

Demographic and health survey of the villages near the mining area within 6 km distance of mines were conducted under programme on Studies on Uranium Mines (SUM Jaduguda). This study was funded by the Board of Research in Nuclear Sciences (BRNS) and was conducted by Tribal Cultural Society. This study brought to the fore both qualitative and quantitative information with regard to parameters, namely demographic profile, health status and levels of gamma radiation. The study covered 4123 households in the three clusters through interview schedules and Participatory Exercises conducted in all 26 villages. 14 health camps were organized in the three clusters and Manoharpur (control site) totalling 6525 patients whose database was developed for future comparisons.

Of the total population from 4123 households covered, 46% were males and 54% were females. In all the clusters the family size ranged between 3 - 6 members per household. Maximum persons in all clusters belonged to age group of 20-30 years age group followed by 0-10 years. About 2% of the population was observed to live more than 80 years among all clusters. An exhaustive list of 30 diseases formed the basis of medical check-ups in the health camps to record their occurrence both among males and females.

Some of the core observation in the study area pertaining to demographic, socio-economic and health status studies are - 1) the area is predominantly Tribal populated consisting above 60% of Tribal population; 2) Literacy is 57%; 3) Only 5% have received any vocational/skill training; 4) unemployment is 69% ; 5) Around 50% of the population is in Below Poverty Line (BPL) category ; 6) 29% families have electricity in their home ; 7) Access to education facilities-Primary school-90%, Middle school-30%, High School - 11% in their village ; 8) Major source of livelihood is agriculture and working as daily labourer ; 9) Around 20% population do not have food availability round the year ; 10) Major reason for taking loan is to meet Medical expenses ; 11) The most prevalent diseases are malaria and general fever ; 12) Out of 65 locations monitored 7% exhibit Annual Gamma Radiation dose level above 2 mGy/a, 70% locations exhibit between 1-2 mGy/a and 23% locations exhibit less than 1 mGy/a.

The Research Report to follow depicts in details the findings and observations of the study.

## Acknowledgment :

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## EXECUTIVE SUMMARY

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Project Period	: 15 May, 2006 to 31 December 2007
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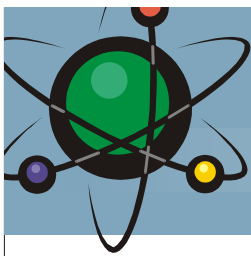
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Power generation is an essential prerequisite for establishment of a strong industrial base and infrastructural development. In this regard availability of nuclear fuel for continuous production of nuclear energy is a crucial factor. Uranium Corporation of India Limited (UCIL) is undertaking mining and processing of uranium ore in mass scale and is contemplating to expand its operation in East Singhbhum which is endowed with huge uranium deposits.

It is essential to take a baseline of the target area with an objective to know demographic details, health status of the area and also survey on the gamma radiation by Thermo Luminescent Dosimeters (TLD). This study intends to furnish a benchmark regarding the above mentioned parameters for a comparative analysis of the various phases of the new mines.

The Study was conducted under the project name - "Demographic & Health status studies in Bagjata, Banduhurang & Mohuldih Mines at Jaduguda", the project period being from 15th May, 2006 to 31st December 2007. The team which conducted the study & the facilitators included Nuclear Scientists, Medical Professionals (Doctors & Nurses), Social Scientists and Field level staff.

The study covered 26 villages of Banduhurang, Mohuldih and Bagjata of East Singhbhum District which were divided into 3 clusters within a distance of few kilometers away from the already existing mines. Apart from the three clusters, Manoharpur, which is 100 kms from Jadugoda, was also included in the study as the control site especially for comparing health status data only. The study methodology included tools like Interview Schedules and Participatory Rural Appraisal (PRA) tools for data collection. Public health concern always takes a center stage while undertaking interventions like mining activities in the wake of radiation exposure, etc. With a view to clear clouds of such apprehensions, Health camps formed an important component, to find out incidence of diseases among the people of the study area. Outdoor background gamma radiation monitoring was also undertaken using TLD to measure the base line radiation levels prevailing in the three clusters.

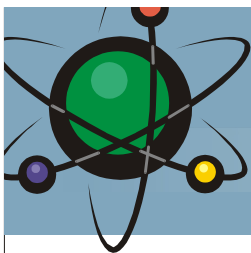


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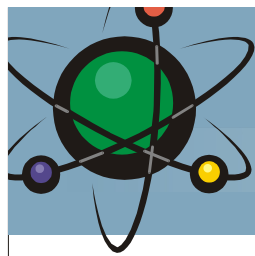
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ABBREVIATIONS USED

UCIL	: Uranium Corporation of India Limited
PRA	: Participatory Rural Appraisal
TLD	: Thermo Luminescent Dosimeters
GPS	: Global Positioning System
GIS	: Geographical Information System
BARC	: Bhabha Atomic Research Centre
TCS	: Tribal Cultural Society
SC	: Scheduled Caste
ST	: Scheduled Tribes
OBC	: Other Backward Caste
PDS	: Public Distribution System
RTI	: Reproductive Tract Infection
CBP	: Complete Blood Picture

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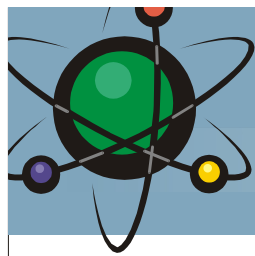
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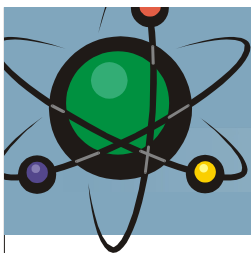
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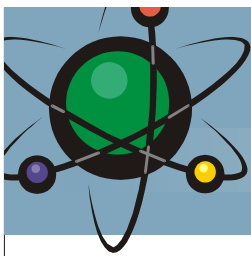
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health pattern of the local residents and at the same time, the redistribution of naturally occurring radionuclides may affect the local residents.

There is, therefore, an urgent need to record and study the changes in the demographic pattern likely to be brought about by the mining activities and those in the epidemiology and health of the people. In order to do this, a baseline data generation on the existing demographic and health status pattern before the mining activity starts was taken up by Tribal Cultural Society, a non profit organization promoted by Tata Steel. Demographic and health status survey of the villages near the mining areas in 6 km vicinity were conducted under the Board of Research in Nuclear Sciences (BRNS) funded programme on Studies on Uranium Mines (SUM Jaduguda). It is expected that successful completion of the survey will provide a platform for future studies in terms of the impact of mining and also for epidemiological survey of India.

The project has carried out demographic study surveys (using Interview schedule & Participatory appraisals) in the three clusters of Bagjata, Banduhurang and Mohuldih and health camps in these clusters as well as the control area with almost similar conditions except the vicinity of uranium deposits. The main points of studies included understanding the demographic patterns like the total population village wise, sex ratio, religion, food availability etc. and for health survey part occurrence of common diseases, comparisons of diseases from study site with control site etc. The project has also attempted to record people's perceptions through qualitative techniques using Participatory Rural Appraisal intensively.

In the long run, after the onset of mining, changes are inevitable with regard to social conditions, cultural aspects and economic development of the local inhabitants of the Singhbhum area and it is hoped that the baseline data generated and analyzed in the present project will be of help if and when similar data, generated during the operation cycle of the mining activities, is compared in coming years.

In this regard, the Board of Research in Nuclear Science (BRNS) decided to take up the issue and responded with a decision to conduct a demographic and health survey, aiming at gauging the effects of uranium mining in the Jaduguda mine area.

## 1.2 Study Area

The core operational area of the project lies in the periphery of the three proposed uranium mines in Banduhurang, Mohuldih and Bagjata in the East Singhbhum district of Jharkhand. Twenty six (26) villages were identified for conducting the survey, which were, sorted into three clusters namely Banduhurang (Golmuri and Jugsalai), Mohuldih (Gamharia) and Bagjata (Musabani), comprising of nine, eleven and six villages respectively. As UCIL has a plant in these three clusters they were clubbed as **Study Site**.

Manoharpur in West Singhbhum District Jharkhand, which is approximately 100 km away from Jaduguda mines, was identified as a **Control Site**. The process for selection of the control site was based on the fact that no agency had any operations in that area and the socio economic profile of that area matched with the study site area. Control Site was used for comparing the health status data only.

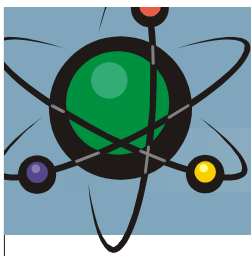
# 1. INTRODUCTION TO THE PROJECT

**1.1 The Stage :** Generation of power is a fundamental catalyst to the social and economic development of a country. India needs more power in order to have a strong industrial base and for infrastructure development. Depletion of fossil fuel resources and the detrimental aspects of CO<sub>2</sub> emission from power generation using fossil fuels like coal or oil make it necessary for us to accept the fact that the nuclear energy is a viable option for the country. Hence, there is a renewed emphasis on nuclear power as an alternative source in the field of electricity generation. Also, nuclear power can be an effective tool in reducing stress on the environment. The need of the hour is to go for sustainable and gainful utilization of atomic mineral resources in India with special reference to Uranium.

In order to promote nuclear energy, it is essential that the basic nuclear fuel, viz. uranium is made available indigenously. At present, the East Singhbhum district in Jharkhand state is found to have large deposits of uranium, and Uranium Corporation of India limited (UCIL), which is responsible for production of uranium in the country, has been mining uranium ore from the mines in the region. UCIL is already producing uranium ore from its existing mines located in Singhbhum district of Jharkhand state. In order to accelerate the nuclear power production program, new uranium mines are proposed to be opened in the Singhbhum district. These new mines viz Mohuldih, Banduhurang and Bagjata mines are a few tens of kilometers away from the existing mines.

Certain apprehensions and concerns, arising out of non-factual perceptions like increase in the incidence of cancer due to radon gas inhalation, congenital malformation due to radiation exposure etc are raised by the stakeholders regarding the social and environmental impacts of mining and related activities. Moreover, while uranium-mining industry would bring economic activities and infrastructural development in the region, it would also create issues like disposal of mill tailings and treatment of effluents. This study aims to find out whether there is an elevated natural radiation environment in the study area and whether there is any change in health pattern in the study area or not. The socio-economic changes that UCIL brings about in its operational area are rural development facilities to the villagers near the mines, as it has been doing in the past around Jaduguda and Narwapahar. Employment generation for the local villagers, educational facilities for their children, creation of health centers, providing infrastructure of communication and providing drinking water etc. would bring about changes in the life style of the people, which ultimately would change the demographic pattern of the area. However, since the public health concern is central to any technological and industrial human activity in modern times, a baseline demographic and health status survey around new proposed mining sites becomes essential to evaluate existing data-pattern. This would help understand background scenario and might form a reference for future assessments of impacts due to mining activity in the region of three proposed mining sites namely, Bagjata, Banduhurang and Mohuldih.

The areas of Singhbhum are not economically advanced areas. By and large, the population is poor and there are existing problems like malnutrition and poor health. The natant mothers are poorly fed and hence the newly born children are not healthy enough. This affects their life expectancy in the postnatal period. The activities of mining and the associated developments in the region are expected to improve the economic condition of the residents either through direct employment in the mining facilities, or by indirect gains due to infrastructural developments in the region. This positive change should alter the



1.3 Maps

The maps indicate the study area of the project

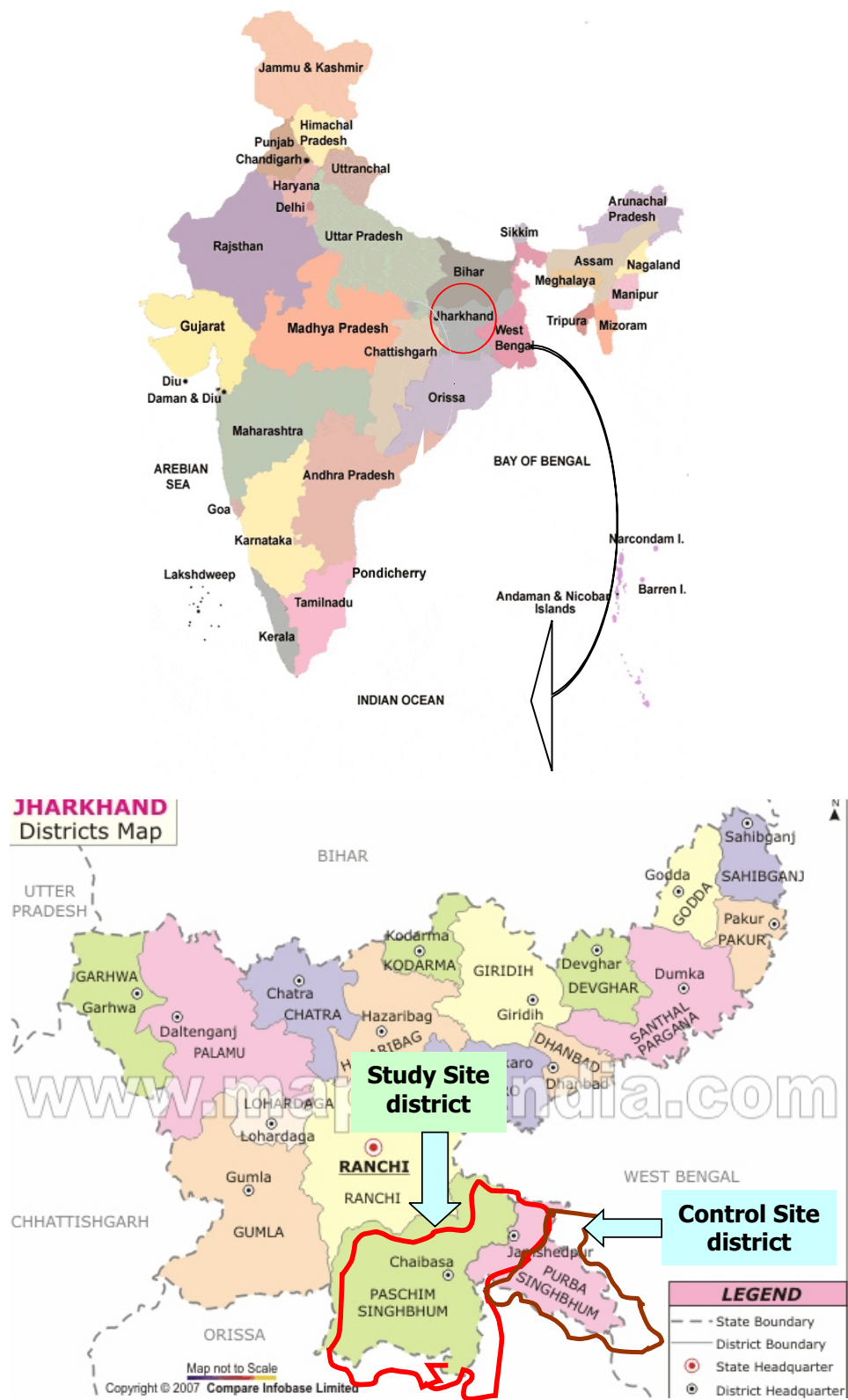
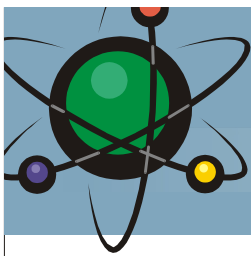


TABLE No. 1.1 : Cluster wise villages

Mine Area of UCIL (Cluster)	Village	Site
Banduhurang (Cluster 1)	1.Pondehasa	Study Site
	2.Ghagidih	
	3.Talsa	
	4.Turamdih	
	5.Kudada	
	6.Nandup	
	7.Matku	
	8.Boyanbil	
	9.Kerwadungri	
Mohuldih (Cluster 2)	1.Dhatkidih	Study Site
	2.Kumhari	
	3.Bondih	
	4.Bamandungri	
	5.Bindapur	
	6.Jillingoda	
	7.Kamalpur	
	8.Parbatipur	
	9.Tirildih	
	10.Dudra	
	11.Mohuldih	
Bagjata (Cluster 3)	1.Gohala	Study Site
	2.Bhadua	
	3.Badia	
	4.Kanyaloka	
	5.Phuljhari	
	6.Bakra	
Manoharpur (Cluster 4)	1.Barpose	Control Site
	2.Nandpur	
	3.Dindimbuli	
	4.Raidih	
	5.Camarbera	
	6.Kasipure	

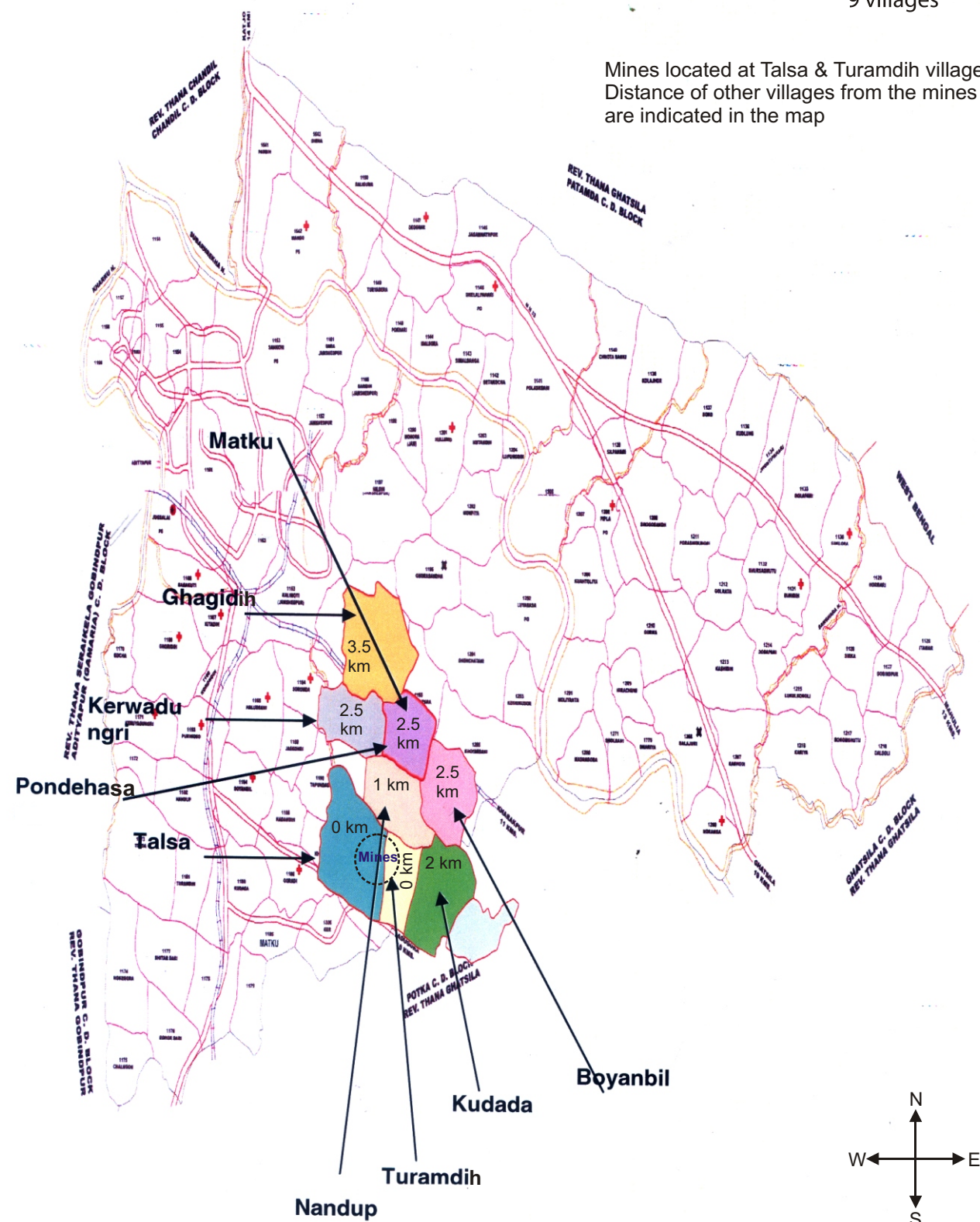




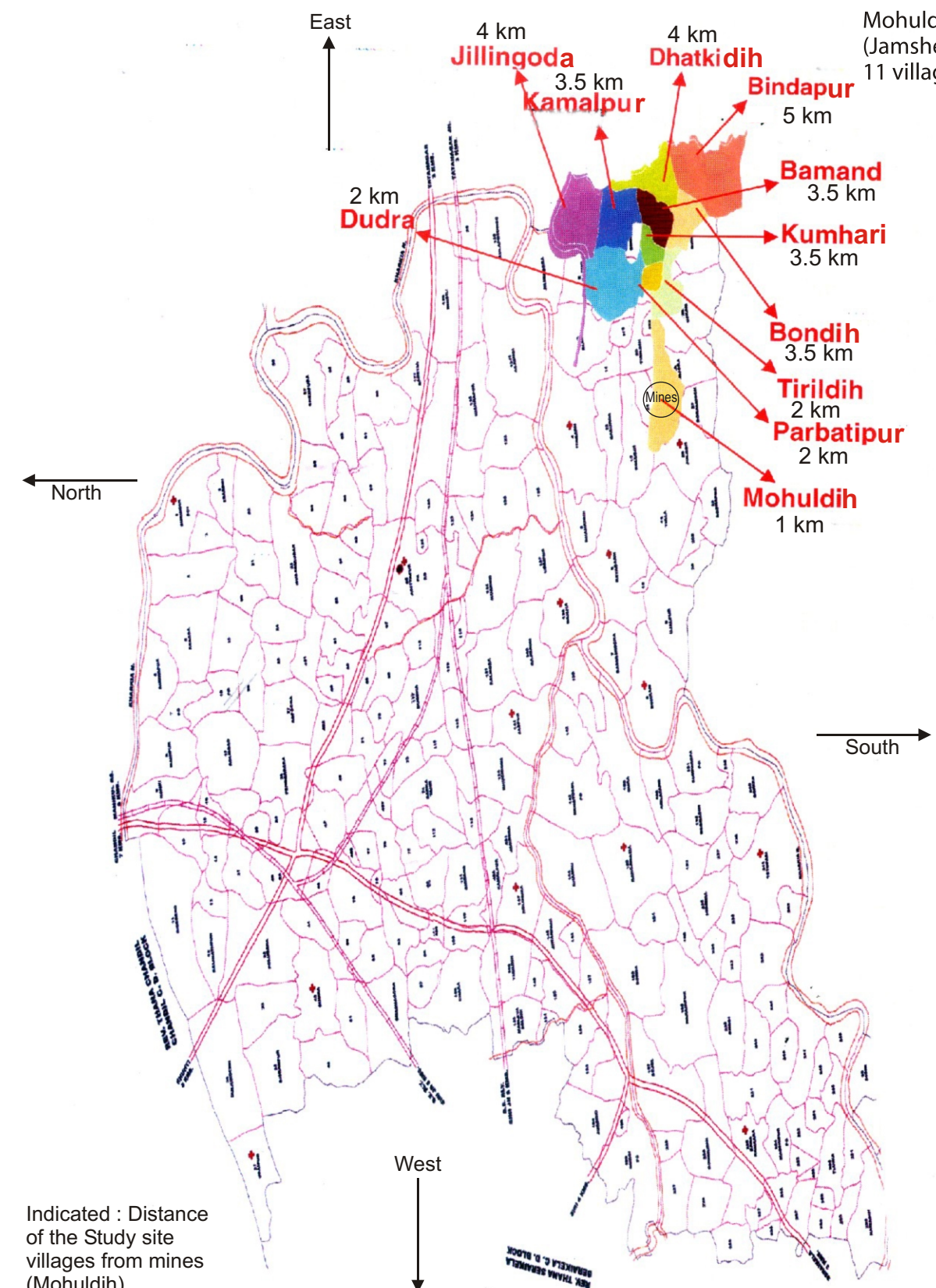
Coloured villages indicate the study sites

Banduhurang  
(Gamharia)  
9 villages

Mines located at Talsa & Turamdih village  
Distance of other villages from the mines  
are indicated in the map

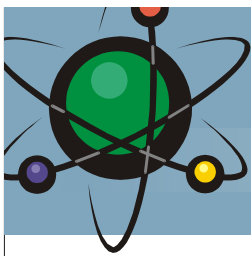


Mohuldih  
(Jamshedpur)  
11 villages



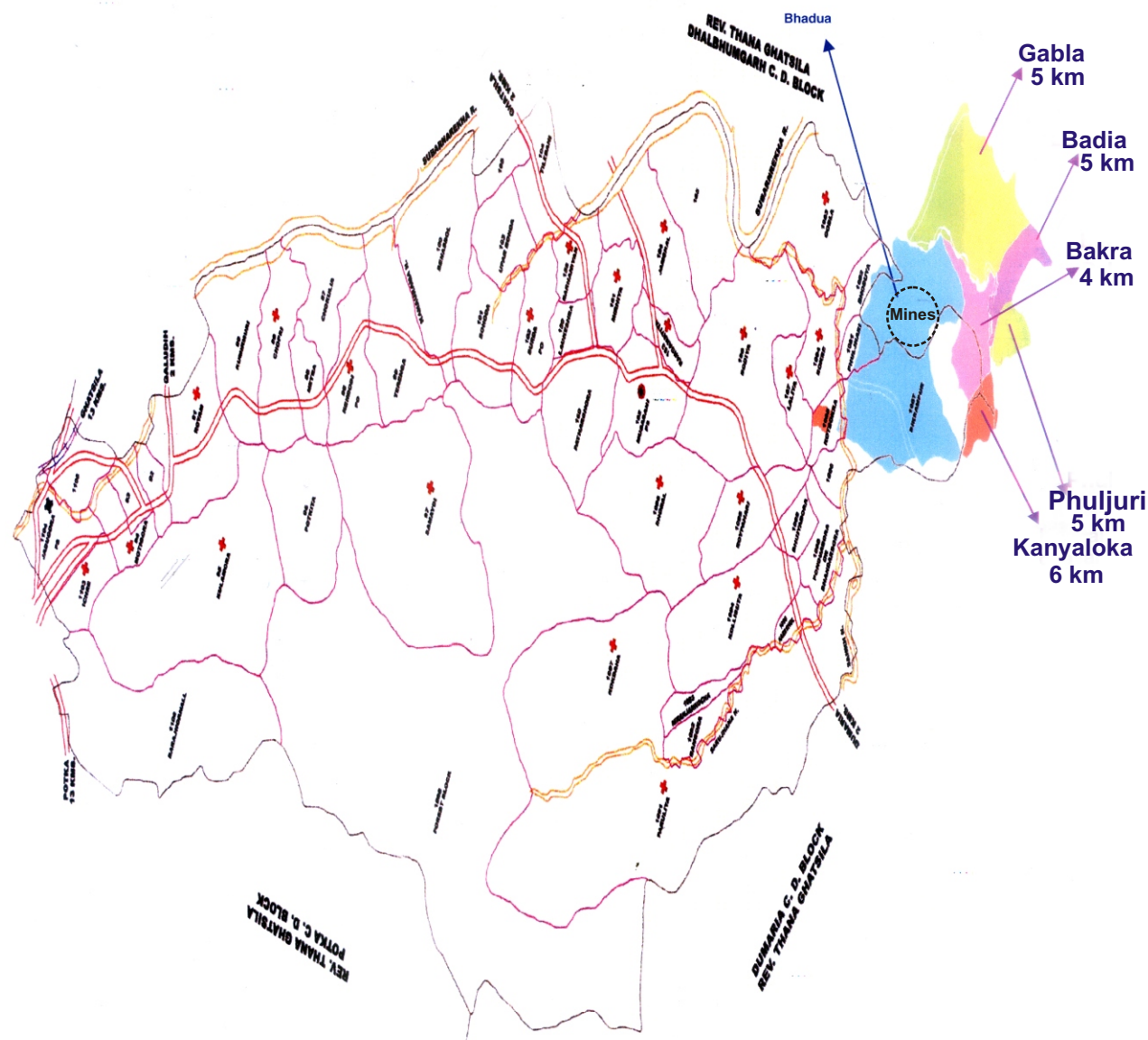
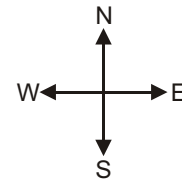
Indicated : Distance  
of the Study site  
villages from mines  
(Mohuldih)





Bagjata  
(Musabani)  
6 villages

**Bagjata Mines is encircled and distance of study site villages from it is indicated**



#### 1.4 The Scope of Study

1. Demographic Profiling of the areas under study
2. Health status on disease prevalence in the areas under study site (Banduhurang, Mohuldih and Bagjata) and control site (Manoharpur)
3. Background gamma radiation survey of the study areas using Thermoluminescent Dosimeters (TLDs)
4. Collection of GPS lat-long data for use in GIS layers

#### 1.5 The tools used

1. Interview schedule (IS)
2. Participatory Rural Appraisal (PRA)
3. Medical camps (MC)
4. Outdoor background gamma radiation monitoring using Thermo luminescent Dosimeter.
5. Use of Garmin GPS system for preparing GIS layers of radiation

#### 1.6 The Sampling methods and the process adopted for data collection

##### 1. Interview Schedule (ANNEXURE II)

For the demographic profiling, interview schedule was used and all households covered in 26 villages taken in the study were studied (all households covered in the 26 villages taken in the study). The 26 villages were divided into three clusters as mentioned in table 1.1. In Cluster 1, 1698 households were covered, while in cluster 2, 1218 households and in cluster 3, 1207 households were covered.

##### 2. Participatory Rural Appraisal

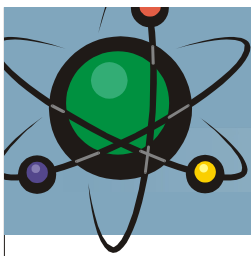
For understanding the social and economic conditions - Social and resource maps of all the 26 villages were developed, whereas in cluster 1 and cluster 2, exercises were carried out to understand the livelihood pattern and preferences, the present employment opportunities, mapping the institutions, wealth ranking and other PRA exercises.

##### 3. Medical Camps

The health status profiling was designed by organizing health camps. In total 14 health camps were organized, 10 for the Study Site area (Banduhurang, Mohuldih and Bagjata) and 4 for the Control Site area (Manoharpur)).

The Medical camps were for all patients on voluntary basis and were attended only by patients. Prior announcements were made in the respective villages about the medical camps to be organized. All the patients were checked by specialist doctors. Blood samples were collected for blood profiling and X ray investigations were carried out for further investigation.

For comparing the disease profile of the study site, 4 medical camps were carried out in the control site - at Manoharpur block in West Singhbhum district of Jharkhand.



## 2. SOCIO-ECONOMIC STUDIES AND ANALYSIS

### 2.0 Introduction

For getting data within the scope of study, designing of the Interview Schedule was essential to the study. A core committee was set up within the division comprising of Social Development Professionals, Doctors, Research Students and people with field experience. Meeting with the core committee was meant for orienting the group on the purpose of the study, the study design and the desired parameters to be measured. Inputs from all the participants helped in developing the draft Interview Schedule, (IS)



Training for Cluster Co-ordinators



Core Committee meeting



Pilot test sharing of Cluster Co-ordinators

The draft IS was shared with the cluster coordinators and field administrators in a two day workshop organized at Tribal Culture Centre. The workshop also involved practical exposure for the field administrators. The draft Interview Schedule was pilot tested and necessary inputs incorporated prior to administrating it in the field.

The raw primary data was collected by investigating 6525 persons in the fourteen medical camps and examining them for various diseases. The patients examined in various clusters varied in numbers from 1531 in cluster1 (Banduhurang), 1845 in cluster 2 (Mohuldih), 1870 in cluster 3 (Bagjata) and 1279 in cluster 4 (Manoharpur). The percentage of patients attending the camp varied from 23.5%, 28.3%, 28.7% to 19.6% among cluster I, II, III and IV. This data was finally fed into a proper analytical frame for drawing interpretations, making logical conclusions and suggesting feasible recommendations.

### 4. Measurement of pre-operational gamma radiation levels using TLDs

Outdoor background gamma radiation monitoring survey was taken up to have data ready at hand if required for a future date. The survey was carried out with the help of Thermoluminescent Dosimeters (TLDs) at 66 locations in 26 villages in the three clusters of Banduhurang, Mohuldih and Bagjata. Survey meter readings were also recorded during the deployment of TLDs.

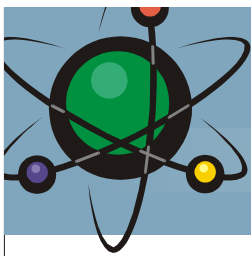
Almost all the villages being spread along the central road, three TLDs were deployed in a village typically in the beginning, middle and end of the village. Where the village spread was too small, only two TLDs were deployed. Global Positioning System (GPS) was used to record latitude - longitudes of each of the location where the TLDs were deployed. All the TLDs were deployed outside the houses to get the outdoor background gamma radiation levels.

CaSO<sub>4</sub>: Dy based TLDs; developed by EAD, BARC for environmental gamma radiation measurement were used for the monitoring. The TLDs were deployed for the period of 3 months and analyzed for exposure received at the location. The values were then used to get the annual gamma radiation levels prevalent at the location

### 5. Use of GPS for preparing GIS Layers

For the purpose of plotting all the Households covered during the demographic survey on the GIS coordinates, was extensively used for the study of 20 villages in the Cluster I and Cluster II. Two Global Positioning Systems (GPS) units were used to record the geographical co-ordinates (lat-long data) during the survey and the data for all the households was recorded. This data together with the demographic data is being passed on to PI of another BRNS project in the same region to create Geographical Information System (GIS) layers.





## 2.1 Socio economic profiling of the study site No. of Households

Table No. 2.1.1 No of Households village wise			
Cluster Code	Village Code	Village Name	No. of Households
1	1	Pondehasa	199
1	2	Ghagidih	96
1	3 A	Chhota Talsa	80
1	3 B	Bada Talsa	127
1	4	Turamdih	93
1	5	Kudada	182
1	6	Nandup	182
1	7	Matku	441
1	8	Boyanbil	187
1	9	Kerwadungari	111
	<b>Sub Total</b>	<b>9 Villages</b>	<b>1698</b>
2	10	Dhatkidih	56
2	11	Kumhari	67
2	12	Bondih	42
2	13	Bamandungari	55
2	14	Bindapur	208
2	15	Jillingoda	140
2	16	Kamalpur	181
2	17	Parbatipur	56
2	18	Tirildih	112
2	19	Dudra	220
2	20	Mohuldih	81
	<b>Sub Total</b>	<b>11 Villages</b>	<b>1218</b>
3	21	Gohala	328
3	22	Bhadua	58
3	23	Badia	288
3	24	Kanyaloka	66
3	25	Phuljhari	150
3	26	Bakra	317
	<b>Sub Total</b>	<b>6 Villages</b>	<b>1207</b>
	<b>GRAND TOTAL</b>	<b>26 VILLAGES</b>	<b>4123</b>

In the study site a total of 4123 Households were covered through the Interview Schedule.

## 2.2 Family Size

In all the clusters the maximum number of family were observed to be comprised of 6 members. Two of the members being elderly and remaining being children. In cluster 2 the family size even fell to 3 members. In maximum households interviewed the male was the head of family as he was the sole bread earner, but in his absence or death, a female headed the family.

## 2.3 Age Distribution

Fig 2 (a, b & c) show the pie charts for each cluster representing the distribution of persons in different age groups.

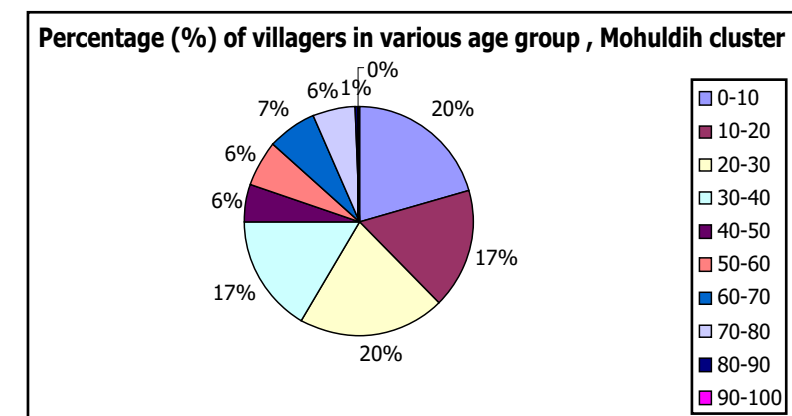


Fig.2.3 (a) Percentage of villagers in various age group in Mohuldih cluster. 74 % of the population in the cluster is seen to be in the age group of 0-40 years.

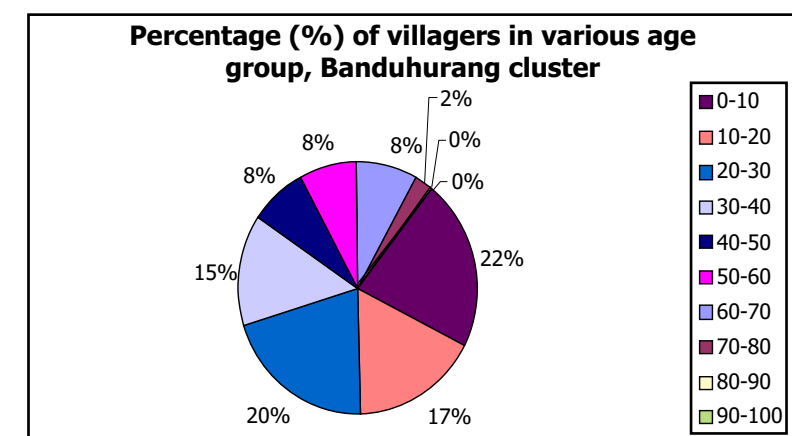


Fig.2.3 (b) Percentage of villagers in various age group in Banduhurang cluster. 74 % of the population in the cluster is seen to be in the age group of 0-40 years.



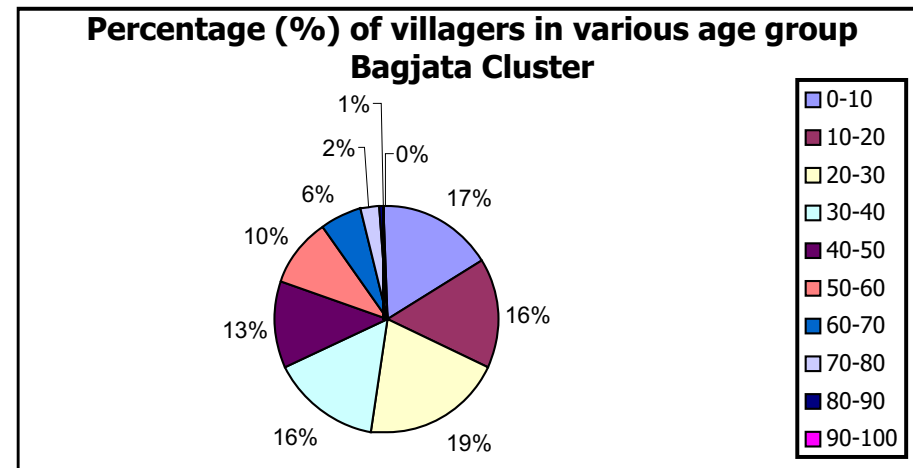
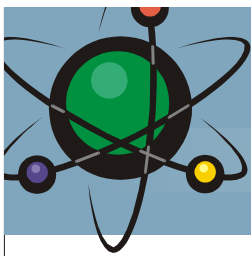


Fig.2.3 (c)Percentage of villagers in various age group in Bagjata cluster. 68 % of the population in the cluster is seen to be in the age group of 0-40 years.

Thus we observe maximum persons in all the clusters belonged to age group of 20-30 years followed by 0-10 years of age group. About 2% of the population was observed to live more than 80 years among all clusters.

## 2.4 Sex Composition of respondents

In order to reduce gender bias the interviews from respondents (one from each household) were arranged in such a fashion that the male to female ratio was near equal.

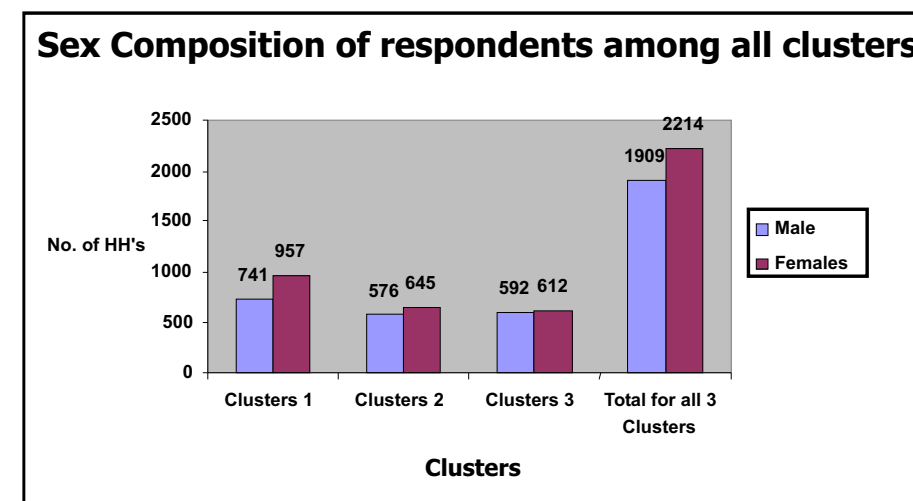


Fig 2.4 (a) : Sex composition of respondents among all cluster in the study areas

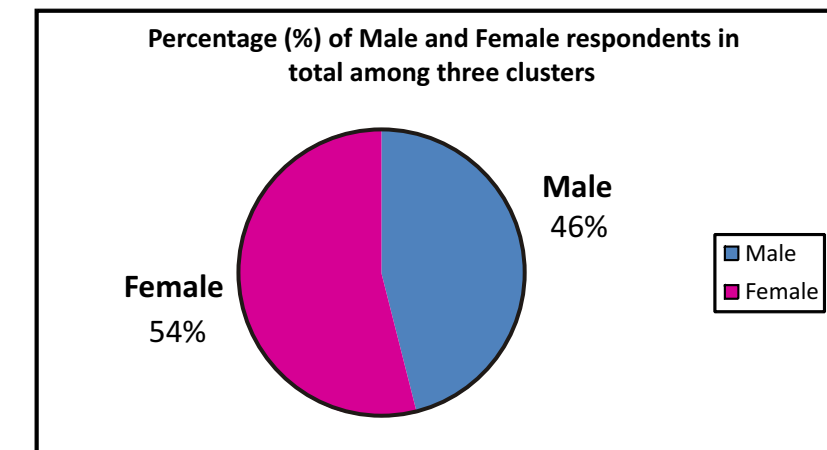


Fig 2.4 (b): Percentage of male & female respondents in the households in all the three clusters

Out of the 4123 respondents interviewed, 1909 were males and remaining 2214 were females. Thus considering all the three clusters together 54% of the individuals interviewed were females and 46% were males.

### 2.4.1 Married /Unmarried

In all the clusters, unmarried Population was more than the married Population. Maximum of the people in the households were unmarried.

In cluster 1, of the total 1698 households, 48.45% (3665) individuals were unmarried and 45.47% (3439) married and remaining were either a divorcee or a widow.

In Mohuldih, cluster 2, 49.39% (2737) individuals were unmarried and 44.99% (2493) were married. In cluster 3, of the 1207 households, 47.27% (2966) were married, 51.02% (3201) were unmarried and remaining was either a widow or a divorcee or a widower.

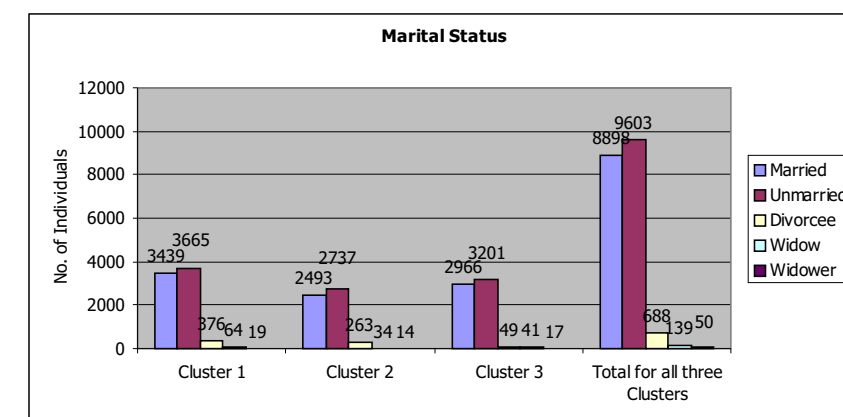


Fig 2.4.1 (a) : Cluster wise and overall marital status of the population in the study area

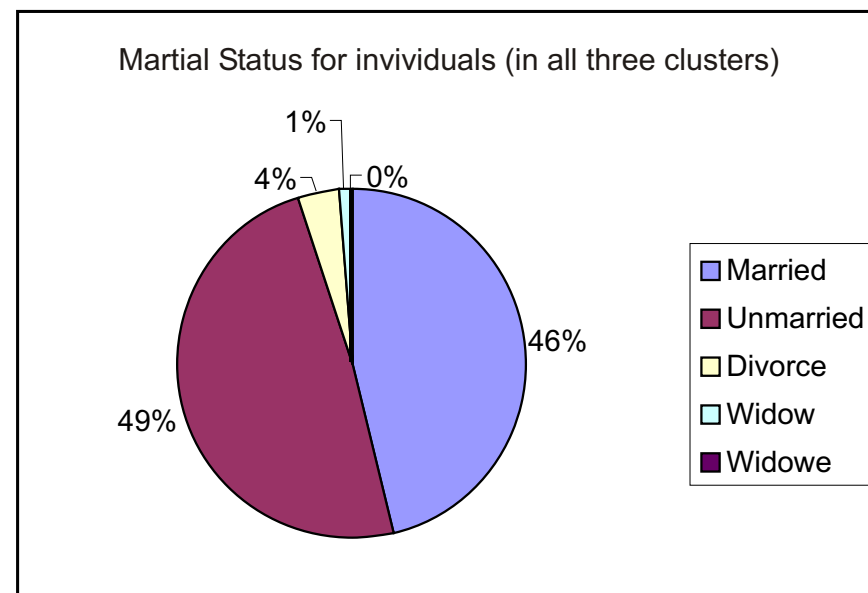
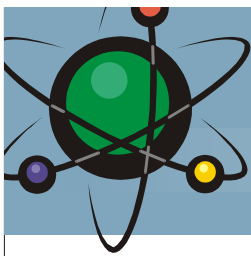


Fig 2.4.1 (b) : Percentage distribution of marital status of individual in all the three clusters

Overall in all the 3 clusters out of the total 19378 persons, 46% (8898) of the individuals were married, 49% (9603) were unmarried, followed by 4% (688) Divorcee and 1% others.

## 2.5 Religion

Various types of religions like Sarna, Hinduism, Sikhism & Christianity exist among the 26 villages covered in the three clusters namely Banduhurang (Cluster 1), Mohuldih (Cluster 2) and Bagjata (Cluster 3). The table given below represents the number of households belonging to the various types of religions among all clusters.

**Table 2.5.1: Distribution of households on the basis of Religion among the Clusters**

Religion	Cluster 1	Cluster 2	Cluster 3	Total for all 3 Clusters
Sarna	1262 (74.32%)	479 (39.32%)	607 (50.28%)	2348 (56.94%)
Hindu	412 (24.26%)	717 (58.86%)	577 (47.80%)	1706 (41.37%)
Others	20 (1.17%)	10 (0.82%)	16 (1.32%)	46 (1.11%)
No Response	4 (0.23%)	12 (0.98%)	7 (0.57%)	23 (0.55%)
<b>TOTAL</b>	<b>1698</b>	<b>1218</b>	<b>1207</b>	<b>4123</b>

\*Others include Sikhs, Muslims & Christian

Cluster 1 = (Banduhurang) Cluster 2 = (Mohuldih) Cluster 3 = (Bagjata)

The table clearly indicates that majority of the individuals were either Sarnas or Hindus in all the Clusters. A clustered bar diagram given below represents the number of households belonging to different religions in various clusters.

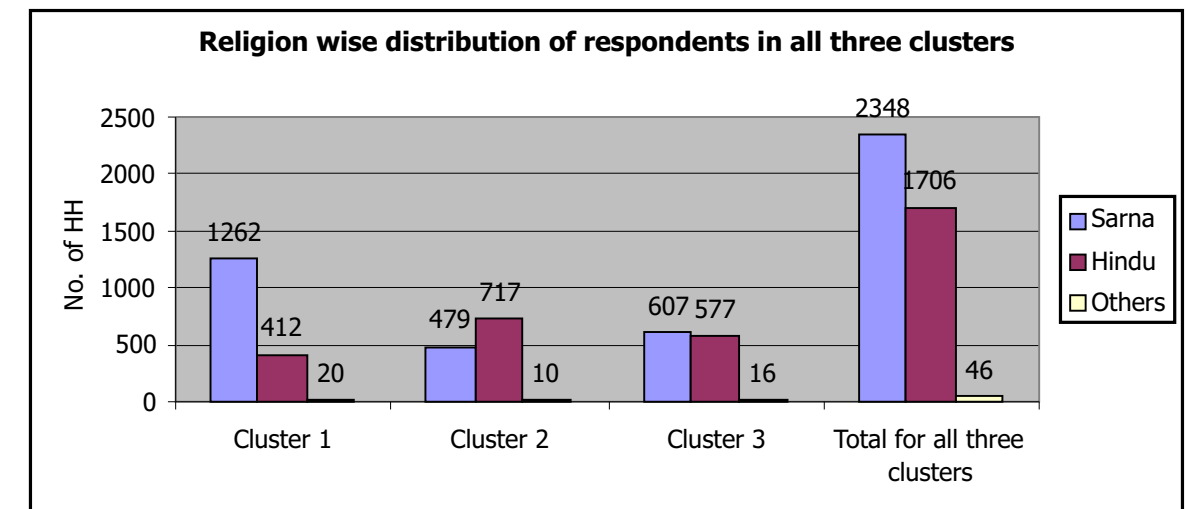


Fig 2.5.1 (a) : Religion wise distribution of respondents in all the three clusters

As seen in Fig 2.5.1 a, maximum no. of 74.32% households in cluster 1 is dominated by Sarna, while in cluster 2 majority (58.86%) of villagers are Hindus. In cluster 3, the Bagjata area, maximum number of households either belonged to Sarna (50.28%) or was Hindu (41.37%).

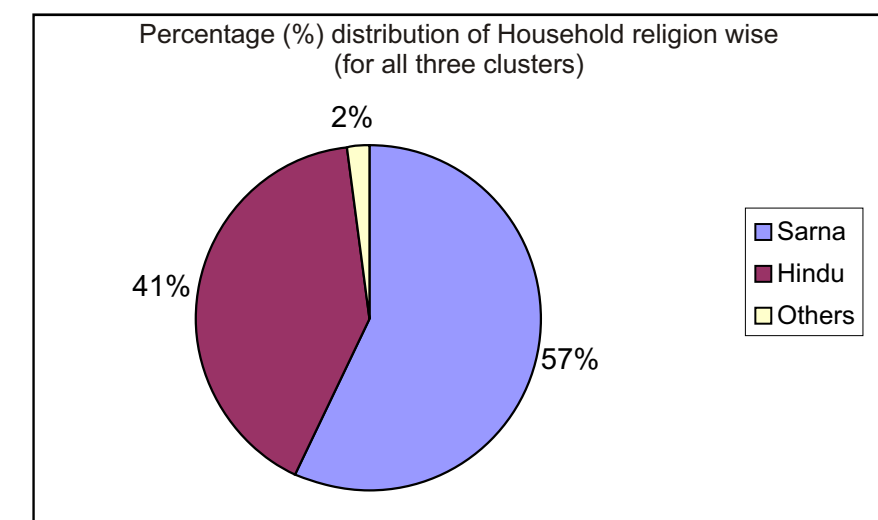
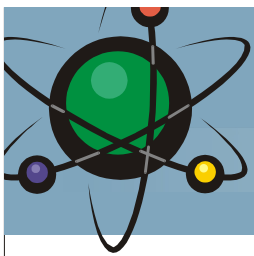


Fig 2.5.1 (b) : Religion wise percentage distribution of household in all the three clusters

The overall percentage distribution of religion, for all the three clusters, as shown in Fig. 2.5.1 (b) indicates that Sarna & Hindu are the dominant religion in the survey areas.



## 2.6 Caste

Given below is the descriptive table representing the number of households belonging to various castes among all the Clusters.

**Table 2.6.1: No. of households belonging to various castes**

Caste	Cluster 1	Cluster 2	Cluster 3	Total for all 3 Clusters
SC (Scheduled Caste)	91	118	44	253
ST (Scheduled Tribe)	1366	555	663	2584
OBC (Other Backward Classes)	190	465	450	1105
General	25	61	11	97
Others	1	9	15	25
Missing Data	25	10	24	59
Total	1698	1218	1207	4123

It is observed that maximum households (63%) belonged to ST category followed by OBC category (27%) and remaining belonged to SC (6%) and General category (2%). There is a clear illustration of percentage of households belonging to the various castes in all clusters by the pie charts below:

**Percentage (%) of Individuals belonging to various Castes**

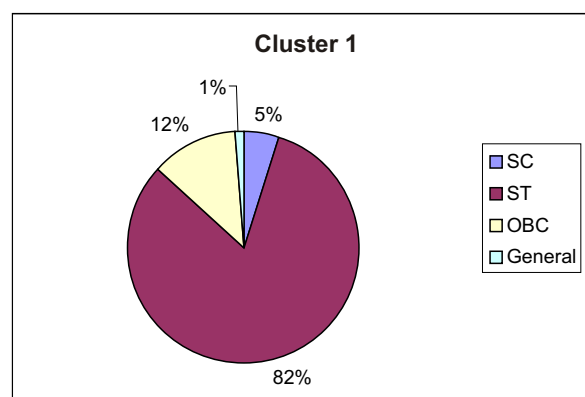


Fig 2.6.1 (a): Percentage distribution of individuals belonging to various castes in cluster 1

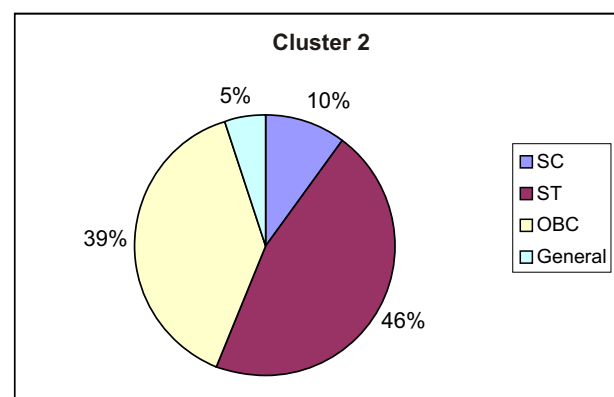


Fig 2.6.1 (b): Percentage distribution of individuals belonging to various castes in cluster 2

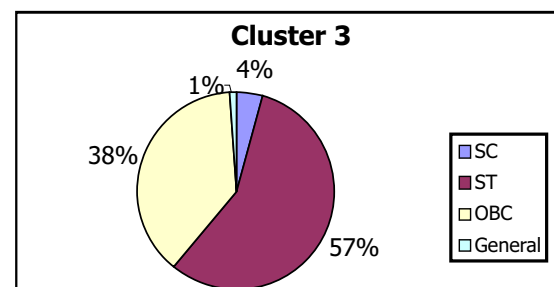


Fig 2.6.1 (c): Percentage distribution of individuals belonging to various castes in cluster 3

Figs. 2.6.1 (a,b,c) indicate that:

1. In Cluster 1, 82% of the households belonged to Schedule Tribe (ST) category followed by OBC (12%).
2. In Cluster 2, majority of the households (46%) belonged to the Schedule Tribe (ST), 39% belonged to OBC and 10% to Scheduled Caste.
3. In Cluster 3, 57% of the households belonged to the Scheduled Tribe (ST) and 43% to OBC, SC and others.

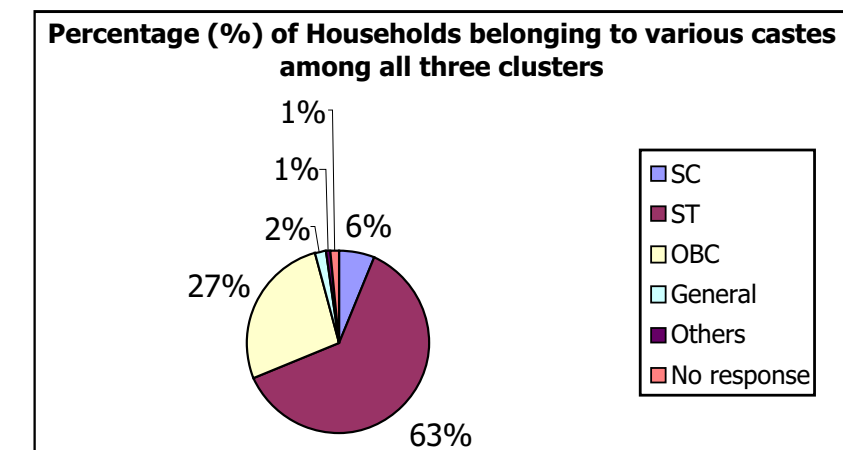


Fig 2.6.2 Percentage (%) of Households belonging to various castes among all three clusters

The overall picture as seen in Fig 2.6.2, indicate that 63% of the individuals were ST, 27% were OBC followed by 6% SC, 2% belonged to the general caste and the remaining 1% belonged to the others.

## 2.7 Educational Status

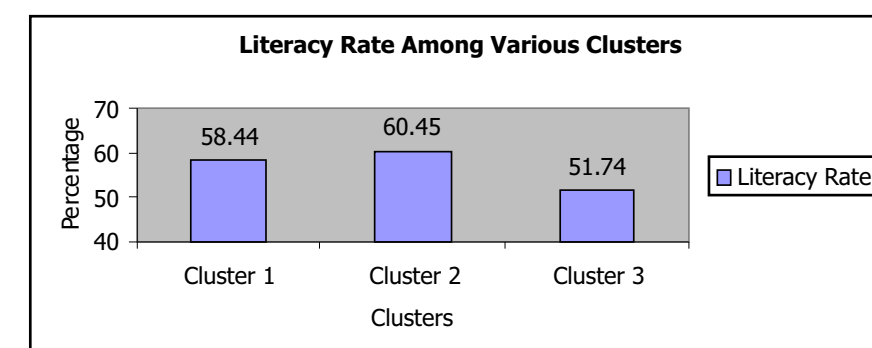
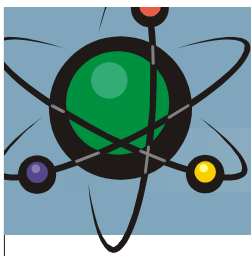


Fig 2.7.1 (a) : Literacy Rate Among Various Clusters

For the study, a person was considered to be literate if he had completed his primary education.

The above graph in Fig 2.7.1 (a) indicates that of the 4123 Households interviewed and from the total population of 18,740, 57% of the population was literate. In Cluster 2, 60.45% of the population was literate being the highest when compared to cluster 1 and cluster 3. The number of children going to primary, secondary, high school varied from village to village. However the illiteracy % includes children upto 5 years of age whose population is around 10% of the total population. Thus illiteracy % in real terms comes to 31.56%, 29.55% and 48.26% in Cluster 1, 2 & 3 respectively



**Table 2.7.1 Educational Qualification in various clusters in the study site**

Educational Qualification	Cluster1	Cluster 2	Cluster 3
<b>Total population</b>	<b>7564</b>	<b>5541</b>	<b>5635</b>
Illiterate	41.56	39.55	48.26
Primary School	31.86	30.17	25.61
Middle School	17.87	19.87	14.27
High School	4.89	7.24	5.97
Matric	2.36	2.04	2.64
Intermediate	0.92	0.99	1.58
Graduate	0.22	0.09	0.20
Other Professional Courses	0.01	0.02	0.06
Post Graduate	0.01	0.04	0.02
Others	0.29	0.00	1.38

The above table 2.7.1 indicates the percentage of people illiterate and status of education for the literates.

## 2.8 Vocational Training

Through the Interview Schedule efforts were put in to measure the number of persons having trained vocational skills. The vocational skills were imparted on polytechnics or different vocational skills.

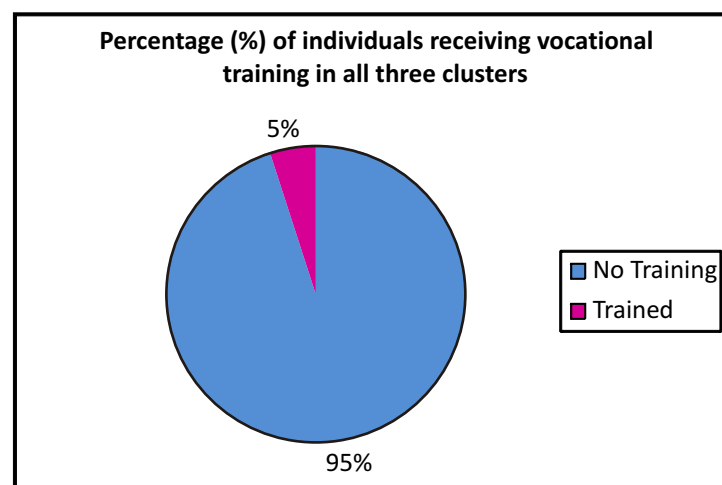


Fig 2.8.1 (a) Percentage (%) of individuals receiving vocational training in all three clusters

The above fig 2.8.1 (a) shows that out of the total population (18839 persons) only 5% of the population had received some vocational training. The untrained 95% includes population upto 16 years of age (minor, i.e. non work force) whose % in total population is around 28%

Table 2.8.1 shows the percentage and type of vocational training to the persons in the area of study.

**Table 2.8.1- % of individuals receiving vocational training in the study site**

Vocational Training	Cluster 1	Cluster 2	Cluster 3
No training	92.75	96.27	96.22
Polytechnic	0.49	0.37	0.31
Electrician	1.20	0.75	0.11
Nursing	0.40	0.14	0.27
Fitter	0.35	0.51	0.35
Mechanic	0.22	0.04	0.23
welding and gas cutting	0.67	0.47	0.19
Auto Repair Machine	0.35	0.04	0.23
Others	3.53	1.36	2.06

Maximum of the population interviewed in various clusters received no formal training. Barely 2% interviewed had received training in various sectors like nursing, electrician, welding and gas cutting, auto repair machine through a polytechnic or a vocational center.

## 2.9 Earning /Non-Earning Ratio

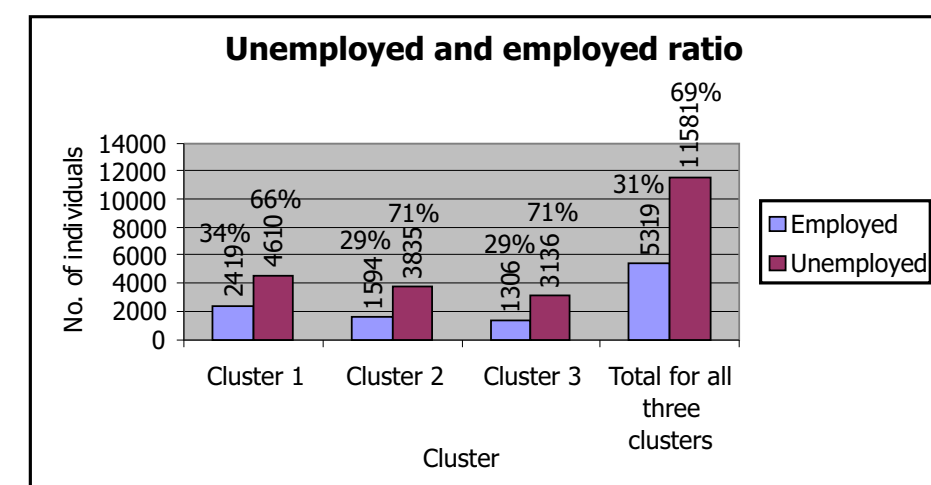
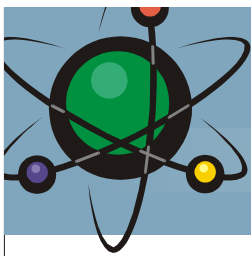


Fig 2.9.1 (a) : Unemployed and employed ratio

Out of the total households interviewed just 31% of individuals were employed. In cluster 1, 34.41% of the people were employed while in cluster 2 & 3 the employment level was further lower to 29.36% and 29.4% respectively.





### 2.10 Below Poverty Line (BPL) families

Through the survey, efforts were put in to measure families coming under the below poverty line (BPL) category. The BPL families are issued cards (commonly known as Lal card / Ration cards) by the government of the State whereby they get necessary food items at a subsidized rate. In this study the criteria for below poverty line is having "Lal Card" issued by government.

Approximately 50% of the households in a village have a Below Poverty Line (BPL) Card. The number of households having a ration card and a BPL card varied among the clusters. A bar diagram shown in Fig 2.10.1 (a) represents the number of households having a BPL and a ration card. Ration cards are also issued to non BPL families and food items are made available through the government ration stores though at a less subsidized rate.

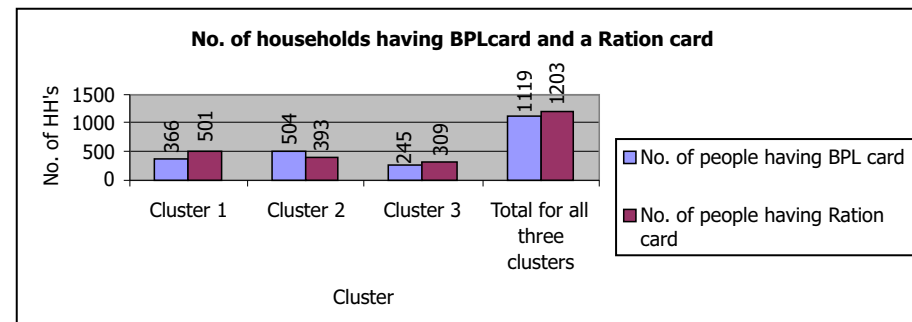


Fig 2.10.1 (a) : No. of households having BPL card and Ration card

It is observed that in Cluster 1 only 42.2% of the households have a Lal Card while in Cluster 2 approximately 56.19% and in Cluster 3 around 44.62% have it.

The households holding ration card varied from 57.79% to 43.81% to 55.38% among Cluster 1, 2 and 3 respectively. Most of the families living below the poverty line and having a ration card is indicative of the fact that households earned low salaries (income and thereby were unable to meet their family expenses and had to go for mortgage, loans, borrowing from moneylenders) which were unable to meet their families' necessities.

### 2.11 Disability:

Table 2.11.1 % of Disability among the villagers interviewed in study site.			
Cluster	Cluster 1	Cluster 2	Cluster 3
Total Population	7564	5541	5635
Not Disabled	95.55	97.58	93.47
blind	0.61	0.20	1.43
deaf	0.61	0.20	0.71
dumb	0.31	0.20	0.22
lame	0.97	0.74	0.88
mental problem	0.92	0.20	1.43
others	1.02	0.89	1.87

As evident from the above table approximately 5% of the total populations were disabled, the maximum being blind followed by deafness.

## 3. HOUSING AND UTILITIES

### 3.0. Introduction

Purpose of the survey covered in the section was to assess the socio economic status of the respondents. Four indicators viz, construction of the house, availability of the lighting source, primary / secondary fuel and drinking water were covered in the survey. The data was collected in the form of answers from the respondents.

### 3.1 Type of House

#### 3.1.1 Construction of the house:

Households living in different villages belonging to various clusters had different types of houses some with thatched roof, mud tiled roof, semi permanent or permanent. Majority of the households interviewed had mud tiled roof while others had a thatched roof or a semi permanent house. The graph given below shows the number of households having different types of houses among the Clusters.

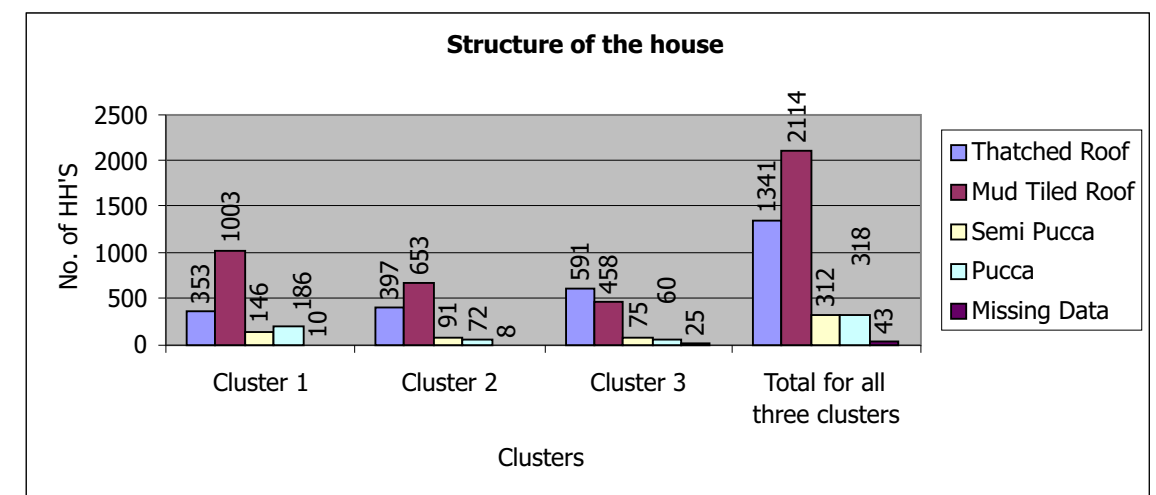


Fig 3.1 (a) Clusters wise distribution of housing types  
Majority of houses showed mud tiled roof in cluster 1 & 2 while cluster 3 showed thatched roof to be predominant

The above clustered bars show the types of houses among the various clusters.

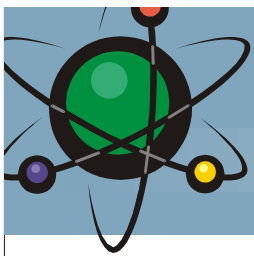
59% of the households have mud tiled roof while others had thatched roof in cluster 1.

In Cluster 2, 54% of the households population had mud tiled roof while in cluster 3, 48% of the households had thatched roofs.

### 3.2 Major Source of Lighting /Energy

#### 3.2.1 Main Source of Light

In most of villages source of light were electricity, gobar gas/oil/kerosene and others, though some of the households had no source of electricity. Data in Table 3.2.1 shows the number of households using the various sources of light available to them.



**Table 3.2.1. Distribution of Households by source of light**

Source of Light	Cluster 1	Cluster 2	Cluster 3
Least Availability	80	137	57
Electricity	142	660	389
Gobar Gas, Oil, Kerosene	156	417	741
Others (mostly wood)	427	0	9
Did not Answer	893	7	13

The above table is indicative of the fact that majority of the households in various clusters used electricity as a source of light followed by gobar gas/ oil / kerosene. Though around 20% of the households interviewed in various clusters had least/negligible availability of light. In cluster 1, 893 households did not respond to this question, one of the reasons might be use of illegal electric connections.

The percentage distribution of households by source of light is represented in form of bar graphs below.

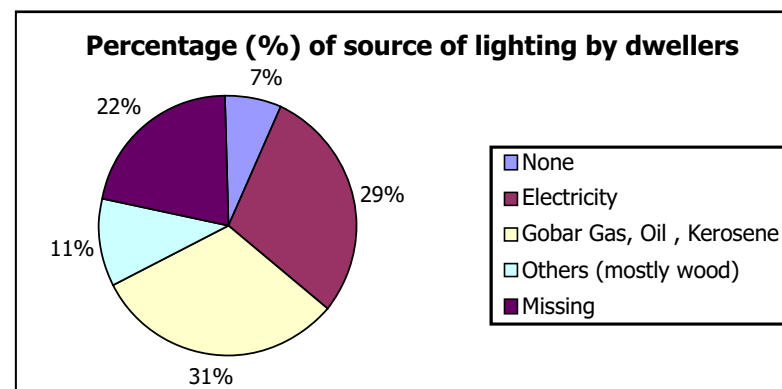


Fig 3.2.1 (b) : Percentage (%) of source of lighting by dwellers

As discussed in previous paragraph as many as 52% of households in cluster 1 did not respond to this question. This was probably due to illegal use of source of lighting as reported by the field workers. 8% used electricity and gobar gas/oil/kerosene as a source of light. In cluster 2 approximately 54% of the household used electricity as the major source of light while 34% used gobar gas / oil / kerosene and the remaining households had no source of light. While in Cluster 3, majority households used gobar gas/oil/kerosene (61%) and the remaining used electricity (32%) and the other households had no source of light.

Maximum of the villagers in all the Clusters who used electricity as a source of light paid a monthly bill of an amount varying between 30-100 Rs.

### 3.3 Fuel used for Cooking

#### 3.3.1 Primary source of fuel

The households used various sources as fuel for cooking like coal, firewood, cow dung cakes and dry leaves. The bar graph below clearly explains the use and consumption of the fuels. The data also shows the primary and secondary sources. Primary and secondary distinction on the basis of usage primary being dependence on it for longer period as compared to the secondary source.

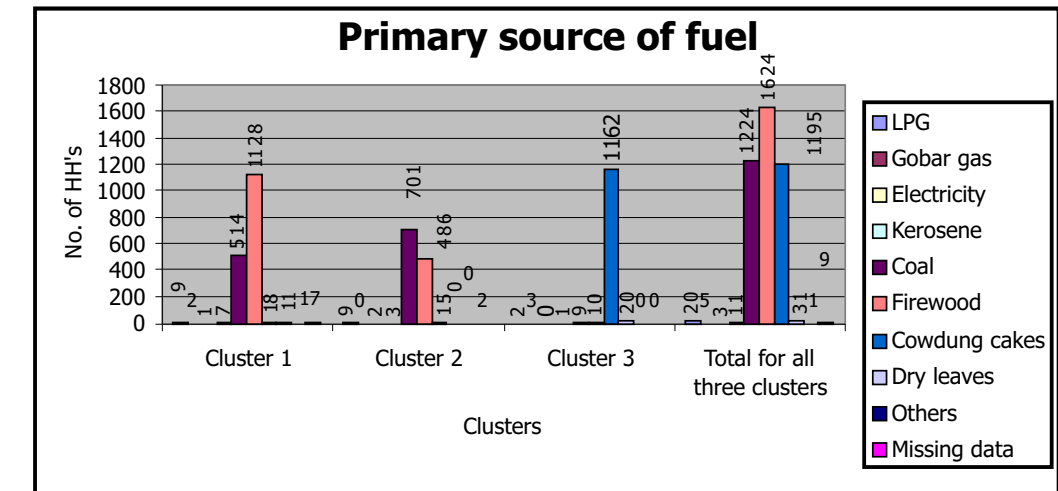


Fig 3.3.1. : Primary source of fuel

As evident in figure 3.3.1 firewood was used as the primary source for 40% households followed by 30% and 28% households using coal and cow dung cakes respectively.

#### 3.3.2 Secondary Source of Fuel

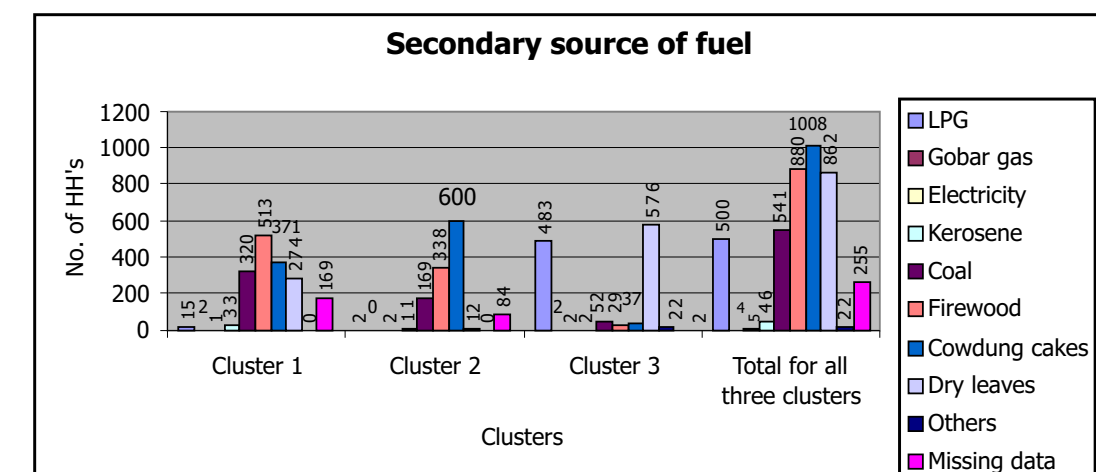


Fig 3.3.2 : Secondary source of fuel

Fig. 3.3.2 indicates that cow-dung cake is the most widely used source for cooking for total of 3 clusters (24.44%) followed by Firewood (21.34%) and dry leaves (21%). Only 0.12% households used electricity.

#### 3.4 Source of Drinking Water

The villages had well, hand pump, lake, tank, river, canal or pond designated for drinking purposes. The table below shows the number of households with their source of drinking water among all the clusters.

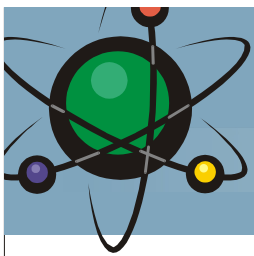


Table 3.4.1 Distribution of Households by source of Drinking water

Sources of Drinking water	Cluster 1	Cluster 2	Cluster 3
Well	468	604	893
Hand pump	1197	587	209
Lake/ tank designated for drinking purpose	8	3	20
River/canal/pond	16	17	73
Others	0	0	4
Missing Data	9	10	10

Majority of the individuals in all the clusters used hand pump as the primary source for drinking water while some also used well as compared to other sources like lake, river/canal/ pond. The clustered bar diagram in Fig 3.4.1 (b) illustrates the findings.

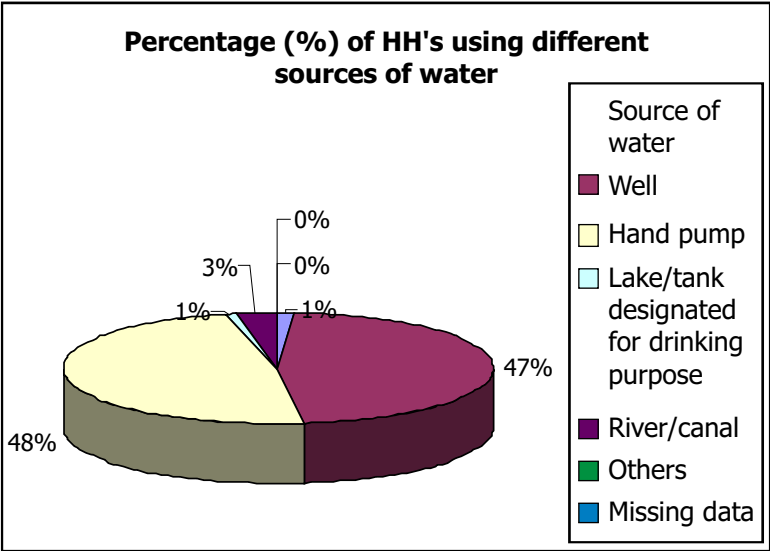


Fig 3.4.1 Percentage (%) of HH's using different sources of water

It is clearly observed that 70% of households in Cluster 1 the source of drinking water was hand pump followed by well (27%).On the other hand in Cluster 2 hand pump and well were equally used in same proportion by households for drinking purpose. In Cluster 3 well water was used by majority households for drinking purpose (73%) and 17% consumed water from hand pump.

3.4.1 Ownership of the Water source:

Regarding the ownership of the drinking water sources of hand pumps and wells, during the survey it was indicated that 80% of these sources were self owned. The balance 20% of the tube wells and wells were owned by the government and constructed on common lands.

4. ACCESS TO FACILITIES

4.0 Introduction

This section assess the availability of various facilities to the villages under survey. This was done by asking the respondents about existence and whether the facility was being used by the household. In the absence of the facility, data was also collected as to where the villagers avail of similar facility. The indicators of this section were availability of schools, health centers, PDS etc.

Total respondent families

	Cluster 1	Cluster 2	Cluster 3
No. of families	1698	1218	1207

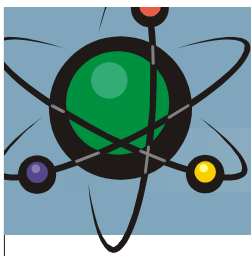
4.1 Education

The table 4.1 below shows the number of families to whom various schools (Primary, Middle, High and Anganwadi centers) are available or unavailable in their village itself.

Table 4.1 : The Availability of education centers:

		Cluster1	Cluster 2	Cluster 3
Primary School	Available	1498	1171	1002
	Unavailable	200	47	205
Middle School	Available	283	288	657
	Unavailable	1415	930	550
High School	Available	35	328	101
	Unavailable	1663	890	1106
Anganwadi	Available	1460	1001	906
	Unavailable	238	217	301

The above tabulated data shows vast majority of the families have Primary School and Anganwadi available in their village and hence those are readily accessible to them. However very less number of families have Middle & High School available in their village itself.



#### 4.1.1 Primary School:

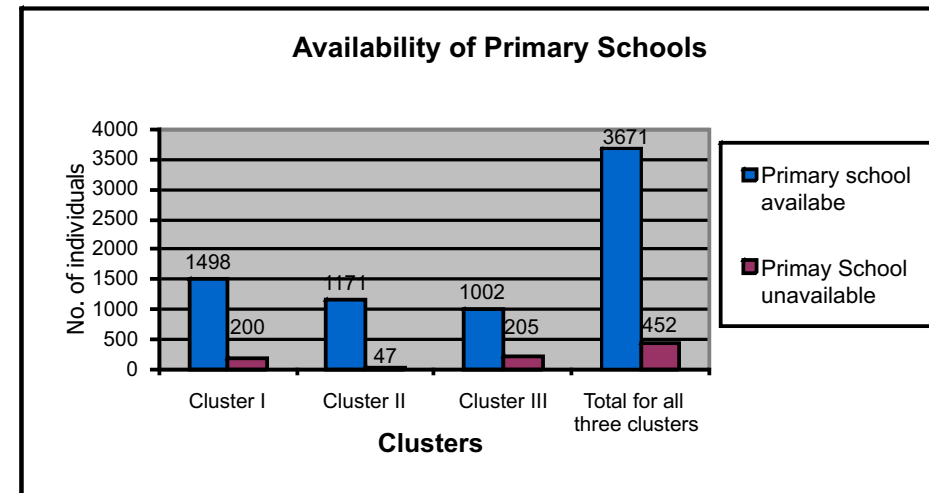


Fig 4.1.1 Availability of Primary school

The Fig 4.1.1 signifies that in cluster 1, only 12% of the families interviewed had no facility of a primary school in their village. For cluster 2&3 this figure is 4% and 17% respectively. Altogether only 11% families are deprived of a primary school in their village and hence have to go to nearby villages to avail that facility.

#### 4.1.2 Middle School:

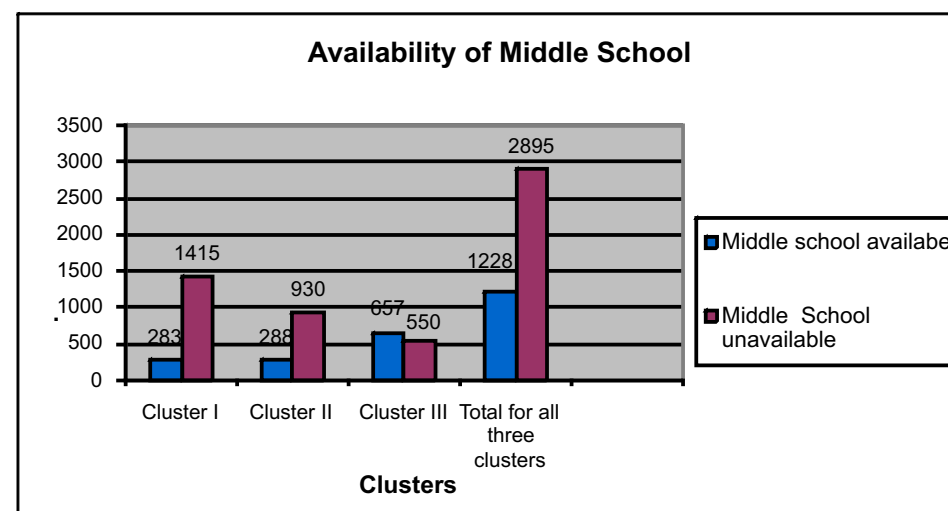


Fig 4.1.2 Availability of Middle school

The above graphs depicts that in cluster 1, 2, and 3 83%, 76% and 46% respectively of the families interviewed had no facility of middle school for which they were required to travel to nearby village or to Jamshedpur for education. Majority of them traveled to nearby village, their mode of conveyance was by cycle or by foot taking around 20 minutes to reach to the nearby facility.

#### 4.1.3 High School

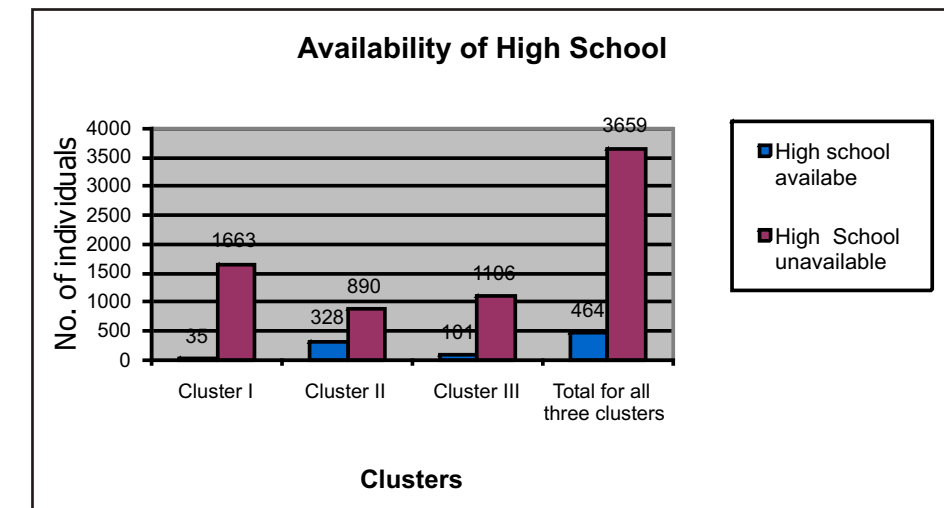


Fig 4.1.3 Availability of High school

From the above graph it is observed that 80% of villagers interviewed had no facility of a high school, therefore the students had to travel to the nearby facility - a town or to nearby village.

#### 4.1.4 Anganwadi centre:

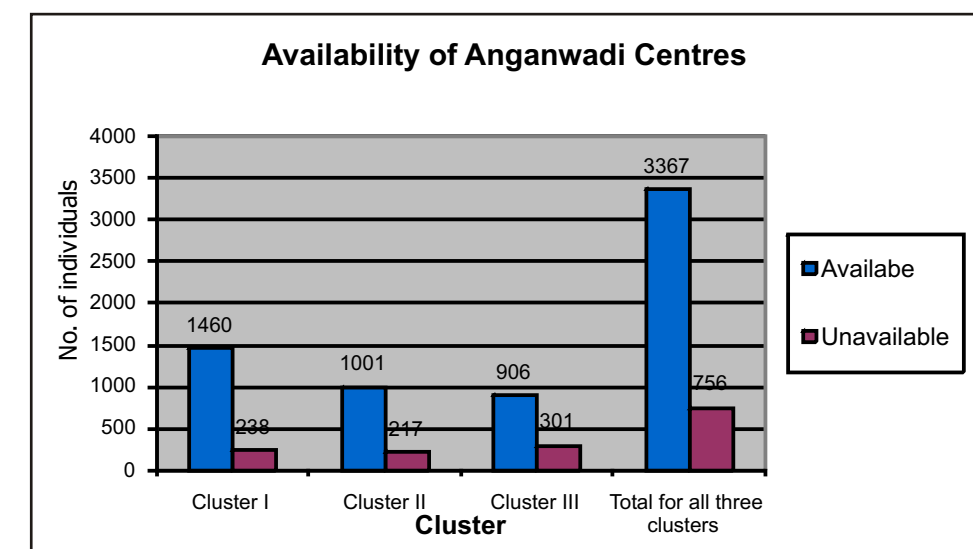
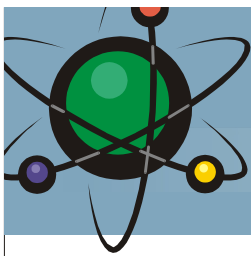


Fig 4.1.4 Availability of anganwadi

Most of the villages interviewed had the facility of an anganwadi centre and thus 82% families interviewed had anganwadi in their village. Cluster wise availability shows 86%, 82% and 75% of the families for Cluster 1, 2&3 respectively.





#### 4.2 Public Distribution Systems (PDS) :

##### 4.2.1 Public Distribution Systems availability in Cluster I

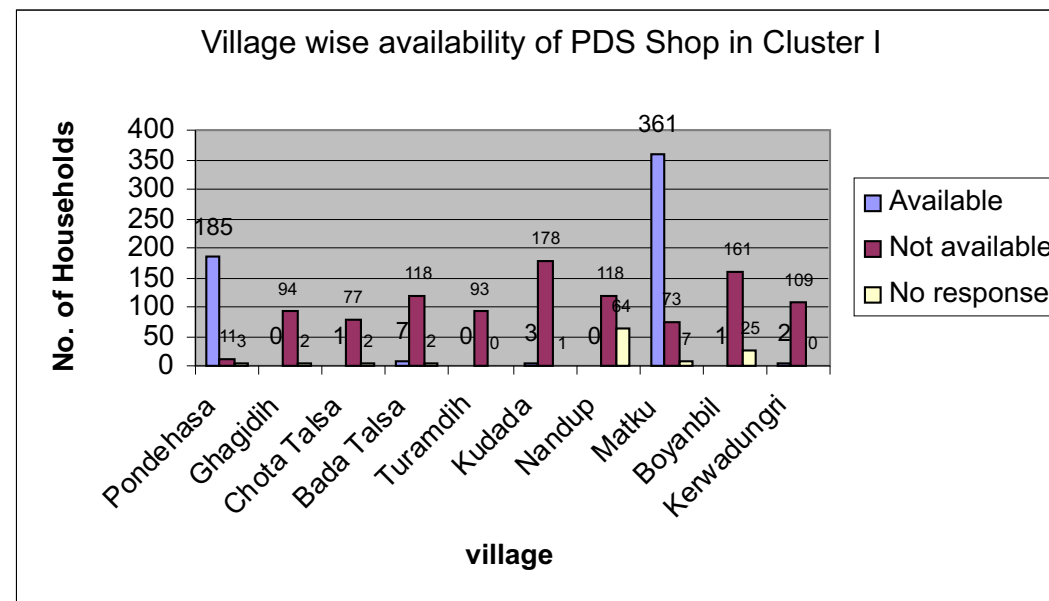


Fig 4.2.1(a) Village wise availability of PDS shop in Cluster I

Fig. 4.2.1 (a) reflects a very skewed availability of PDS shops across the villages of Cluster I. A vast majority of the villagers of Pondehasa and Matku have it in their village while others have either negligible or no availability of PDS at all.

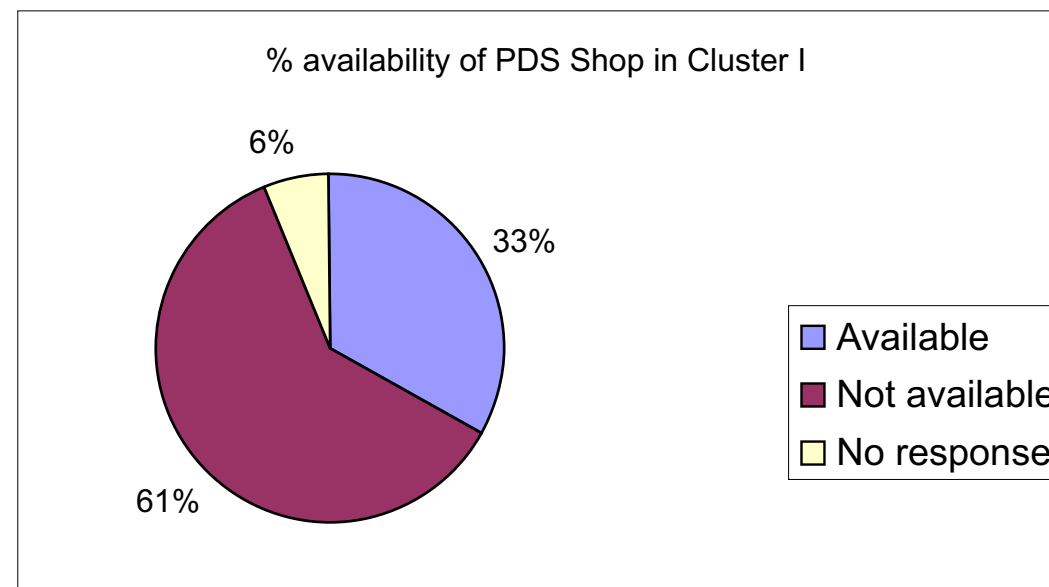


Fig 4.2.1 (b) % availability of PDS shop in Cluster I

In Cluster I only 33% of the households have availability of PDS. That constitutes mainly the villagers of Pondehasa and Matku.

##### 4.2.2 Public Distribution Systems availability in Cluster II

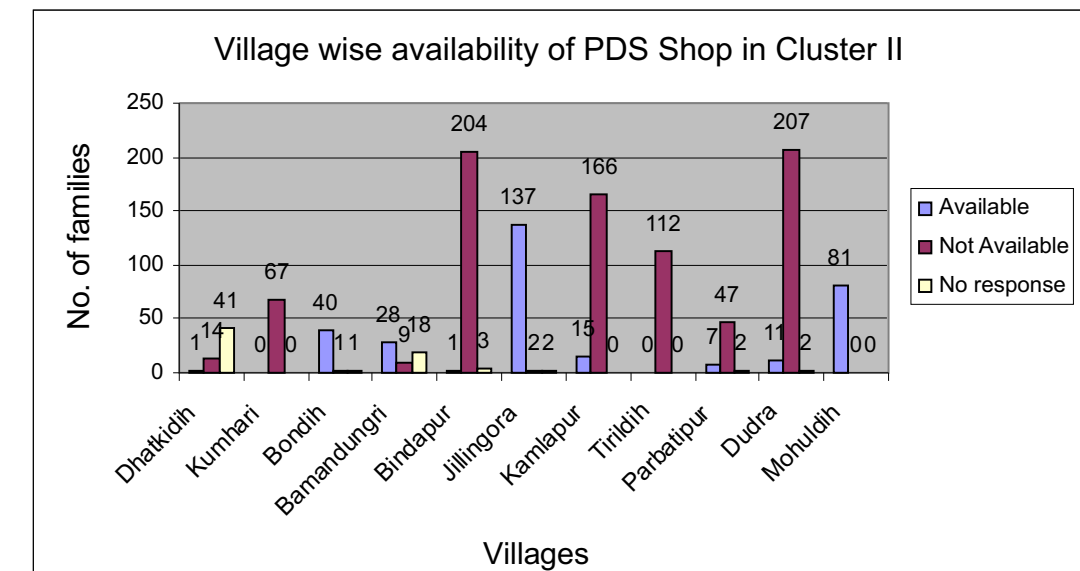


Fig 4.2.2 (a) Village wise availability of PDS shop in Cluster II

Fig. 4.2.2 (a) reflects that populous villages like Bindapur and Dudra do not have PDS shop in their villages. Only three villages namely, Bondih, Jilingora and Mohuldih have majority population having PDS.

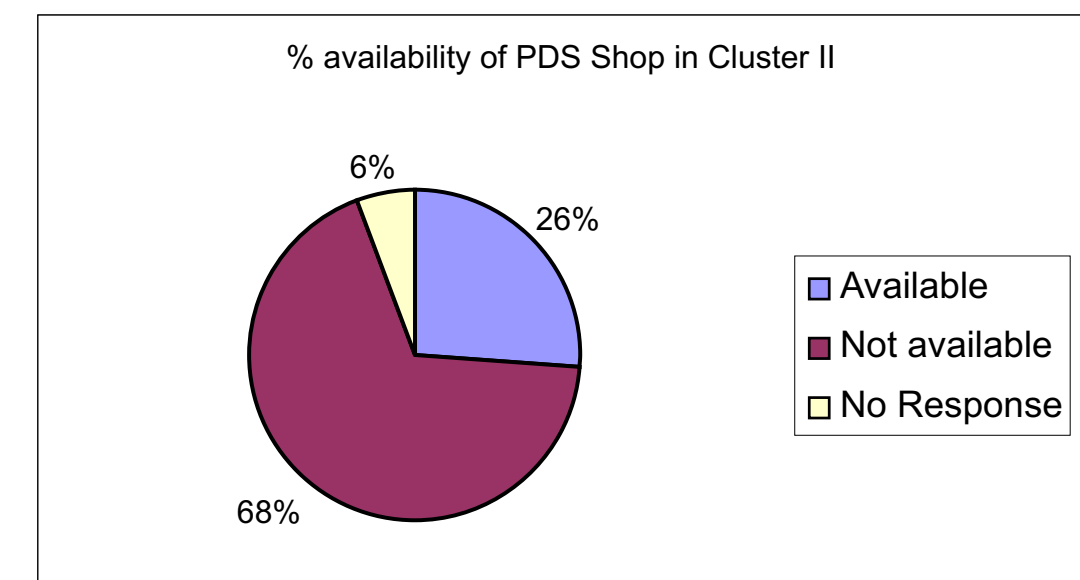
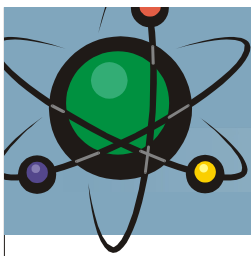


Fig 4.2.2 (b) % availability of PDS shop in Cluster II

In terms of percentage availability of PDS in Cluster II, it is only 26% which is even lower than Cluster I.



#### 4.2.3 Public Distribution Systems availability in Cluster III

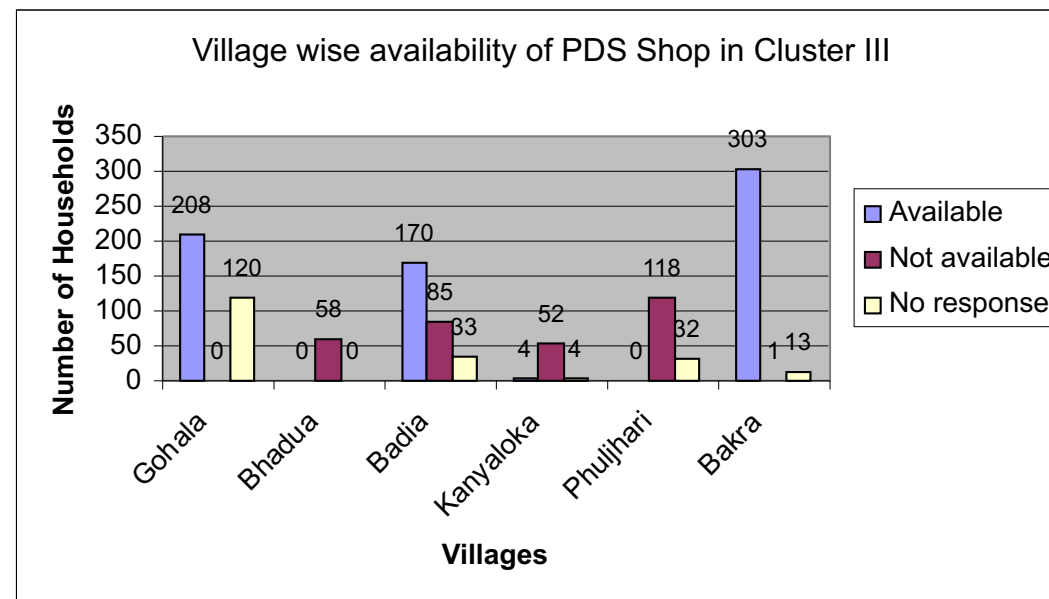


Fig 4.2.3 (a) Village wise availability of PDS shop in Cluster III

Fig. 4.2.3 (a) reflects that three of the six villages under Cluster III have availability of PDS shops to the vast majority of their villagers. Two villages have no availability at all.

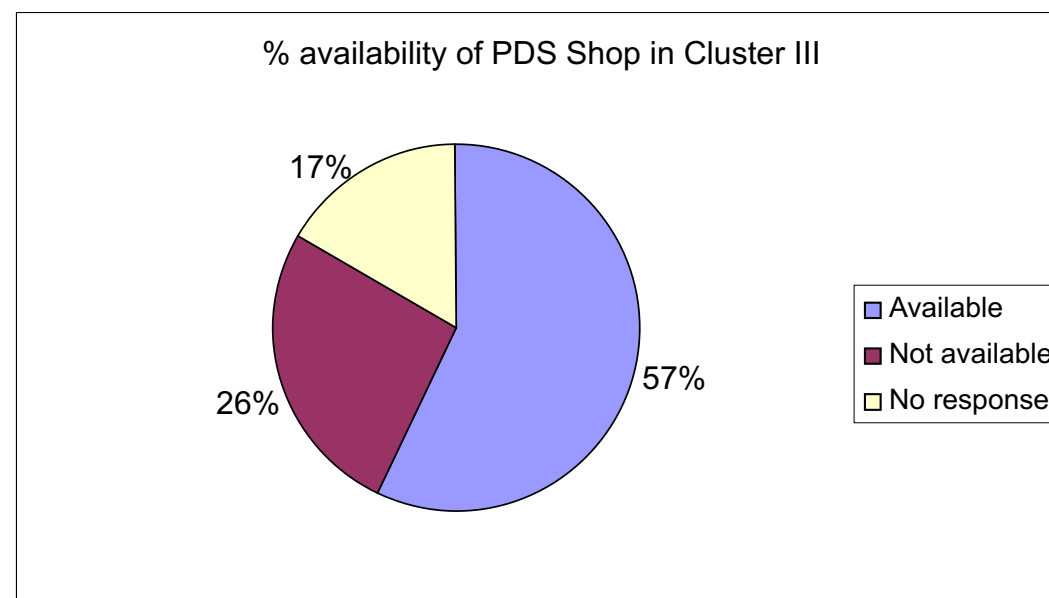


Fig 4.2.3 (b) % availability of PDS shop in Cluster III

In Cluster III, unlike Cluster I and II, majority of the villagers (57%) have PDS availability. This is mainly due to availability of PDS in three most populous villages, namely- Gohala, Badia and Bakra.

#### 4.2.4 Public Distribution Systems availability in all the Clusters

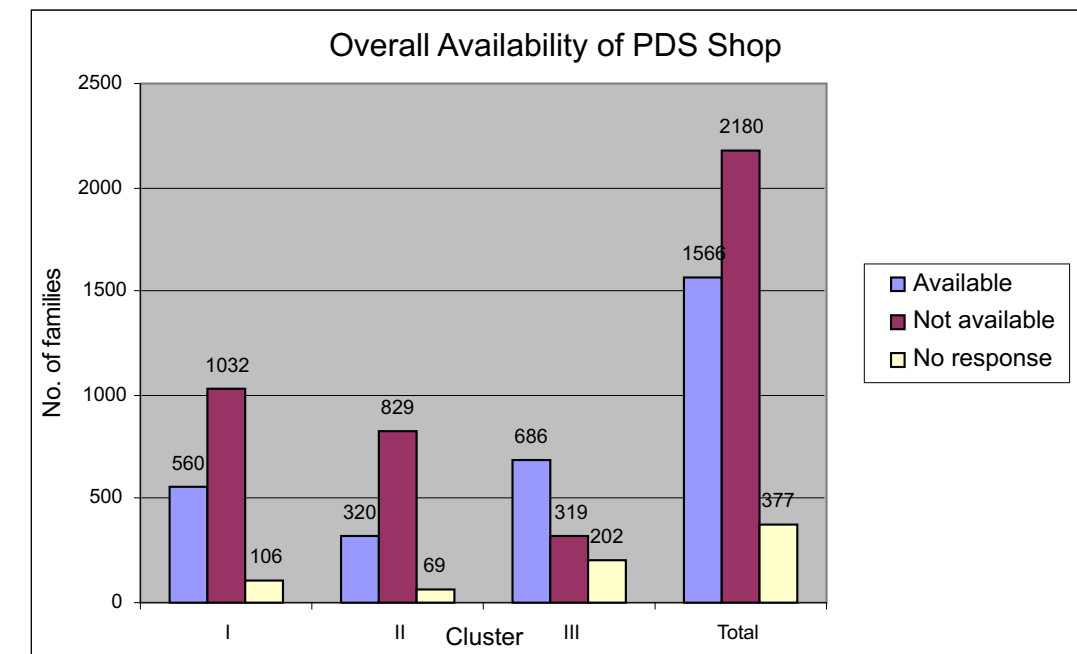


Fig 4.2.4 (a) Overall availability of PDS shop

Fig. 4.2.4 (a) which gives a glimpse of PDS shop availability across the Clusters, reflects that only Cluster III has majority of the villagers having the availability of PDS shop in their village.

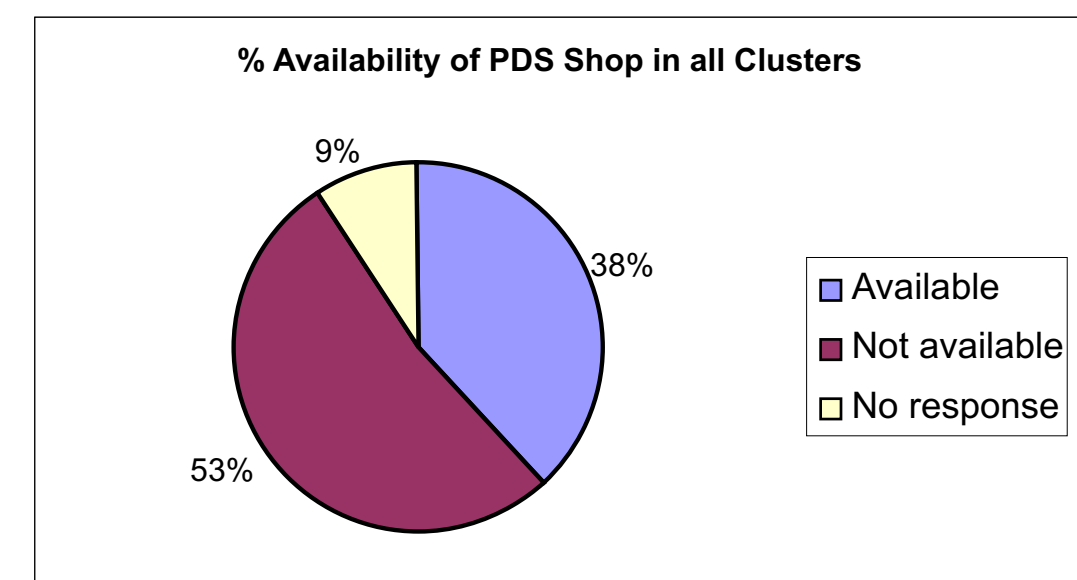
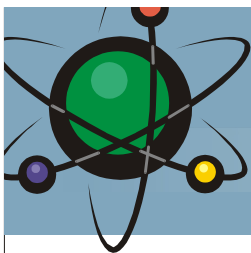


Fig 4.2.4 (b) % Availability of PDS shop in all Clusters

In terms of percentage availability for all the Clusters, only 38% of the respondent families have the availability of PDS. It constitutes mainly the households of Cluster III. A staggering 53% do not have PDS shop in their villages.



## 5. ASSETS

### 5.0 Introduction

Section 5 deals mainly with assets owned by the household. Majority of the households, 75%, were observed to have monthly expenses of Rs. 500-2000 per month. Majority of the households were also observed to own houses and land and such assets necessary for subsistence. The detailed discussion is as follows.

#### 5.1. Land related:

One of the major assets of the villagers has been their house or a homestead. Below given is a table 5.1, representing the number of households having a house, homestead and an irrigated land among the various clusters.

**Table 5.1: Distribution of Land Related Assets among various Clusters:**

	Cluster 1	Cluster 2	Cluster 3
<b>TOTAL FAMILIES</b>	<b>1698</b>	<b>1218</b>	<b>1207</b>
<b>No. of families having a House</b>	<b>1680</b>	<b>1207</b>	<b>1137</b>
<b>No. of families having a Kitchen Garden</b>	<b>1389</b>	<b>1065</b>	<b>1007</b>
<b>No. of families having Irrigated Land</b>	<b>569</b>	<b>836</b>	<b>704</b>

As per the table No 5.1 (Land Related) most of the villagers had own house, while relatively a lower percentage had a kitchen garden and even lower percentage of households had irrigated land. The data in table is detailed by a percentage clustered bar graph below.

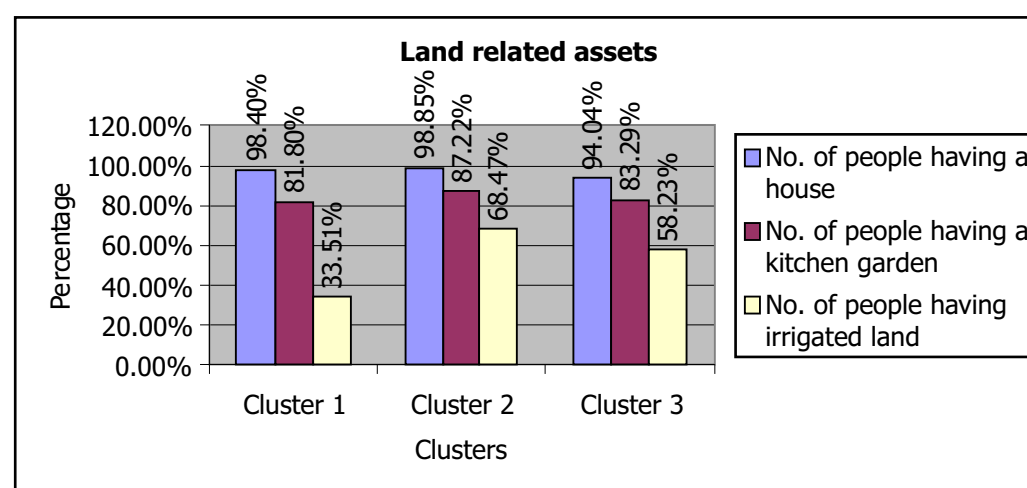


Fig 5.1 Land related assets

On the basis of land related assets across the three clusters, on an average 98% of the families had own house and only 2% lived in rented house. 81.80%, 87.22% and 83.29% of the families in Cluster 1, 2 & 3 respectively had a kitchen garden. 68.47% of the households had irrigated land in cluster 2 and 58.23% in Cluster III, while 33.51% families in cluster I had only irrigated land.

### 5.2. Method of Irrigation:

Agriculture was the main source of income for the families.

Method of irrigation was studied on 43 households of Cluster 1, 10 households of Cluster 2 & 42 HH Cluster 3. There were three methods of irrigation (electric pump, diesel pump or by man/ animal operated systems) adopted by the families having irrigation facilities in the agriculture land. The graph given below illustrates the various method of irrigation used by various clusters.

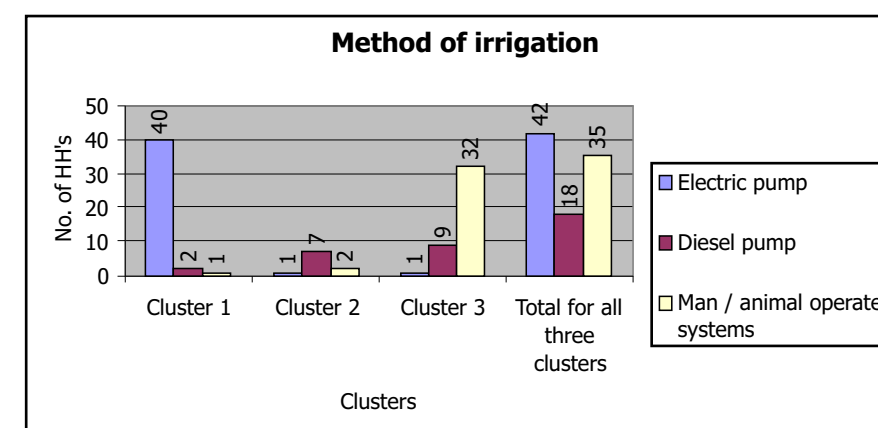


Fig 5.2.1 (a) Method of irrigation

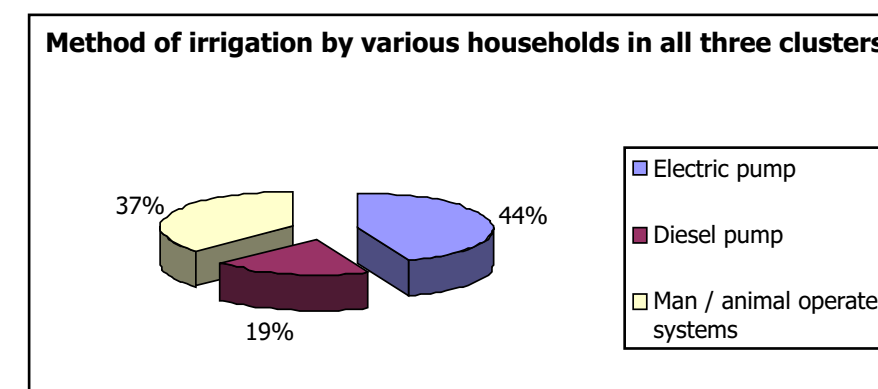


Fig 5.2.1 (b) Method of irrigation by various households in all three clusters

In cluster 1 around 93% of the households surveyed used electric pump as the method of irrigation and the remaining used diesel pump (4%) and man/animal operated systems (3%). In Cluster 2 around 70% of the households used diesel pump and remaining used electric pump (10%) and man operated system. In cluster 3, 76% of households used man made operated systems as the method for irrigation.

### 5.3 Livestock and Poultry

Most of the households in various clusters had assets in form of animals, agricultural equipments and household durable goods.

#### 5.3.1 Animals:

Most of the households had various types of animals used as a source of food, income and for travelling purpose. Maximum of the households had cows, bulls, goats, sheep and poultry in all the clusters.

The table 5.3.1 given below is a clear illustration of the above mentioned fact.

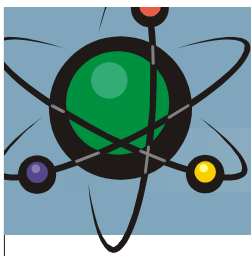


Table 5.3.1 :Availability of assets ( animals)						
	Cluster 1		Cluster 2		Cluster 3	
	Families	Nos.	Families	Nos.	Families	Nos.
Cow	249	522	313	717	185	357
Bull	427	1038	396	830	455	972
He Buffalo	5	11	15	29	54	110
She Buffalo	5	9	5	10	4	8
Goat	522	2061	314	1036	458	1718
Sheep	138	600	67	366	72	309
Horse/ Donkey	1	1	6	10	2	2
Pig	186	672	99	236	125	242
Poultry	1208	8766	639	4090	866	5009
Duck	68	319	104	404	73	345

Maximum of the households were the owners of certain assets in form of animals. Though almost all the household have cow, people don't milk them. Thus this is an underutilization of resource.

5.3.2 Agricultural Equipments:

Villagers among all the clusters had the ownership of following agricultural equipments like tilling equipments, bullock cart, tractor, electric pump, sprayer, rice howler, thresher and generator. The table 5.3.2 given represents the number of households having the number of agricultural equipments.

Table5.3.2: Availability of assets (agricultural equipments)						
	Cluster 1		Cluster 2		Cluster 3	
	Families	Nos.	Families	Nos.	Families	Nos.
Tilling Equipments	282	385	337	794	301	359
Bullock Cart	118	122	170	176	239	244
Tractor	8	8	5	5	10	10
Electric Pump	0	0	6	6	5	5
Sprayer	1	1	2	2	1	1
Rice Howler	24	24	71	71	14	14
Thresher	1	1	0	0	5	5
Generator	5	5	2	2	1	1

Thus from the above table we conclude that majority of the households in all the clusters owned tilling equipments, bullock cart and rice howler in larger ratio as compared with other agricultural equipments like thresher, sprayer, electric pump, tractor and generator.

5.4 Household Durable Goods:

Household durable goods are also a part of assets and they are composed of the following items like mobile phone, TV, refrigerator, cycle, two wheeler, four wheeler, six wheeler, air cooler, fan and others. The table 5.3.3 below shows the number of households having the number of various household durable goods in all clusters

Table no 5.4: Availability of Assets (Household Durable Goods)

	Cluster 1		Cluster 2		Cluster 3	
	Families	Nos.	Families	Nos.	Families	Nos.
Household Appliance						
Mobile Phone	132	141	143	180	82	87
TV-B/W	307	321	293	299	98	99
TV-Colour	201	210	127	136	68	71
Refrigerator	29	30	32	38	18	18
Air Cooler	22	26	24	31	12	15
Fan	507	811	394	652	198	309
Others (DVD, Radio)	68	68	1	1	11	11
Means of Transport / Communication						
Cycle	1475	2342	1026	1524	936	1106
Two Wheeler	333	398	236	278	120	132
Four Wheeler	12	12	4	7	3	3
Four /Six Wheeler	4	5	4	5	0	0

Maximum number of households in all the clusters had some durable good but the items mostly owned by maximum households in large numbers were cycle, fan, two wheeler, TV (black & white) and other goods like mobile phones, refrigerator, air coolers, radio's were owned in smaller quantities.