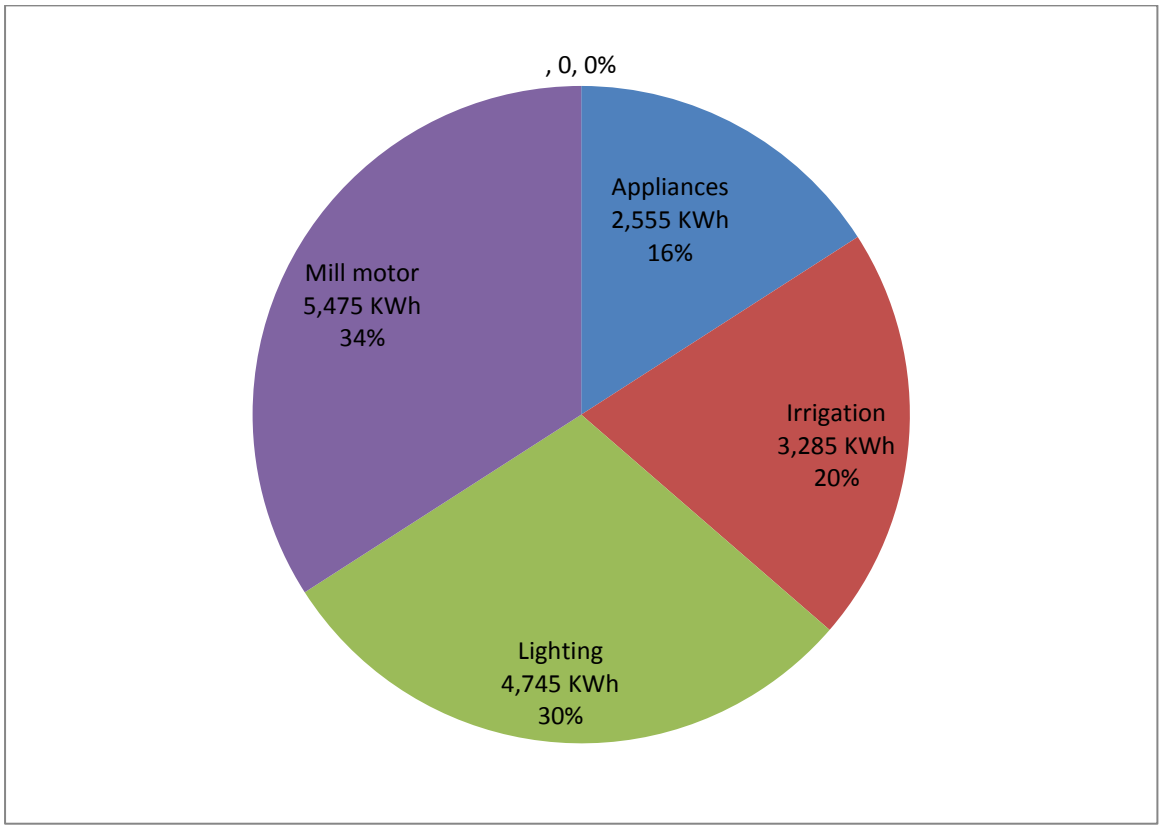


Figure 5 Break up of annual electricity consumption in the sample

4.4.Fossil fuels

The use of fossil fuels by the villagers of Kattanbhavi is very limited. 17 households in the village have a motorcycle, 1 owns a tractor, and 2 own Tempos and none own any cars. The motorcycles are mainly used to travel around Kattanbhavi and sometimes to Belgaum. The tempos in the village run an average of 50 km daily. The following table gives the details of the calculations for getting the total consumption of fossil fuels in the sample.

Table 30 Consumption of fossilfuels by the households in the sample

Vehicle	Fuel	Daily running	Average fuel consumption	Total daily fuel consumption	Total annual fuel consumption	Energy (GJ/Year)
M. cycle	Petrol	189	50 Km/L	3.78 L	1379.7 L	58.9
Tractor	Diesel	4 hr	1 L/hr	4 L	1460 L	60
Tempo	Diesel	100	5 Km/L	20 L	7300 L	300
Pump	Diesel	0.58	1 L/Hr	0.58 L	212 L	9
Total						**427.9**

The following table gives the total energy usage by the 51 households in the sample.

Table 31 Energy consumption by the households in the sample

Source	Uses	Energy/Year
Firewood	Water heating, cooking	**949.5 GJ/Year**
Fossil fuels	Transport (Motor cycle, Tempo), Tilling (Tractor)	**427.9 GJ/Year**
Electricity	(Lighting, appliances)	**16060 KWh/Year**

Thus it can be seen that the sample households in Kattanbhavi use 1377.4 GJ/Year in the form of fuels and 16060 KWh/Year in the form of electricity.

5. Governance Institutions and Implementation of Scheme

5.1. Introduction

The following chapter highlights the working of the governance institutions and the implementation of various schemes in Bambarga Gram Panchayat. Traditionally each village in this area was governed by five local representatives called the *Panch*. Then in 1987 came the KadoliMandal Panchayat, which was the combined governing body for about 30 villages in this area. Bambarga Gram Panchayat was established in the year 1993-94 and it has been the governing body for the 9 villages around Bambarga including Kattanbhavi since then.

5.2. Governance institutions in the village

The two major governance institutions in the village are the Gram Panchayat situated in Bambarga and Jan Jagaran, a local NGO based in Belgaum, the nearest city. The following describes the activities by both the institutions.

5.2.1. Bambarga Gram Panchayat

Image 60 Bambarga Gram Panchayat

The Bambarga Gram Panchayat was established in the year 1993-94. The GP consists of 9 villages from which 14 members are elected. The following table shows the villages and the number of members from each.

Table 32: Villages and the number of elected members in Bambarga Gram Panchayat

Ward	Village	Number of Members
Bambarga	Bambarga	4
Kattanbhavi	Kattanbhavi	3
	Guramhatti	
Gugrenhatti	Gugrenhatti	1
	Hosur	
Ningenhatti	Ningenhatti	1
	Gudihal	1
	Idilond	1
	Shivapur	1
Bambarga Gram Panchayat		**14 Members**

Prior to elections, the Gram Panchayat issues a circular which contains the required criteria such as caste, gender etc. for the selection of the members. There are two ways in which the members can be selected to the Gram Panchayat, that is, either through elections or through consensus amongst the villagers. Hence, it is not compulsory to conduct elections. In the event that a consensus cannot be built election is necessary like in the last elections.

The details of the current elected members from Kattanbhavi are as follows.

Table 33: Details of the elected Gram Panchayat members from Kattanbhavi

Name	Category	Gender
KaryppaLingappa Bhandurge	General	Male
NakkappaKumbargi	ST	Male
Anita Mallappa Bhandurge	General	Female

Visit to the Gram Panchayat

We visited the gram panchayat on May, 21st, 2013. There, we met with the president (*adhyaksh*) Balram Naik and the supervisor, who gave us the details, on the structure of the Gram Panchayat and the current schemes. The Bambarga Gram Panchayat consists of the President, Supervisor, Panchayat Development Officer and other office bearers. Apart from these, there are elected members to the Gram Panchayat from every ward. The President is elected after every 2 years. The last two Presidents have been from the Bambarga Village. One of the President's duties is to be present in every ward and Gram Sabha. Apart from this he, along with the other Gram Panchayat members, plans and oversees the implementation of all the schemes. Considering the various applications and demands from the villages, an action plan with the required budgetary allocation is prepared and passed in the meetings of the Gram Panchayat members, which is submitted for approval to the ZillaParishad. The priority to the works, schemes etc is decided by the members depending on the urgency of the need and available resources like funds.

The Gram Panchayat members are given regular training regarding the functioning of Gram Panchayat. Apart from this they are also given an opportunity to highlight their problems in front of the Chief Secretary, Chief Executing officer, Nodal Officers, Block Development Officer etc through video conferencing, twice or thrice a year.

5.3.Government Schemes

The Gram Panchayat gets grants under various schemes and monthly meetings are held between the Gram Panchayat members to plan the implementation of these schemes. After the meeting, an action plan is made which is sent to the Taluka Panchayat, which then forwards it to the district Panchayat. The district and taluka in this case is Belgaum. After the action plan is approved, the Gram Panchayats begins the implementation. The Gram Panchayat officers informed that no government Scheme or budgetary or non budgetary allocation is left unutilized in this Gram Panchayat, yet they were unable to provide any details of implementation of most of the schemes.

Another issue the Marathas expressed was that the Naiks were favoured for approval of the schemes' benefits over Marathas. Thus there were reported attempts by Marathas to avail these benefits with proxy Naik applications.

Following are some of the details of the current schemes and their implementation as told by the President and the villagers.

5.3.1. NREGA

NREGA work started in the Bambarga Gram Panchayat around the year 2005. Earlier there was less awareness regarding NREGA. The villagers went to do NREGA works without submitting an application for NREGA cards. Hence, people did not get paid for the work they did. Then a group of concerned people united under the name Parivartan Sancta and started building awareness regarding NREGA. This group consisted of Dilip Kamet, Ashok Deshpande, Shivaji Kagnikar, Baswant Kole, Bharati Bhandurge, Suresh Kaluhi, Vishweswariya Hiremath and Sidling Jendarli. Due to this effort in the subsequent years people applied for NREGA job cards, unemployment allowance etc.

The Bambarga to Kattanbhavi road was repaired under this scheme in 2007-08. The subsequent works include repairing and desilting the ponds, construction and repairing roads, storm water drainages etc.

To get a better perception on the working of NREGA, we attended a meeting on May 28th, 2013. The agenda of this meeting was to file a complaint regarding the non payment of unemployment allowance under NREGA. This meeting was presided over by BaswantKole, a social worker, working with Shivaji Kagnikar who has been instrumental in the development of the village. In the meeting it was highlighted that many women from Kattanbhavi did not get the unemployment allowance. Moreover, certain ladies were also not paid for the work they did. Baswant Kole was helping them in filing a complaint to the Gram Panchayat.

However, during our visit to the Gram Panchayat none of these issues were stressed at. On the contrary Kariappa Bhandurge, one of the Gram Panchayat members from Kattanbhavi maintained that many of the villagers do not do work as part of NREGA. The villagers go for work but do not work properly and sit around. Interestingly, only three households in the sampled households of 51 worked under NREGA with an average wage of 150 per day. The average day of work given was 70. However, one of the households complained that they did not get all the money owed to them.

5.3.2. Indira Awas Yojana

This scheme gives funds to BPL families for construction of house. The details of limits to funding were not available in the Gram Panchayat. The funds are released in four instalments.

The first instalment is given after completion of the plinth, second after construction of walls up to the lintel beam, third after the construction of the roof and the final after the completion of plastering. The funds sanctioned on paper for the households sampled were around 50,000 Rs. According to the Gram Panchayat, about 35-40 families in Bambarga Gram Panchayat get the benefits of this scheme every year. Amongst the 51 sampled houses in Kattanbhavi, 4 households have built a house under this scheme.

5.3.3. Total Sanitation Campaign

According to the Gram Panchayat, various toilets have been made under the Total Sanitation Campaign in the Gram Panchayat. However, the inside story as told by the Jan Jagaran members is completely different. The release of funds under Total Sanitation Campaign requires a photographic proof of the completed construction of a toilet. The Gram Panchayat officials have repeatedly painted the old toilets built by the Jan Jagaran with the biogas plants and claimed to be built by them using the funds allocated under TSC.

5.3.4. Swarna Gram Yojana

The works under Swarna Gram Yojana scheme include construction of roads, storm water drainages, Anganwadi etc. This Karnataka Government scheme allocates funds upto 1 Crore to the Gram Panchayat under this scheme.

5.3.5. Bhu Chetana Yojana

This is also a Karnataka Government scheme, which provides guidance, training and assistance to the farmers. The visiting team from the Department of Agriculture, Government of Karnataka, checks the soil samples and accordingly provides advice for the suitable to be cultivated, required fertilizers and provides seeds and fertilizers to the farmers. Under this scheme, the team can make weekly visits to a Gram Panchayat. The Gram Panchayat insisted that this scheme was working fine, however the villagers of Kattanbhavi painted a completely different picture. During the household surveys people were not aware of this scheme and could not recall the visit of any officer from the Department of Agriculture.

Gram Sabha

We attended the Gram Sabha on June 3rd, 2013 to get a better understanding on the functioning of the Gram Panchayat. The meeting was presided over by the President, the Supervisor and the Panchayat Development Officer. An engineer from the Zilla Parishad was invited to give the budget of the schemes allotted to Bambarga Gram Panchayat. He gave information regarding the different schemes mentioned above.

Interestingly, the people attending the Gram Sabha complained that the notice for the Gram Sabha did not reach on time; as a result the attendance was very low. Many of the villagers later insinuated that the Gram Panchayat members did not want people to attend the Gram Sabha. Another complaint was about the language in which the notices are issued. There are many Marathas in the villages under Bambarga Gram Panchayat, in Kattanbhavi itself the Maratha population is 70 per cent. Hence, people demanded that the notices should be issued in Marathi also. In this sense, Bambarga Gram Panchayat is unique, as even though the villages are in Karnataka the Maratha population is huge. This sometimes creates problems in terms of governance also, for instance the proceedings in the Gram Sabha were in Kannada language and majority of the Maratha people were not comfortable with the Kannada Language. Hence, while questioning the president regarding various schemes they spoke in Marathi and demanded explanations in Marathi itself.

Following are some of the other observations from the Gram Sabha

- Women were very vocal about their rights and asked pertinent questions to the president and the Gram Panchayat members regarding various schemes.
- Job cards under NREGA had not been received even after a year.
- There was a discrepancy in issuing of job cards. One of the woman complained that she got an APL ration card even after giving a proof that she was in fact BPL.
- Some of the women had not been paid under NREGA
- A watchman in Kattanbhavi did not get his salary since 4 months.

Constraints faced by the Gram Panchayat

- The president of the Gram Panchayat said that the Taluka Panchayat does not agree to all the proposals sent by them. Hence, they have to overshoot the numbers in the proposals to get the required amount.

- Many of the villagers apply for BPL cards even if they are APL and it is difficult to make them understand the criteria needed to by deemed BPL.
- As mentioned earlier, Kariappa Bhandurge, one of the Gram Panchayat members from Kattanbhavi maintained that many of the villagers do not do work as part of NREGA.
- Funds have to be allocated for the neediest of the village even at an expense of other villages of the Gram Panchayat.

5.4.Jan Jagaran

Jan Jagaran, a NGO working in the Belgaum district was set up by Shivaji Kagnikar, a social worker along with Fr. Joseph Chenakala S.J. and Shatgonda Desai. It is funded by the Goa Jesuits and is working in multiple fields such as education, watershed, livelihood and empowering the rural women through the formation of Self Help Groups. One of its most successful programme is the executing some of the government schemes, such as bio-gas and rural sanitation in Belgaum District on a turnkey basis.

NGO Schemes / activities

Following are the different fields wherein in the NGO is working in the village.

Self Help Groups

There are 4 SHG's in Kattanbhavi, each with 20 members. These groups have been formed with the help of Jan Jagaran. The number of members is kept low so as to keep the transactions and the operation of the group at a personal level. This increases the level of accountability amongst the members. The following table gives the details of these SHG's.

Table 34: Self Help Groups active in Kattanbhavi

Name	No. of members
Lakshmi SwaSahayySangha	20
SaraswatiSwaSahayySangha	20
SavitribaiPhuleSwaSahayySangha	20
JijamataSwaSahayySangha	20

Although these groups are different, still, currently their monthly meetings for financial transactions are held together with the help of officers from Jan JagaranSantha. At present,

the officers managing the meetings in around Kattanbhavi are Yashwant Bhandurge and PirajiMahut. The NGO also conducts workshops to train the groups.

Monthly meeting

We attended one of the meetings held on May, 14th 2013. This meeting was held for financial transactions like collecting the monthly contribution to the funds, repayment of debts etc. As a representative case, the details of one of the proceedings are mentioned below.

The meeting was presided by Kamal Appaji Bhandurge. Each of the members deposited amounts ranging from 100 to 1000 Rs as their contribution to the group fund. In addition, the members who had drawn loans from the SHG had to pay 1% of the pending loan amount as interest. Some of the people also partially repaid the principle amount. Role of the officers was crucial in motivating the members to repay the loans, even in small quantities like 50 Rs (for a pending amount of 20000 Rs). All these transactions were recorded in the log books of the respective groups and the log books were open for scrutiny by the members of the groups. Three people were given loans for reasons like land purchase, marriage etc. The loans were sanctioned with consensus among the group members.

Biogas and toilets

Till 2012, Jan Jagaran had built 10,000 biogas plants cum toilet units in the villages of Belgaum district of Karnataka State. 259 biogas plants have been built in Kattanbhavi alone. The biogas plants are built on a turnkey basis, based on the targets allocated to it by the Department of Rural Development of Karnataka Government. Hence, there is a functional linkage between Jan Jagaran and the government. According to evaluation study done on National Project on Biogas Development (PEOPC, 2002), 500 Rs per plant is given as a turnkey job fee to NGOs for building biogas plants. Shivaji Kagnikar was instrumental in getting the Turnkey certificate for Jan Jagaran. One of the criteria to get turnkey certificates is that the NGO contains a trained person in Biogas and the necessary manpower. Jan Jagaran cleared all the criteria.

Training Workshops

Various workshops have been organized since the early 80's to train masons in making biogas plants. The duration of these first workshop organized is typically 6 months wherein interested villagers from about 10 villages around Kattanbhavi take part. At the end of the training, the masons are required to build 3 functional biogas plants to earn the certificates. Datta Bhandurge from Kattanbhavi was one of the first to take part in this workshop.

Local people involved with Jan Jagaran

Jan Jagaran consists of workers from different villages in Belgaum district. This ensures that the local people, who understand the village situation, are responsible for the functioning of different schemes. For instance, Yallappa Naik oversees the construction of biogas plants in Kattanbhavi and also the nearby villages such as Ningenhatti, Guramhatti etc. He takes care of the finances and fills the application for subsidy to the Gram Panchayat. Yashwant Bhandurge and PirajiMahut are two Jan Jagaran worker from Kattanbhavi and Guramhatti respectively, who are responsible for functioning of SHG's.

5.5.Karnataka Electricity Board

First electricity connection was provided in Kattanbhavi in 1975 and today almost 100% households in the village have electricity except for the ones built this year and still under construction. The Karnataka Electricity Board (KEB) representative comes every month to distribute thebills and collect the tariff. Residents of Kattanbhavi have availed two schemes from KEB viz. Bhagyajyothi scheme and the flat bill for agricultural electricity connections. The Bhagyajyothi scheme provides free electricity to BPL families. The electricity connections for agriculture have a flat bill for 1200 Rs irrespective of the usage.

5.6. Institutions in the village – *People's perceptions*

Venn diagram along with discussions with the villagers gave a clear picture on the relative importance and presence of the institutions that play a role in Kattanbhavi. Although, Gram Panchayat should be playing a larger role in this regard, the ground reality is that the NGO Jan Jagaran has a greater presence in the village.

5.6.1. Gram Panchayat

Field observation revealed that the villagers were not happy with the functioning of the Gram Panchayat. The Gram Panchayat on its part painted a pretty picture of the village, which was distant from the ground reality. According to the villagers, corruption was also prevalent in the Gram Panchayat and the members elected were more power hungry than passionate. Many of the villagers said, processing of application used to take a lot of time and many a times they did not get the subsidies due to them. Overall, the people do not trust the Gram Panchayat.

5.6.2. Shivaji Kagnikar/Jan Jagaran

People informed that earlier Kattanbhavi was a highly underdeveloped village and the people were living in harsh conditions. However, the efforts of Shivaji Kagnikar and Jan Jagaran have played a huge role in transforming the village. In every household survey, people used to talk about the hard work put in by Shivaji Kagnikar. The watershed work undertaken by him has helped to curtail the water scarcity prevailing in the village. Moreover, in the words of the villagers, the afforestation drive has been a good step towards environment preservation.

Apart from this, construction of biogas plants in the village has provided multiple benefits. Some of the benefits perceived the people from the biogas technology are as follows

- Eliminated the disadvantages of cooking in *Chulha* such as, irritation and pain in the eye due to excessive smoke, large cooking time (Typically 3.5-4 hrs in Kattanbhavi), soot accumulation on the utensils and lung and eye diseases.
- Saving firewood
- Reduced the drudgery of the women, as they have to collect firewood from far off villages such as Guramhatti
- Biogas slurry as a organic fertilizer for the farms

Conclusions

Discussions with the villagers on a day to day basis along with the analysis of the primary data collected from household surveys has aided in getting information on various sectors such as agriculture, water and energy. Following are the sector wise inferences discussed in the report

Primary/ Secondary Data Analysis

1. 21% of the population belongs to the Scheduled castes and 5% to the Scheduled tribes.
2. The overall sex ratio of Bambarga Gram Panchayat however is 997 as compared to Indian national sex ratio 940 and Karnataka state sex ratio 965 (Census of India, 2011) are much higher.
3. In the sample, 28% people belonged to Naik caste and the other 72% were Marathas.
4. Sex ratio of the whole sample is 893 as compared to Indian national sex ratio 940 and Karnataka state sex ratio 965(Census of India, 2011) which is much lower.
5. Sex ratio in children below 6 is worryingly low, mere 500.
6. Literacy 66% as compared to 74% in overall India and 76% in Karnataka (Census of India, 2011).
7. Literacy is higher in Marathas (69%) than Naiks (60%).
8. Despite the clear cut difference in the economic status between the Naiks and the Marathas, the trends in the education pattern remain similar in both cases.

Agriculture

1. The primary source of income for 90 per cent of the households was agriculture.
2. The average land holdings came up to be 2.3 acres and the average number of land parcels is 4.4. Further analysis showed that there is a difference between the land holdings of the three socio-economic classes identified, namely Maratha APL, Maratha BPL and Naik BPL. The APL Maratha had a higher average land holding of 3.4 acres and the BPL Naik had the least average land holding of 1.2 acres.
3. Rice is the major crop cultivated with 93 per cent of the sample cultivating rice, followed by potato with 77 per cent of the sample cultivating potato.
4. 67 % of the farmers do not wish for their next generation to continue with farming due to the various issues highlighted in the report.

5. There are two milk collection centres in Kattanbhavi with a daily collection of 500 to 700 L. The daily revenue from the dairy business is about 11,000 to 17,000 Rs and almost every household in the village is a member of one of the dairies, the households who actually have production of milk enough to sell at the centre is less than that.

Water

1. The average water utilization of the sample came up to be 62 LPCD. However, the usability varies between Maratha APL, Maratha BPL and the Naik BPL. The figures are 69 and 71 LPCD for the APL and BPL Marathas but the number drops to 45 LPCD in case of the Naik BPL
2. The bore wells used by the people to bring water during summer are at a lower elevation, and are far away, 1.2 to 1.8 km from the habitation. Due to this, the access to the bore well water for the Naik people is restricted owing to their lower economic condition.

Energy

1. 90% of the households in Kattanbhavi have biogas plants at their place.
2. Biogas requirement for the sample came up to be 355.6 GJ/Year
3. The sample used 63.3 tonnes of firewood per year with an energy usage of 949.5 GJ/Year
4. The annual electricity consumption of the sample is was calculated to be16,060 KWh
5. The energy utilization from fossil fuel came up to be 1377.4 GJ/Year.

PRA

1. There is a spatial demarcation with respect to Maratha and Naik community.
2. There are no social barriers with respect to access to water or forests.
3. Scarcity of water is the major problem perceived by the villagers followed by low quality roads and education.

Governance Institutions and Implementation of Scheme

1. The two major governance institutions in the village are the Gram Panchayat situated in Bambarga and Jan Jagaran, a local NGO based in Belgaum, the nearest city
2. The Marathas expressed that the Naiks were favoured for approval of the schemes' benefits over Marathas.

3. Many women from Kattanbhavi did not get the unemployment allowance.
4. Job cards under NREGA had not been received even after a year.
5. There was a discrepancy in issuing of job cards. One of the woman complained that she got an APL ration card even after giving a proof that she was in fact BPL.
6. The Taluka Panchayat does not agree to all the proposals sent by the Gram Panchayat. Hence, the GP has to overshoot the numbers in the proposals to get the required amount.
7. Many of the villagers apply for BPL cards even if they are APL and it is difficult to make them understand the criteria needed to by deemed BPL.
8. Funds have to be allocated for the neediest of the village even at an expense of other villages of the Gram Panchayat.
9. The local NGO Jan Jagaran has built 259 biogas plants.
10. The Karnataka Electricity Board provides the Bhagyajyothi scheme and flat bill for agricultural electricity connections. Both these schems are availed by the residents of Kattanbhavi.
11. Field observation revealed that the villagers were not happy with the functioning of the Gram Panchayat. The Gram Panchayat on its part painted a pretty picture of the village, which was distant from the ground reality

Acknowledgements

We are truly thankful to a number of people for making this field work segment of the course work possible. It would not be possible to name each and every one here.

First of all we are thankful to Prof. Narendra Shah, CTARA,IIT-B our field guide for his help and motivation throughout the work.

We wish to thank Mr. Shivaji Kagnikar and the Bhandurge family for allowing and hosting us to carry out this field work at Kattanbhavi and helping us for everything we needed, academic and otherwise. They reserved time for us every day to inquire about the proceedings of our work and to see if anything is needed from their side. They made our stay memorable.

We are grateful to Mr. Baswant Kole and Mr. Piraji Mahut for helping in many tasks during the field work.

Mr. Mohan More deserves a special mention here. He was the third member of our team as he accompanied us for all the activities right from day 2 of the field work. This work would have suffered a lot if not for his continuous efforts. We are grateful to Mr. Mohan More.

We wish to thank More, Chaugule, Patil and Kotekar families for helping us from time to time.

Learning

Abhiram Sahasrabudhe

This field work was a memorable learning experience. The long duration of stay has ensured that we get to experience more aspects of village life than possible in a few days of stay. The learning is spread across many aspects of this field stay and thus mentioned under some of the areas that could be classified. The last section, village life has the learning that is about the general experiences during the visit.

Participatory Rural Appraisal activities

These activities / tools had been tried by us on field in a previous trip. That was a practice run, but the actual experience was totally different. The thing that struck me the most is gathering people is difficult. Whether they have time or not is different, but gathering them and getting them together is very difficult. This is particularly so when dealing with different social-economic groups at the same time. As outsiders, the reasons for people not gathering seem hard to guess or understand, but living in the context, most of them are real problems like the ST people were a bit reserved at first while talking to or approaching us. To get past this, we need to be in the village, body-mind-and-soul. Then slowly the dynamics start to unfold. The understanding of the social dynamics in the village might be very superficial during these 10 weeks but the idea that such invisible systems are at work is what I shall take out of the experience.

A very good way to peep into how the locals look at their situation is the PRA tools. The social map and resource map help a lot in this regard. When making them, it is tempting to just take the pencil and draw all that you can to finish it faster, but the people discuss the village while doing so, and I feel these discussions also are as important as the map they produce at the end of it. They give you relations people form with the surroundings, how they are related to each other etc. these relations are an important reference with respect to the interventions we would make in the future eyeing development. It is these relations that are the field dynamics and bring about just everything in the real life. Thus a thorough understanding is important. The superstitions existing here like burning the groundnut husk would spoil crop are important if you wish to promote its use as a fuel.

Agriculture

We had heard that agriculture is the largest employment provider in our country. I knew this but it just occurred to me what it was like to be a farmer. This was not my first time to farms or the environment due to my family background but the duration of the stay and the opportunity to work made the difference. We got to participate in almost all of the agricultural activities done during our stay in Kattanbhavi.

The pre monsoon period was spent in preparing the kitchen garden, making a barbed wire fence to keep the grazing goats and mainly people out, making the supporting मांडव for the climbers of various gourds etc. one more important task is to cover the stored dry fodder with a water proof sheet. I learned how to consider the wind direction and the pattern of taking the fodder out while doing this. The fodder likely to be taken out soon need not be covered as a few days rain does not penetrate deep to spoil it.

We removed of large weeds before ploughing by tractor. Removal of crop residues before the rains is important because the remains of the Jowar crop are sharp and can inflict serious injuries if someone steps on it. After this, a few rains followed and it was sowing time. We participated in sowing rice, potato and ground nuts. While sowing potatoes, we got to pull the plough instead of the bull too as it makes better furrows for sowing. Things like these, tricks and tips for better agricultural practices were learnt during the stay. This was a good experience to learn this directly from the practitioners. After sowing, weeding needs to be done. In non-transplanted rice, potato and ground nut, a tool called *Kolpa* कोळपा. It is a steel strip joined to bamboos, like a plough. Its width depends on the crop and it is pulled through the planted furrows. The plate travels along the ground, about 2 inches below surface uprooting the weed. This has to be done on a day without rains otherwise the weed survives and it is not possible to do it if the soil is too moist.

Water

Kattanbhavi is a water stressed village. Thus getting water for our own daily needs was also a task. This gave us a clear idea about the hardships faced by the people in such areas, where they have to deal with this problem all the time. The acquisition to utilization of water had to be synchronized so that excess water is not utilized, neither is excess water brought home. Getting water was a time consuming job and a bit risky too as they had to get the water from the well, through a muddy uneven road.

The scarcity of water and the fact that in a non polluted village, even after working in the field the whole day you do not get very dirty have convinced me that having a bath/shower daily is a luxury and not a need. Thus we need to change our behaviour according to the local resource requirement and needs. Another similar thing is with clothes. Exceptionally clean as good as new clothes are actually resource expensive and thus not really justifiable in the sustainability scenario.

Energy

In the village, main requirements for energy were cooking and irrigation. The cooking was taken care of by biogas plants to some extent. This saved a lot of firewood as the demand went down. The people have also planted *Glyricidia* along their farms. It is a fast growing tree and its branches can be used as firewood. The result of these is that now the forest around Kattanbhavi is now in a growing stage again. Availability of electricity was an issue due to about 16 hours of load shedding. Thus many activities like water pumping (for irrigation and PWS), the floor mills etc. have to be operated whenever electricity is available. The people have to go to farms in the Rabi season to start pumps at night or early mornings because the three phase supply is available only at that time. The learning from this was that the activities have to be modified around the available resources, the other way around is not a real option. Due to the lifestyle and low availability of electricity, the consumption was very low.

Village life

The visit brought out the deviation from simple life that is marketed as development. Many of the indicators of development in our minds are mere variations and do not develop our potential, just give it a new look. Living out of our comfort zones in a completely new setting meant taking charge of things to get things done in time and as good as possible. Listening to the people before talking (and not judging) was difficult at first but when we did it, the picture changed. We got much more insights into the village life than earlier.

I think this visit has been included in the course to help us get out of the ideological north-south divide. This divide seems to be responsible for superficial reporting and hence further conception of projects which do not deliver the real results. This field visit also served the purpose of clearing the differences between the felt and perceived needs as Prof. Amulya Reddy points out. We perceive money as the need, but the actual need is the resources. The

villagers have a mix of resources to manage the life as these resources would be very hard to buy like water.

Karishma Bhuyan

Staying in Kattanbhavi was an amazing experience. I learnt a lot about their village, village life, their culture along with the issues faced by them.

Ice breaking

Before starting work in a village, it is important to be noticed. I and Abhiram went to fetch drinking water from the community well, on our first day of the field stay. We could barely manage carrying that heavy pot and had water splashed on top of us. However, everyone noticed us. The villagers were amused and kept telling Bharata Akka, our host in Kattanbhavi, why she asked us to fetch water. However, we insisted that we were more than happy to do so. This way, we made more friends as they felt more comfortable with us. Apart from this, we had endless tea sessions, informal discussions with the people of Kattanbhavi. We learned a lot through these informal discussions and had fun while doing so. Hence, I learned that living in villages as the villagers do helps to open up the villagers. Informal discussions and socializing is an excellent way to understand the village and village culture. Moreover, it is very important to be noticed in the first few days of the stay, if one constantly stays in the background, doing research silently, the village might not feel a part of the research and would be reluctant to participate.

Amalgamation of Marathi and Kannada:

Kattanbhavi is a unique place where both Marathi and kannada people live together. However, it is dominated by the Marathis. Though, they live together and belong to the same village, I felt that there is an absence of a feeling of brotherhood or oneness among them. There is a cultural divide between them and generally they don't mix. Even then the situation is not as bad as portrayed in the political circles. It was very important to prevent ourselves from getting biased from the contradicting perceptions of both the communities.

I could also see the linkage between the economic status of a community and its general awareness. The Marathas being at an economically higher status were well informed and aware. However, the Naiks were in a comparably poor state.

Culture

I got to experience their culture by attending the various cultural events. I think attending cultural events is an amazing way to understand the society, norms and beliefs (both positive and negative) of a village. During my stay in Kattanbhavi I attended a lot of such events. In

one of the naming ceremonies for babies, I observed that the whole village celebrated together and the parents took the blessings of the elders of all the houses in the village and invited them for dinner. This just shows that in events like these the whole village comes together as one family to celebrate the happiness of one of its own.

Another event when the whole villagers comes together to celebrate is marriage. Moreover, in this case it is not only one village but a group of villages that take part in the celebrations. It was an amazing experience to attend these marriage ceremonies. Month of April and May are the months where the marriages take place. But this year all the dates of marriage were in the month of May. Hence, the village was in a perpetual state of celebrations in the initial month of our village stay. Following are some of the things I learnt while attending the different functions:

- During the functions there is no distinction in caste. Naik's and the Marathis celebrate together.
- While eating there is no caste divide, everyone eats together.
- Village youth help with the various activities related to the functions.
- No intercaste marriage is allowed
- Girls are married off at a very young age.
- There is a lot of expenditure made for these functions. A villager informed me that about 1 lakh Rs is spent on a babies naming ceremony. This is a lot, but important from the society point of view, hence can be a constraint if imposed.

Human Scale

In the appropriate technology class we had learned about human scale, and I got to experience it in the village. Many of the things are measured in human scale rather than standard measurements. Hence, for any intervention it is important to live in the village to understand their rationality.

The distances between the different villages were very small and one could travel from Kattanbhavi to burkenhatti in 30 minutes on foot. I and Abhiram travelled on foot to the nearby villages of Burkenhatti and Bambarga on a few occasions and it was not impossible. Infact, for majority of the villagers, this was very common as the transport services were not very good. Due to the human scale in distances, relatives from the nearby village could come

and help in the farms. This was a sharing system which worked well in the agricultural season. However, in our village quality of roads wes a major issue.

Agriculture

During my stay I participated in many farming operations from weeding to making bunds. These were great learning experiences and sensitized me to the backbreaking job that farming is and at the same time made me aware of the skills needed in performing each operation. The preparations for the new farming season starts after the first rains. These preparations include removing the seeds for sowing for example for groundnuts and preparing the land by ploughing, weeding, removing stones etc. I worked in three farms belonging to Yashwants Bhandurge, Maleshi Chaugule and Parashram More. The first and the second ones were in the village whereas the third farm was outside the village near Ningenhatti. It is common for people to have farms outside the villages, the ancestors owned lands that spanned across different villages. Following gives my learning in each farm.

Yashwants Bhandurge's farm

- As mentioned in the report, there are four people in the village who own tractors and lend it to other people to plough their respective lands. On the first day of our visit to Yashwant Bhau's farm we observed the tractor working. We removed the last years Jowar stalks from the farmland while the land was being ploughed. The Jowar stalks are very sharp and might pierce the farmer during the various farming activities, hence they are removed beforehand. This required a lot of patience and stamina, as removing all the stalks from 1/3 of an acre is not an easy task. However, Yashwant Bhau's mother in law, whom we fondly referred to as aai was very strong and skilled. Later these stalks were collected at the sides and burnt. There is a pond near their farm; however they don't use its water as it is privately owned.
- Ploughing and weeding are done after a few rains when the land is soft. When people don't have bulls for ploughing the land, they borrow it from other villagers.
- Some of Yashwant Bhandurge's farms had a lot of stones. Hence, one of the major activities before sowing is removing these stones.
- Another activity before sowing is preparing the seeds. Almost everyday in our hosts house we used to remove the groundnuts from its shell and also separated the good seeds of beans (known as *kala police* in the local language) from the bad ones. The bad ones are not wasted but used for eating purposes.

- We sowed groundnuts in Yashwant Bhandurge's farm. The sowing of groundnuts was a tedious task and following describes the whole process:
    - An instruments known as *hargi* is used to make parallel furrows perpendicular to each other.
    - The groundnuts are sowed in the corners of each square. One had to bend down put the seeds and put soil over it. Two seeds were sowed at a time in each of the corner, to avoid failures.
    - The alternative is to sow on parallel rows, which according to Mohan More, another villager, gives more productivity. This particular strategy requires lesser efforts.
    - Corns and a variant of beans were sowed in the periphery of the fields. Corns take about 4 months to mature and the beans take about six months. Groundnut on the other hand takes 4 months to mature.
    - In the end, fertilizer was added over the soil.
- We also sowed rice in another patch of land. The sowing of rice was a tad easier. First the seeds were sowed in parallel lines; one could through the seeds standing up. Next, fertilizer was added followed by covering it with soil. In the end the field is levelled using a *gutta*. On one day we sowed rice in three patches of land (~0.5 acres).
- After the sowing is over, weeding is done in the field routinely. Weeding can be done manually using a *korpa* or using bulls. Working with the *korpa* is cumbersome. One farmer drags it, just like the bulls and another adjusts the directions so the groundnut plants are not uprooted. Using a korpa puts a lot of stress on the neck and back. However, it is more appropiate than bulls as the bulls legs might trample the young plants.
- Corn was also grown in another stretch. However, in Kattanbhavi corn is used only as animal fodder. Before sowing corn, a weed locally known as congress was removed from the field.

Parashram More's farm

- Parashram More's farm was situated almost 3 km away near Ningenhatti, a nearby village. Almost al the farmlands near his fields were owned by the More clan. There was a perennial stream near his farmland, wherein villagers from Ningenhatti came to collect drinking water and wash clothes.

- Contrastingly to Yashwant Bhandurge's farmland, Parashram More's farmland was heavely fenced to protect it from wild animals, since his field was near the forest. For instance he had cultivated both chilli and *Gavar*. The *Gavar* was eaten up by wild animals. This leads to a lot of man animal conflict. However, they were not allowed to kill any. Interestingly, the villagers spent about 35000 Rs to build a trench in the area to keep wild animals at bay, but this strategy did not work.
- We harvested chilli in Parashram More's field and it involved a lot of skill, technique and hard work. One had to distinguish between the chillies that were ready for harvesting and the ones that were not. One chilli crop could give a maximum of 100 chillies at a time. However, this year the productivity was less and the maximum number for the day was 67!
- Distances can be a huge problem, when the farmland is located far away. Farmers have to travel on foot to the farm with baggage such as food and tools. After harvesting the chilli they had to bring it back to the house. Mohan was carrying a load of as much as 50Kg and had to carry it back on his head. His mother was also carrying the same amount of load. For me carrying 10 mangoes was difficult, I did not know how they managed to carry that much load. Similar to Parashram More, Lakhsham Bhandurge's farm is located in the Kurihal village as his great grandfather had bought land there. In such a case, it becomes mandatory to be back before it gets dark, otherwise it can be risky. In one such incident, a boy named Rahul was about to be run over by a bullock cart as he fell down in the dark. These are one of the many constraints that the farmers face on a daily basis.

Moneshree More's farm

- We went to Moneshree More's farm to sow potatoes. Yashwant Bhandurge's family also joined the More family as they are both related. Following describes the whole process of sowing potatoes
    - The potato sacks are taken to the field and are cut in two halves in the field itself. While cutting the potatoes one has to make sure that the eye of the potato is present in both the halves. The tool to cut potatoes is knows as a *veera.* On one day, I and Abhiram together cut 5 Qt of potatoes to be sown.
    - Here again, parallel furrows are made on the field using *nangar*, which is pulled by two buffaloes.

- Potatoes are sowed in the furrows. For sowing, the cut portion of the potato has to touch the ground.
- The soil is added on top of the potatoes using *nangar* again, followed by addition of fertilizer. The fertilizer used were both chemical and organic. The organic fertilizer in this case was press mud which was procured from the nearby sugar factory.
- When we went to Maleshi Chaugule's farm for sowing potatoes. The techniques of putting fertilizers was different, wherein the fertilizers were put in middle of the potatoes sown, followed by covering it with soil. This is done when the fertilizer is more in quantity.
- Beans (known as *Kala Police*) were sowed perpendicular to the parallel furrows after every five steps.

Dependence on rain

Farmers are heavily dependent on the weather especially the rainfall. Sometimes the right amount of rainfall is needed and sometimes it is not needed at all. All the farmers had a very good sense of the climate and the weather; they were like human weather stations. However, sometimes excessive rains or rainfall at the wrong time, interfere with the farming activities. For instance, once, when we were sowing potatoes, there was a heavy rainfall. Immediately we had to cover ourselves with raincoats and plastic packets, waiting for the rain to subside. But as the intensity of rains increased we had to abandon our work in the field. This causes problems as the potatoes were exposed on the field and Yashwant Bhandurge had to go back to that field again to finish the work. Luckily the potatoes were not spoilt. Prashram More, however, was not so lucky. Some of Parashram More's chillis had rotted due to heavy rains. Many crops fail when the farmlands get flooded.

In another case we had gone to weed the groundnuts that we had sown. However, as it started raining weeding became difficult. I learned that to effectively weed the farm, even the smallest of things such as the wetness of the soil matters. It was difficult to remove weeds from a wet black soil as the roots would not come out.

Accounts

Except for one villager that we met, none of the farmers had an exact idea about their revenue and expenditure. Farmers generally don't maintain accounts and it was very difficult to find

out the per acre expenditure or the profit or loss made. According to me, this is one of the drawbacks.

Experimenting

Farmers routinely experiment in their fields. Yashwant Bhandurge tried different techniques of using fertilizer so as to compare the yields.

Holiday (*Wara*)

Wara is called to prevent the farmers from going to the fields. A few of the villager elders gather in the village temple and announce that the villagers are prohibited to go to their farms. This is like a forced holiday for the farmers. I could not understand the rationality behind this, as the *wara* was called on a day which was immensely suitable for farming. As per one of the villagers, this is done by the powerful ones to exert their dominance. The people who do not agree to the decision have to pay a fine.

Variable market rates increasing farmer's vulnerability:

Farmers worked very hard to make a living. Still, they are the most underpaid and vulnerable sections of the society. They are highly dependent on market forces to get profits. It is possible that all the hard labour does not fetch any returns and the toil and effort put can go to waste. More should be done to safeguard their interests.

Health

Adequate medical facilities were not available in the village. The PHC was in Handigannur. One had to travel to other places to access treatment facilities. There were two barefoot doctors visiting the village on a regular basis. These were not certified doctors. Following are some of my observations on field

Injections

I observed that people would take injections for small problems such as regular fever. Initially, I inferred that maybe; the doctors try to mint money by giving injections as villagers have less awareness about medicines. However, later I realised the villagers also insisted on getting injections otherwise they don't feel like they had been treated well.

Weight

In another case, our host took a weighing machine to Moneshree More's (another villager) house so that people could check their weight for fun. There was a celebration going on in his house, hence many people were there. While people checked their weight I realised that their

weights were really low (taking in to their height and age). I was shocked as I personally knew these villagers and was aware of their capacity to work. These people did a lot of hard work and were stronger than me and Abhiram. Still, a girl of 21 years and height 5 feet weighed only 35 Kg.

Women health:

In Kattanbhavi, girls get married at a young age. Girls usually study till class 10 and are married off after that. Hence, there are many who have gotten married before 18. Due to this, they also get pregnant when they are teenagers. Pregnancy has a huge impact on their health. One of the women, who has 4 children, said that she nearly died in her second pregnancy. She got married when she was seventeen and had her first child when she was 18. Many of the women deliver their babies at in the house itself.

Family planning

Family planning is common in Kattanbhavi. Many of the women have been sterilized. Interestingly men do not undergo sterilization and there is only one man in the village that had been sterilized. However, the problem arises when the women use intrauterine devices such as copper-T. I was told that a few women have died due to infection by using such devices.

Lack of money

People in villages don't have very large saving or income. Hence, whenever there is a health problem, it leads to a lot of financial problems. One such family in the village was facing this problem. This particular family was below the poverty level and consisted of 5 members. The daughter was partially paralysed and was taking treatment for it. She had to pay a lot of money to buy medicines every month and it was draining their financial reserves.

Recycling and food Preservation

Villagers use very less resources. In the field I could truly observe that we Indians hide behind the poor as in the cities we are very resource intensive. However, having less demands should not be misunderstood as a lack in the happiness levels of the villagers. In villages there is a good culture of recycling and preserving. Following highlights some of these

- The roof of the house that I was staying in was made of tiles taken from an old school. These tiles were made in 1865. The doors and the windows were also from that era. These were in a very good condition and highlight the way the villagers preserve and

recycle. Many of the houses in Kattanbhavi, like that of our hosts are very old and in good condition.

- In one house I saw that the curtains were made of sarees and bags were made of old clothes, this is a very common practice. While going to the fields also, the villagers use gunny bags and fertilizer packets as a means to protect from the rains.
- Since there are no fridges in the village, except in the shops, people are required to preserve their food. The leftovers from the previous day are boiled regularly to prevent them from spoilage. Drying and making pickles (*Loncha*) is also common. Once my host made *chutney* (*Thecha*) from dried prawns and it was eaten for the next 10 to 15 days. Moreover, the leftovers are also modified to make some new food. Once I ate a modified bhakari and the host told me it is known as the poor man's food. We loved eating it, it was very tasty. There is a lot to learn from the village women about preserving food and recycling. They are the masters of it.

Education

There is more awareness in Kattanbhavi in terms of education. Almost all the children in the village go to school. Education plays a very important role in shaping ones future and majority of the villagers understand this and are doing everything to provide it.

During one of the household surveys, a farmer of the village told us that he wants his son to study as he himself is uneducated and understands the hardships one has to face in the absence of education. He was proud of his son as he told us that he was very hard working. These children are studying in adverse conditions. One of the villagers informed us that he used to give his son 20 Rs a week to get by. This is a meagre amount from the city perspective but meant a lot to the boy who is earning well now. In a contrasting case, there were houses were the children had dropped out of school, either because of the hardships they face or because they don't understand the importance of studies. In one such case, the father of the boy was visibly disappointed and upset since his dream was to educate his son, however his son dropped out of school in class 10. Having interacted with this boy I learned that he had a lot of potential but he was interested in farming and wanted to pursue the same. Even though there is no harm in wanting to do farming I still feel that education is important because the land holdings are shrinking and people have to be able to find alternate sources of income.

Education is certainly a privilege in the village as it is very difficult to go to school and study. Kattanbhavi has two schools, one Marathi till class 5th and another Kannada till class 4th. Older children have to travel 4km daily to Handigunnur, a nearby village to go to school. They have to travel for an hour on foot and the roads become extra difficult to travel in the monsoon season. Additionally, this school in Handigunnur is a Marathi medium school and the nearest kannada school is in Burkenhatti but the quality is not good, hence the the Naik have to travel to Manekeri which is further away from Kattanbhavi. One of the Naik villagers was lamenting that his son is at home most of the time due to the distances involved. In such a case, the son will have to drop out even against his will.

I also observed that there is an oppertunity cost involved in sending ones children to school. Farming needs a lot of man power. With the average rate of labour being 100 Rs per person per day using ones children to work in the farms becomes necessary. Still, majority of the children in Kattanbhavi go to school and study well despite the harsh conditions. One of the good examples that come to my mind is that of the current Gram Panchayat member from Kattanbhavi. He has two sons, one of them working with the Mahindra group in Pune and another is in the Military. He was a proud father and found pleasure in informing us that his granddaughter is also very bright and does well in school.

As per the discussions with the village children, the quality of teachers is not good. Much should be done by the government to train the teachers and improve their teaching capabilities.

Migration

Many people in Kattanbhavi used to migrate to Mumbai earlier. However, recently the trend has been on a decline. I got to hear about many perceptions about migration. Following are some of them.

- One of the negative impacts of migration on Kattanbhavi is AIDS. For instance, earlier many of the villagers used to go to Mumbai for work. From there they used to contract various diseases such as AIDS. Once, they would come back to the village; their wives would also get affected by it. Interestingly, an increased incidence of AIDS has had an impact on their culture also. For instance, the ladies in the village get tattooed on their foreheads and hands. However, this is rarely done now and I could not find any young girls with tattoos. One of the women told me that since the

needles used are not sterilized properly she is unwilling to tattoo her daughter's arms in the fear that she might contract AIDS.

- When children migrate out, the old parents find it extremely difficult to manage the farmlands and the households. One of the women in Kattanbhavi was complaining that her children don't even send money home.
- During my conversation with one of the farmers, who was living in Mumbai I realised that life in Mumbai is very difficult for these farmers. Though I wasn't surprised but still hearing the firsthand account of his experience in Mumbai and other cities was an eye opener to his plight. He said that being uneducated he was naive and often duped by others. They used to get paid decently; still he could not save any money. He said that all his days outside the village were a waste and he is currently in debt.
- In a different perspective, a girl told me that migration was infact good. She said earlier, woman used to have children after a gap of nearly 3 years since the spouses were never home. However, now that the males are not migrating, her friends were having children after every year. She said it affected the women's health as child bearing at an early age and in the village was very difficult.

Drudgery

The women in the village do a lot of work. After visiting Kattanbhavi I became aware of the large distances involved in fetching water or firewood. It is one of the biggest constraints in villages. I realised how heavy even one pot of water can be and bringing 5 such pots from even a distance of 300-400 m is a huge task. On our first day I and Abhiram fetched water from the well and we could barely manage holding one pot, together!

The women in the village also hardly rest. They wake up in the morning, do the household chores like cooking, cleaning the house, cleaning the cow sheds, washing utensils, milking the cow etc. After finishing all these tasks they go to the fields. They come back and the cycle of household chores is again repeated. They sleep late in the night and wake up early in the morning. Hence, even small improvements in the water, energy and agricultural sector that save on time can have a compounded impact on women's life in villages. A woman once told me that biogas has allowed her to spend time on watching T.V otherwise earlier there was absolutely no time to relax.

Alcoholism

Alcoholism was another problem in Kattanbhavi. It was shocking to know that the children as young as 10 years old were drinking alcohol in the village. Interestingly, fed up with alcoholism in the village, the women of Kattanbhavi and the nearby villages had organized a protest march. After that it is perceived that alcoholism has reduced. However, in another perspective given by a villager, only visible alcoholism has reduced as people are still drinking *albeit* in their houses behind closed doors. According to the villager, many of the people in Kattanbhavi are joining the army. They get subsidized alcohol from the government. People say that if the government is giving alcohol, it may not be such a bad thing after all. Hence to counter the problem of alcoholism, it is important to create awareness about the misgivings of alcohol addiction. Both the carrot and the stick model can be applied. For instance, During one of our visits to Parashram More's farm, we saw an area where alcohol was being made. The police had however raided that place. There were two houses in our village that made alcohol. Even after police raids and protest by certain villagers, the houses have not stopped making liquor. They say it has been their ancestral job and they would continue to make liquor.

Corruption

Through the informing discussions with the villagers I learned about the misgivings of corruption. One of the villagers said that corruption is inevitable. He said that if a person has to get some work done he has to travel to the city such as Belgaun, many a times the officers in charge ask them to come later. According to him, it was better to pay a person 100 Rs to get the work done, rather than wasting another day and effort, which might cost him 300 in total taking into account the expenditure on travel and the opportunity costs. He also mentioned that corruption is a vicious cycle which affects the poor people the most. Through this and other conversations I understood that corruption eats away the funds allocated for the poor and also makes their life even more difficult.

Jobs

Many of the villagers are now joining the army. Even though, this is a positive trend, farmers face a lot of problems in getting their children employed in the Indian Armed Forces. It was shocking to know that the middlemen take as much as 2 lakhs to get a job in the army. However, even after paying the money there is no guarantee of a job. Same is the case of people going abroad (Dubai) for jobs; they have to pay hefty amounts to middlemen. Young men roaming about the village without any work to do is not an uncommon sight during the

non agricultural days. Hence, according to me unemployment is one of the biggest menaces. Having said that, it is always better to get a job in or near the village so that the concerned person can look after his farmlands and help the old people in his family. In many households, where the children were migrated out, the old parents found it extremely difficult to manage the farmlands and the households.

PRA

Participatory Rural Appraisal activites along with the discussions gave a good understanding of the village. Certain activities were conducted at the begining to aid the subsequent processes such as deciding the sampling criteria. For conducting activities such as resource maps and social maps, it is important to have as many participants as possible. To gather people and get a wholistic overview we used the SHG meeting to reach out to as many villagers as possible. As it is an extended stay, PRA activities need not be an one off event. We used the whole of the 10 weeks to gather data on a regular basis, whenever the oppertunity presented itself. For instance, the various events and timelines were collected during the course of stay from various people. This enhances the quality of information collected. Venn diagram was of particular interest to me, as the results were not according to my perception, for instance even though the Gram Panchayat was incompetent, it was the most important. Activities such as these help us to probe deeper in to the villagers thought process.

Self sufficient

The villagers are very self sufficient. For instance, many of them help while making their own houses; most of them can troubleshoot in case of problems with pumps, electricity connections, biogas plants etc. Even young boys of class 8 can mend motors, bicycles etc. In the city for many of these problems, people would hire external help; however, in villages people solve their own problems. This is a very nice talent as it saves them a lot of energy and time.

Superstitions

The cultural beliefs of people play a big role in decision making not just in villages but in cities too. In Kattanbhavi for example the shell of groundnut is thrown carelessly without making any use of it. There is a belief that if these are burnt then the crops burn with it. However, one of the villagers who is using it as a fuel for heating water jokingly remarked that he burns it and nothing happens to his crops. In another instance a women asked me if

the wind mill situated near the village is responsible for reduction in rainfall. In case of the biogas plants also, some of the villagers feel that once the cow dung goes inside the plant it gets burnt and the slurry has less fertilizer value than the gobar. These and other such beliefs lead to the rejection of certain good practices and technologies. Hence, one has to be aware of the cultural beliefs of a particular place before coming up with any solutions so as to prevent rejection or there has to be a proper awareness program in place.

Appropriate technologies of Kattanbhavi

- There are many new techniques that I observed in Kattanbhavi. The floor of the house of my host was made of mud and gobar. After every 8 days, they used to wipe the floor with gobar which used to bury any small insects like dust mites. This is the way they used to make sure that the floor was clean. Also, I observed that their brooms were small and was locally made. It was simple to make and used to suit their floor. Also as the kitchen was swept regularly while cooking, it was easier to do so with this broom, while sitting.
- Once while travelling back from the farm in a bullock cart I was told that the wheel of the bullock cart was made of steel and mud was put in the middle hinges so that if the iron rusted then it would rub with the mud and fall off. There is also a technique involved in riding the bullock cart. When the cart goes uphill, the weight has to be in the front and vice versa. This is done to reduce the load on the bullocks neck.
- The feedstock of cattles consists of rice stalk and jawar stalk. However, they don't eat wet feedstock and it is impossible to get these from the fields every day. Hence, these stalks have to be stored. Small feedstock houses known as *wali* are made and it protects the feed from leakage. I had once carried rice stalk (*pinjar)* to feed the cattle and I noticed that it was extremely dry even after heavy rains in the night.

Technology and the village

One of the village elders, fondly known as Vimal Aai said that it used to take her 9 hours to travel from Kattanbhavi to Belgaum in the olden days and she used to travel twice a week to sell her produce. Now, life has become much easier due to better transport. These are some of the ways where technology has helped in uplifting the village. It is a well known fact, but the dissemination of the mobile phone technology has been impressive. People owned at least one cell phone per households usually even more than that. Mobile phones provided the added advantages of camera, music and radio, all of which can be availed at a cheaper price.

In one of the households, the household head was using the mobile phone to listen to one of the agricultural programmes meant to provide information to the farmers. In such cases mobile phones come in very handy. Apart from mobile phone even television can be seen in majority of the households. According to me, villagers live a very busy life. After working hard for the whole day, it is nice to have some entertainment in the evening. This must be the biggest driving force behind the success of television.

Cooking

The villagers use *chulha* instead of the stove when there is a lot of cooking to do. During the monsoons, when the seeds are being sowed, the women have to make a lot of food to be taken to the farms. Then many a times they have to use the *chulha* also. In one such instance my hosts used the *chulha* to cook food along with the stove. It was a good way to observe the difference in cooking. The *chulha* took a lot of time and the fumes emitted out of it made breathing uncomfortable. The fumes also burnt the eyes. The wood burnt with great difficulty, hence my host put plastic in it. I had observed this in another house too; wherein plastic was burnt in carelessly in the fire where water was being heated. The woman mentioned that cooking using *chulha* is very difficult and I could experience the difficulties myself. Hence, biogas has been a boon to the farmers, still it is not enough in the agricultural season, when it is most required.

Household Survey

During the household survey we were routinely mistaken as government officials. Interestingly, villagers are wary of government officials. One of the villagers told us that villagers might be unwilling to give us information on agriculture etc, as there is a feeling that we would take something away from them like confiscate their lands. Hence, we had to explain that we were students who were there to study their village. On a particular household survey the wife was very suspicious of us and kept on asking her husband why we need this information. Luckily for us, her husband trusted us and explained to her that we mean no harm. It is very important to build trust in people and make them comfortable in such cases. As far as what I have observed, one should wait and socialize with people, spend some time with the villagers before gathering information through household surveys. It is also important to listen to any extra information that they might want to share, thus one needs to be flexible while questioning. Sometimes the villagers may not understand the questions as it might seem unimportant or irrelevant to them. In such questions it is very important that we explain the purpose and importance to them. Rather than questioning the family head, which

is usually the male, the females of the households should also be given chance to participate. We did not face much problem in this regard in Kattanbhavi as the females are very outgoing and empowered. They had a lot of knowledge on agriculture and water and were not shy to share the information.

Another observation was that people are mostly clueless about their age. This is the way in villages wherein the birth of a person is denoted by an event or season rather than a fixed year. This caused a lot of problems while filling important applications. However, most of the young mothers in Kattanbhavi did have an accurate idea about the birth dates of their children. Apart from this, many of the important identity proofs such as ration card misspelled the villager's name. This used to cause a lot of problems to the villagers.

APL/BPL

There are a lot of problems with the issuing of Job cards in the village. The government's rationality is different from that of the villagers. For instance, many of the times the villagers don't get the lands transferred on their names. The division of lands amongst the brothers or the *batwara* in the local language is done with the elders of the village with everyones consent. Due to this, even though they have fewer lands and have a lot of mouths to feed, they are given BPL cards.

Gram Panchayat vs. people's perception

There was a stark contrast in the claims of the Gram Panchayat and the villagers. The gram Panchayat maintained that there was no problem in the village. However, the people's perception was entirely different. There is immense distrust between the people and the Gram Panchayat. During one of the Gram Sabha, the president wanted to end the session as soon as possible. However, could not as one of the local social workers, kept on questioning him regarding various schemes. Hence, it is very important to exercise ones rights in a democracy, by questioning the government agencies in such meetings.

The Marathas in Kattanbhavi faced a peculiar problem. All the formal letters and notices were in Kannada language, which was not known by some of the Marathas. In one of the gram sabha's this was an issue and the Maratha people from Kattanbhavi insisted on conducting the rest of the proceedings in Marathi.

Shraamdan vs Panchayati Raj System

There was a very unique perception about the Panchayati raj system that I learned during my stay in the village. According to the village elders, prior to the Panchayati Raj system, the people were more responsible towards their village. They used to work freely (*shramdaan*) for the betterment and development of their own village. For instance, the road from Kattanbhavi to Bambarga was built by the villagers themselves. Also, the wells in the village have been dug manually by the villagers. However, now people are more dependent on the government and the feeling of *shramdaan* has reduced. If there is a need for anything, the common behaviour is to leave it to the Gram Panchayat rather than collectively do something about it.

Additionally, with the advent of the Panchayati Raj Systems, the scope of corruption has increased. According to some of the villagers, earlier in Kattanbhavi, the panch used to work for the village, thinking of it as their duty. However, now getting elected to the gram panchayat is also about power and even the well meaning people can change and give in to corruption. This is was evident from the various stories that I heard in the village.

JCB vs people

In the appropriate technology class we had read that the increased use of machineries has replaced labour which has led to unemployment. In the small scale of a village, use of JCB for making well rather than people was one such replacement. However, the villagers and the panchayat members understand the importance of labour and currently people instead of JCB is being used to make wells. One of the Gram Panchayat members said that it is better if he can feed 20 mouths instead of one.

Building awareness is important

Sometimes people behave a certain way or do certain things because it has been happening since a very long time. Sometimes these actions are detrimental to the people's interests. For example: through our discussions with Shivaji Bhav we learned that 12 years back, the villagers were selling groundnut to a local merchant at cheaper rates and thus were getting cheated. Shivaji Bhav made them realize this fact and convinced them to extract the oil from the groundnuts instead. After this the villagers started travelling to the nearby villages such as kudnur and rajgoli to extract oil for household use and the residual cake could be used as goat feed, thus providing dual benefits.

Similarly, about 12-13 years back, people used to go inside the drinking water well to collect water, thus contaminating the water. Bharata Akka, our host, took the lead and cleaned the well with the other ladies of the village. They also started a water rationing system based on the number of people per household. The cases of water borne diseases drastically reduced that same year and there has been no problem ever since.

Such cases highlight the importance of building awareness in people about the disadvantages or harmful effects of certain activities or actions. It takes a lot of effort, but if successful, the results are very positive and long lasting.

Bibliography

World Bank. (2008). *Review of effectiveness of rural water supply schemes in India.*

Bhat P. R., C. H. (n.d.). *Biogas plant dissemination: Success story of Sirsi, India.* Bengaluru: Centre for Application of Science and Technology for Rural Areas (ASTRA) and Centre for Ecological Sciences, Indian Institute of Science (IISC).

Bond, T. T. (2011). History and future of domestic biogas plants in the developing world. *Energy for Sustainable development, 15*(4).

India, C. o. (n.d.). *Rural Urban Distribution of Population.* Retrieved 7 31, 2013, from Censos of India web site: http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf

PEOPC. (2002). *Evaluation Study on National Project on Biogas Development.* New Delhi: Planning Commision of India, GOI.

Venkateswara Rao P. V., B. S. (2010). Biogas generation potential by anaerobic digestion for sustainable energy development in India. *Renewable and Sustainable Energy Reviews*, 2086–2094.

Annexures

Annexure I: Sample household questionnaire

Fieldwork Segment 2012 (TD 609)

Questionnaire – Household Profile[1]

Sample No. 1

Household Head's Name:LakshmanSatbaBhandurge

APL

Name of the Caste : Maratha

Caste Category (encircle) Maratha[1] Naik [2] Other [3]

Household: Background Information

Please provide us some background information about all individual members of the household

Name	Age (in Yrs)	Sex (M/F)	Education (year of schooling*)	Occupation **			Earning Members (Tick)
				Main	Secondary***	Average Monthly days of work	
Lakshman	37	M	10	Agri	Mason		Y
Lakshmi Lakshman	30	F	7	Agri			Y
AshwiniLakshman	14	F	8	Stud			
AkshayLakshman	13	M	7	Stud			
AniketLakshman	10	M	4	Stud			

Remarks (if any):

[1]Sampling criteria: spatial, caste, class, gender

* **Education code**: Class 1to 12 = 1, 2, ……12; Adult literacy (night school) = AL; No education =00,

Dropped-out of school = D and from which class, Graduation = G, Post graduation = PG

** **Occupation code:**

Farmer/cultivator =01, Homemaker (housewife) =02, Agri-laborer = 03, Non-agri-laborer = 04, Salaried job =05, Artisan =6 Business =7, Student =8, Unemployed =9, other ……..(specify) =10

*** If no secondary occupation, write '-'

Source of income for the family (annual):

Income code: Agricultural =1, Wages labour =2, Salaried job =3, Livestock =4, Fishery =5, Migration =6, Business =7,

Small Industrial =8, Arts and crafts =9, Forest Produce =10, Allied Agricultural activities = 11, Others (specify) =12

Primary source(s) of Income	Secondary source(s) of Income	Tertiary source(s) of Income
Agri	Dairy (2 cows)	

Migration

Has anyone from your household migrated (out) during the last 5 years?

Yes =1, No =2 (skip the next section)

Migration Details - (Record Migration for economic purpose only**)**

Number of Household Members	Destination Place Village/ City/ Town	Number of Days/Year	Wage Earnings/ Month (Rs) (XXX ????)	Residence at Destination Puccah =1 Kuchha =2 Tent =3

Remarks (if any):

Government/NGO Scheme Benefits/Facilities

Govt. = G NGO =NG	Scheme	Wage per day	No. of days of work	Nature of Assets*
NG	Cashewnut plantation	125 (8 hrs)	1 month in 2 years	Plantation (1995-96)
NG	Biogas (1994-95)	150 (8 hours)	25 days/ month for 3 months	Biogas plant (700 rs/plant)
G	Flat bill for Agricultural electricity 1200 / year			

* only private assets

Remarks (if any): Plantation and biogas was old work, does not work as mason any more, built 35 plants in 4 village, hired labour for it

Agriculture

Land Particulars (**in acre**):

Total owned land: 3 Fallow land : 0.5 Operated land: 2.5

Leased-In: …… Leased-Out: …… Green House…….. If land is fragmented, in how many parcels: 4

Crop Production/ Food Availability (last one year)

Multi- crops (enter crop names):Rice June to Oct, Veg cucumber – 3 month cycle starts after 1.5 months continues next 1.5 Nov to Feb till April, benise- Nov to Dec, Potato- June to August Jowar - Sept to Jan , Corn – any 2.5 months with moderate water, Lalbhaji, Raddish, Methi, Turnip, Corriander, Cabbage

Crop ccycle – Rice-Beans+Corm-Chillies Rice-Cucumber

Intercrops (enter crop names):Banana (3 years 3 crops)+ Chillies (3 months) Chillies only once every 3 years

Corn+Beans Dec to Jan,

Crop	Land Allocated	Per Acre Production	Per Acre Expenditure	Produce Sold (in quintals)	Selling Price (Rs/Quintal)	Frequency of watering	Watered in which months
Cereals							
Jowar	25 G	7-8 qt	2000	1.5 q	1800-2800	-	
Rice	1.5 A	20-25 qt 30-35 if transplanted	10000	22 q	1200-2000	Continuous	As reqd
Corn	1.5					4	Whenever sown
Pulses							
Oil							
Vegetables	Beans Cucumber Cabbage Chillies Potato	20 G 35 G 10 G 30 G 25 G	15000 13000 18000 27000 50000	25 q 40 q OR 40 q 15 q 30 q	1000-2500 300-1000 250-500 1500-2500 400-1200	7-15 15-20 7-10 10-15	
Fruits	Banana	30 G				Every 4 days in red soil	
Cash Crops							

1 Guntha is 1089 sq. feet 1Acre is 40 Gunthas = 43560sq.feet

Is your farming mostly organic or chemical (applying only organic manures or chemical fertilizers)

Hired Laborcost and number: 340 Labor@ 70 rs/day

Farming Viability

Please list out the main risks in your farming according to priority ranking?

a. Climate
b. Market rates
c. Labour.

How often, in a cycle of 5 seasons, do you end up with negative net returns (investments being higher than what is obtained in return from the farm)? 3 in last 5

Do you want to remain in farming? Yes

Do you want your next generation to remain in farming? No

Please give reasons for the above:

Energy

Is there a electric connection

If not, was there one in the past and if yes, why was it disconnected

Consumer Number Electricity Bill per month

Energy usage	**Type of Device**	**Source of Fuel/Energy**	**(Amount of Fuel/Energy)/ (Duration of Usage)**	**Cost of Fuel/Energy**	**Remarks, if any**
Lighting[+]	Tubelight Incandescent bulb CFL	Electricity	1 x 3 x 60 4 x 2 x 40 2 x 2.5 x 25	2.20/kwh	intermittent at night after 10
Cooking[+]*	Gas stove	Biogas	Daily 3 hours 2 burners		
Water heating	Included above				
Travelling	Once weekly	Public bus			
Appliances	TV Mixer Mobile charger	Electricity	1 x 2 x45 1 x 5 min x 1 x 1 x 2.5		

	Battery charger		2 x 1 x 2.5		

[+] all available devices/ alternatives in use must be noted (e.g. candles, petromax, kerosene lamp, elec bulb (yellow/ CFL/ LED)

* Source of cooking fuel and time spent in for its collection should be noted

Any problems with the existing cooking energy system? (drudgery, pollution, time..)

Is there awareness about LPG/biogas/solar-cookers/improved cook-stoves etc.

Is there willingness to try out new ways? What are the major constraints/ barriers that keep them away?

Livestock	Number	Feeding style (Stall fed or Grazing)	Feeding amount/d	Feeding cost/d	Output (Dung, Food, Animal Power)	Usage pattern	Earning
Cow/Bull	3/1	Stall	25				
Buffalo F/M							
Poultry	2		100				
Goats							
Others							

Biogas plant? (seen/ owned –operational/ dysfunctional? Feedback/ comments?)

Use of animal power?For which activities (workload, time)?

Water pumping: (Both for agriculture and drinking water)

Type of pumps used (make, capacity, power rating, years in operation, Maint issues, user feedback)
Bore – Sambhav – 5 hp - 8 stage pump 5 hours
Common 5 hp – 25 min

Source of energy: diesel/ electricity/ solar/wind (awareness?)
Both electric

Frequency/time of usage - is it constrained by the availability of the energy source?

yes

Installation Vs operation cost
Bore 20000
Common 16000

If traditional water harvesting unit (animal/human powered) - estimation of number of hours, amount of water drawn, approx. distance/depth, O&M issues, costs etc.

Water

Water Utilization	Source (Serial No.)	Amount of water taken (daily)	Distance between source and use	Mode of transport	Time spentt
Drinking	DW well	64	1 km	cycle	1 hour
Agriculture					
Other household use	Pipe	320	0		15 min

Specific problem with drinking water (if any)

Source far away

Boil in monsoon

Any other water related problem (if any) …….