

Threat to Forest Commons: Mapping the Livelihoods of Mining induced Communities in the Eastern Ghats of Andhra Pradesh

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Abstract

India's rich mineral reserves lie in the same regions that hold its greenest forests and tribal people. Mining is not only a direct, but also an underlying cause of forest loss and degradation. It also has a negative impact on wildlife, river systems, tribal livelihoods, tourism and climate. This paper tries to map the existing livelihoods pattern of the affected communities in the upcoming bauxite mining and alumina refinery areas of Andhra Pradesh. The study covered 355 households in Visakhapatnam and Vizianagaram district of Andhra Pradesh. Using the Sustainable Rural Livelihoods Framework, the study shows that all project-affected people do not have a sustainable livelihood. Though they are rich in some capital, they are lagging behind in other forms of capital. Land acquisition process has not completed in these areas. However, once it completes where will these people go? They will lose their agricultural land and the forest will be destroyed. What will be their new source of livelihoods? These are some of the unanswered questions, which the study has tried to answer.

Keywords: *Mining, Forest, Andhra Pradesh, Tribal*

1. Introduction

Exploitation of forests for commercial interests are often promoted by conventional forestry debates. These debates, however, exclude local communities, and hardly mention mining as a cause of forest destruction. For example, after two years of intensive review of the world's forests, mining is mentioned only once in the report of the Intergovernmental Panel on Forests (1997) to the United Nation's Commission on Sustainable Development¹. The Global Forest Resources Assessment, 2005 (Food and Agricultural Organization (FAO) 2006), also mentions mining only once; not as a direct cause of forest destruction, but as a cause of forest fires². According to the State of the World's Forests, 2007, the world has four billion hectares (ha) of forest, covering about 30 percent of the world's land area. Deforestation is going on at an alarming rate of 13 million ha a year. Over a period of 15 years, i.e., between 1990 and 2005, the world has lost three percent of its total forest area (FAO 2007). This study only estimates recent deforestation; it however, does not include information about mining-induced deforestation. Though the second part of the report is devoted to selected issues in the forest sector³, there has been no mention of mining.

Nevertheless, pressure on forests also comes from outside the forestry sector and one such important cause is mining. Mines can occupy and despoil large tracts of land. Not only the many mines opened during the past few decades, but also the current mining exploration affects forest ecosystems (Forest Peoples Programme, Philippine Indigenous Peoples Links and World Rainforest Movement 2000). According to a study of the World Resources Institute (WRI), large scale mining and exploration of fossil fuels, with their related roads and energy needs represent the second largest threat (after commercial logging) to frontier forests⁴ globally, affecting nearly 40% of all frontier forests classified as moderate or high threat (Bryant, Nielsen and Tangley 1997). South America leads the list followed by Russia and North and Central America.

According to the 6th Citizens' Report of Centre for Science and Environment (CSE) titled, "Rich Lands Poor People: is 'Sustainable Mining' Possible?", 'almost all of India's minerals are in the

¹ Important forms of deforestation include illegal logging, illegal land occupation, illegal cultivation, grazing pressures, unsustainable agriculture, the demand for fuel wood and charcoal to meet basic energy needs, refugee- related problems, mining and oil exploitation in forested areas not conducted in accordance with national legislation, natural climatic events and forest fires.

² Most fires in forests and woodlands today are caused by humans – either for conversion of forests to agricultural lands; maintenance of grazing lands; extraction of non-wood forest products; hunting and clearing of land for mining; industrial development; or resettlement.

³ The selected issues include climate change, desertification, forest landscape restoration, forestry and poverty reduction, forestry sector outlook, forest tenure, harvesting, invasive species, monitoring, assessment and reporting, mountain development, payment for environmental services, planted forests, trend in forest products, urban forestry, voluntary tools, water, wildlife management and wood energy.

⁴ According to the WRI, "frontier forests are the world's remaining large intact natural forest ecosystems. These forests are – on the whole – relatively undisturbed and big enough to maintain all of their biodiversity, including viable populations of the wide ranging species associated with each forest type.

same regions that hold its greenest forests and most abundant river systems. These lands are also largely inhabited by India's poorest and most marginalized people – the scheduled tribes and scheduled castes – who depend on the very same forests and watersheds for their survival' (CSE 2008). The average forest cover of the 50 major mineral-producing districts is 11,890,400 ha – about 18 percent of the total forest covers in the country. The forest cover of the top mining states is above the national average. Chhattisgarh has the highest forest cover (43 percent), followed by Jharkhand (30 percent), Orissa (27 percent), and Madhya Pradesh (26 percent) (CSE 2008).

This article has been arranged as follows. Section one is an introduction to this study. Section two sets the background. Section three gives a conceptual framework on mining and livelihoods. Section four introduces the study area, methodology and sample selection. Diversified rural livelihoods in the study area is explained in section five. Section six describes about mining and livelihood assets. Finally section seven concludes the study.

2. Background of the Study

According to the Geological Survey of India (GSI), bauxite deposits of Andhra Pradesh (AP) and Orissa, referred as the East Coast Bauxite deposits are the largest bauxite reserves in the country, with Orissa accounting for 51 percent and AP 21 percent of the total reserves of India. Though bauxite mining started in Orissa long back (25 years), it is yet to start in AP. According to Oskarsson (2009), the causes of this obstacle in AP are control of technology by a few multinational companies, lack of financial resources, violent Maoist movement gaining strength in the bauxite hills, and the awakening of the civil society to the negative consequences of bauxite mining. However, the present Government again promoted this project.

The Government of Andhra Pradesh signed two Memorandum of Understandings (MoUs), one with Jindal South West Holding Limited (JSWHL) of the Jindal Group and the other with the Government of Ras Al Khaimah (GoRAK), from the United Arab Emirates to set up an Alumina and Aluminum Refinery and Smelter⁵ in the state of AP, at locations other than the Scheduled Areas⁶. The GoRAK created an Indian company called Anrak. The proposed refinery of Jindal is in the plain area of S. Kota Mandal⁷ of Vizianagaram District and the proposed alumina complex of GoRAK is in the plain area of Makavarapalem Mandal of Visakhapatnam District. Both the

⁵ *Aluminum originates as an oxide called alumina. Aluminum itself does not occur in nature as a metal. Deposits of bauxite ore are mined and refined into alumina – one of the feed stocks for aluminum metal. At the refinery, alumina is extracted from the bauxite ore; and at the smelter, aluminum is extracted from its oxide alumina.*

⁶ *The Fifth Schedule of the Constitution of India deals with the administration and control of Scheduled Areas and Scheduled Tribes in these areas. In the landmark Samata Judgment of 1997, the Supreme Court ruled that the state has no right to grant leases even on government-owned forest land to private companies on areas governed by the Fifth Schedule of the Constitution, and that only cooperative societies solely run by Scheduled Tribes could mine in such areas, subject to compliance with the Forest Conservation Act and the Forest Protection Act. As a result of the judgment, the AP Government was directed to stop all private mining within Scheduled Areas.*

⁷ Middle tier of administrative unit in the Panchayati Raj system of AP.

cases are identical in their plan to mine bauxite from the Agency Area of Visakhapatnam District via government-owned Andhra Pradesh Mineral Development Corporation⁸ (APMDC).

People staying in the upcoming mining and refinery area are strongly protesting government efforts to start mining. Displacement is the foremost concern. They depend on forest for their livelihoods and destruction of forest will ruin their livelihoods. NGOs and media representative raised concerns that mining will disturb the hill streams which supply water to the plain areas. There are coffee plantations below the bauxite-rich areas, and the villagers grow rice, pulses and beans there. Around 2,025 ha of coffee plantations will be lost if the mines come up; numerous workers in the plantations will lose their jobs (Bhatta, 2008).

In January 1994, the Ministry of Environment and Forest (MoEF), Government of India issued the Environmental Impact Assessment (EIA) notification under the Environment (Protection) Act, 1986. The notification imposed restrictions on undertaking new development projects, or expansion or modernization of existing ones, unless environmental clearance was obtained from the ministry. The idea was to assess the principal environmental and social impacts of the projects to ascertain the likely costs and benefits of the proposed projects. A detailed analysis of these four EIA reports (submitted by Jindal and Anrak, one for mining and another for refinery) show that, they have neglected the socio-economic aspect. Neither there is any clear analysis about the existing socio-economic conditions of the people, nor on the future impact of mining on their livelihoods. This study tries to fill the gap.

Bauxite mining and aluminum refineries have not yet started in the study area. Though land acquisition has started in both the refinery areas, people are still continuing with their existing livelihoods. Most of the impact assessment studies go for a before and after comparison or with-without comparison, considering a few control villages. However, this research has tried to study the existing livelihoods of the community in the pre-mining / refinery period. It is setting a baseline which can form the basis for a future impact assessment.

The main objectives of this article are:

- (i) To map the existing livelihoods pattern of the affected communities in the mining areas.
- (ii) To set a baseline study for future impact assessment.

3. Mining and Livelihoods: A Conceptual Framework

The conventional view on mining sees mineral reserves that can be mined profitably as part of a country's stock of natural capital, along with agricultural land, forests and other natural resources (Davis and Tilton, 2005). It was widely assumed that countries that possess rich

⁸ *As the area with bauxite reserves in the state came under the notified tribal zone, it could be leased out only in favour of the tribals or state-owned enterprises as per the directives. Accordingly, the AP Government decided to offer lease rights to the APMDC and sell the bauxite to the aluminum companies. By using APMDC as a dummy corporation, the government is trying to avoid the ruling in the Samta Judgment. However, it is also illegal to use APMDC as a dummy on behalf of private companies.*

mineral deposits are fortunate. However, over the last few decades, a more negative view of mining has emerged, that questions the positive relationship between mineral extraction and economic development (Davis and Tilton, 2005). Mining profoundly impacts local communities in the form of jobs, migrant workers, land, water, air and noise, loss of wildlife habitat, increased tax revenue, etc. The argument is that the impact of mining on the livelihoods of the local communities is largely neglected. Often, all the benefits accrue to the mining industry and its work-force, depriving the rest of the population in the locality. This population bears only the costs, while the provision of benefit is lopsided.

A livelihood is often conceptualized as "incomes in cash and in kind: as well as the social institutions (kin, family, compound, village), gender relations, and property rights required to support and sustain a given standard of living" (Ellis 1998, quoted in Chimhowu and Hulme, 2006). This includes the accessibility of, and benefits derived from, public services like education, health, roads, water and related infrastructure. Livelihood approaches involve a conceptual shift from analyzing rural people as smallholder farmers to a much broader understanding (Murray, 2002, quoted in Chimhowu and Hulme, 2006).

Several frameworks have been proposed for the analysis of livelihoods. They include the Sustainable Livelihoods Framework (SLF) (Carney, 1998, 1999; Scoones, 1998), the Framework for Thinking about Diverse Rural Livelihoods (Ellis 2000), Capitals and Capabilities Framework of Bebbington (1999), and the United Nations Development Programme's (UNDP, 1999) Sustainable Livelihoods Diamond. These frameworks have different emphases, rather than fundamental differences. They all attempt to integrate assets, constraints and human capabilities in a logical and comprehensive manner to analyze the status, form, nature and condition of livelihoods over space and time (Chimhowu and Hulme, 2006). Among these frameworks, the SLF has been the most popular, partly because of its robust analytical ability and also because of its widespread promotion by donor agencies (Chimhowu and Hulme, 2006).

According to the SLF, households make a living by using five types of assets / capital (natural, physical, human, social and financial) in an environment influenced by institutional and structural factors. It identifies vulnerability as a key factor that households seek to manage. There are five key features, which make the framework very relevant. Firstly, it views households as making a living in a variety of ways of which farming is just one (Francis, 2001; Murray, 2002). Secondly, the framework sees land as just one asset among a group of other assets. Thirdly, it places the interaction between the various capitals within a broader policy environment. Fourthly, it allows investigating livelihood dynamics in a given geographical and physical context (Murray, 2002). Fifthly, the focus on risk and vulnerability is appropriate.

This framework has largely been used in agriculture and rural livelihoods projects, but its relevance to mining projects has not been much assessed. In this study, instead of starting with vulnerability, it describes different economic activities the households of mining and refinery villages are pursuing. The affects of these activities on the assets, in the form of five types of capital are studied.

4. Methodology, Study Area and Sample Selection

Both primary and secondary sources of information have been collected for this study. Secondary information was collected from the Socio-Economic Survey of AP, Statistical Abstracts of AP, Geological Survey of India and the EIA reports of the companies. For primary data collection the survey was carried out in different phases from March, 2009 to June 2009. Household survey with a structured questionnaire was carried out with the help of a group of 12 trained assistants. This survey covered 355 households in Visakhapatnam and Vizianagaram districts of Andhra Pradesh. Another set of qualitative data was collected with the help of a structured village questionnaire. Small group discussions took place on the socio-economic condition of the villages. These discussions were informal in nature. Data were collected from 12 study villages.

Our study areas are situated in the Visakhapatnam and Vizianagaram districts of Andhra Pradesh. The study area is divided into four zones, which consist of four mandals: (1) S.Kota Mandal of Vizianagaram District (proposed Jindal Refinery), (2) Anantagiri/Araku Valley Mandal of Visakhapatnam District (proposed Jindal Mining), (3) Makavarapalem Mandal of Visakhapatnam District (proposed Anrak Alumina complex) and (4) G.K.Veedhi Mandal of Visakhapatnam District (proposed Anrak Mining). These zones are the starta of the study. As this is a geographically well-defined area, it is very easy to identify the population by taking all the villages, which are near the proposed mines and refinery areas.

According to the first field report, a list of villages and hamlets which are near the study area was prepared. Given the choice of a target population, the next step was to put together a list of the target population, known as the sample frame population, from which, ultimately, the sample was drawn. Secondly, a list of 15 villages⁹ was prepared, which is just within three kilometer from the proposed mines and refinery areas and where land acquisitions have either finished or just started. Key features of sample villages and demographic features of sample villages are given in table 1 and 2 respectively.

5. Diversified Rural Livelihoods

Livelihood diversification is a survival strategy of the rural households in developing countries, as agricultural activities are unable to provide sufficient means of survival (Hussein and Nelson 1998). Ellis (1998) defines livelihood diversification as "the process by which households construct a diverse portfolio of activities and social support capabilities for survival and in order to improve their standard of living". Livelihood diversification is normal for most people in majority of the rural areas of developing countries in both Asia and Africa (Adams 1994; Schoonmaker Freudenberg 1994), and non-agricultural activities are a critical component of such diversification. It has been confirmed by many researchers that rural people not only specialise in crop and fish production or livestock, but also depend on other activities (Dercon and Krishnan 1996; Ellis 1996; Unni 1996). This is reflected in all the villages (Figure 1 and 2).

⁹ Presence of Naxals prevented us from collecting data in the Anrak Mining area. Therefore, our final study is based on 12 villages instead of 15 villages. Anrak Mining area is excluded.

In both the refinery areas wage income (Jindal 59 percent and Anrak 68 percent) is the primary source¹⁰ of income of the sample households. This is followed by agriculture, which also has the same percentage (Jindal 21 percent and Anrak 22 percent). Though villagers devote a lot of time to agriculture, income from agriculture is not very high. Job and fuelwood collection is the third source of primary occupation in Jindal Refinery area (both 7 percent each). Petty business and other occupations have a very small percentage (2 percent each). However, in the Anrak Refinery area, the percentage of other sources of income is very less. Here livestock is also a primary source of income for some households (2 percent). The percentage of job and business is very less.

The primary occupation in the mining area is entirely different from that of the refinery areas. Here agriculture plays an important role and it is the primary source of income for 57 percent of the sample households. The second occupation is wage labour, which mostly involves labour work at coffee board. Every year they work in the board for three months. This is followed by employment. Here the percentage of job is very high in comparison to the refinery areas. Most of the jobs are in AP Mineral Development Corporation (APMDC). Income from NTFP and livestock are not major sources of income in the mining villages. Though many households have cattle and poultry and they collect NTFP most part of the year, income from that source is a secondary one.

5.1 Livelihoods Diversification: A Gender Dimension

Many livelihood diversification strategies are often gender specific. Literature confirms that though women may undertake a similar wide range of diversified activities as men (Chen 1989), in many contexts men are able to avail themselves of diverse opportunities that are not open to women because of cultural constraints (Hussein and Nelson 1998). This section discusses all the economic activities taking gender into consideration (see Table 3 and 4).

In Jindal Refinery area, majority of the active individuals devote their time (77 percent) to agriculture (see Table 3). This is followed by farm and non-farm labour and jobs. Petty business has a very less percentage. Others include fuelwood collection for sale, driving, cooking, laundering and livestock rearing. One important point in this table is that women have equal participation in all the economic activities except jobs. The reason for this is that majority of the jobs are given by Jindal (as a part of compensation process, which started last year) and women have not received the same.

In Jindal Mining area, the majority of the workforce is engaged in agriculture (71.85 percent), followed by farm labour and job. Non-farm labour work is absent here. Unlike Jindal Refinery area, the percentage of woman participation here is equal in all the economic activities including job. Agriculture plays an important part also in Anrak Refinery area (84.40 percent), followed by non-farm labour and others. Others include laundering, driving, fuelwood collection and livestock rearing. The percentage of job is very less here. Here also women have equal participation in most of the works.

¹⁰ Here primary income means the highest share of income coming from that source, for that particular household.

A look at the secondary occupations show that in Jindal Refinery area, wage labour is the second major economic activity (nearly 80 percent) followed by NTFP collection. Here NTFP is fuel wood collection. Here also women have equal share in all the economic activities except job. All these jobs are given by Jindal and as now, they are getting only stipend; people take it as their secondary economic activity. In Jindal Mining area, NTFP collection is the second major economic activity (94 percent) followed by wage labour. Here also women have equal participation except for job. In Anrak Refinery area, wage labour is the secondary occupation (93 percent) followed by agriculture. Here also women have an equal role to play. This explains that in all the three study areas, women are equally active as their male counterparts. The next section shows that literacy rate is very low among women in all these three study areas. As a result, most of them do not have a job. However, they are playing a major role in all other economic activities.

6. Mining and Livelihood Assets

The livelihood approach is concerned first and foremost with people. According to this, people require a range of assets to achieve positive livelihood outcomes; no single category of assets, on its own, is sufficient to yield all the many and varied livelihood outcomes that people seek. The framework identifies five core asset categories or types of capital upon which livelihoods are built. The current understanding of poverty places considerable emphasis on ownership or access to assets that can be put to productive use as the building blocks by which the poor can construct their own routes out of poverty (Ellis and Mdoe 2003). Therefore, it is interesting to study the existing livelihoods of people, on the following five types of capital.

6.1 *Human Capital*

In the livelihood framework, human capital is taken as a livelihood asset, or as a means of achieving livelihood outcomes. It represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives. Human capital is required to make use of any of the other four types of assets. Therefore, it is necessary, though not sufficient on its own, for the achievement of positive livelihood outcome. Many people regard ill health and/or lack of education as core dimensions of poverty and thus, overcoming these conditions may be one of their primary livelihood objectives (DFID 1999). Table 5 shows the educational status of the sample households and table 6 shows the status of health of people in the study areas.

The literacy rate is very low among women in all these three areas. Illiterate percentage varies from 57 percent to 64 percent (see Table 5). Among men, it is 39 to 45 percent. Further the percentage of education in men is more than that of women in all categories, except in the primary education in Anrak Refinery area. The percentage of those educated above graduation is very low among women in both the refinery areas, and zero in Jindal Mining area. As Jindal Mining area, covers tribal hamlets in the forest area, the percentage of female illiteracy is comparatively high. However, the percentage of male illiteracy is much less in these areas. Both the refinery areas show a more or less same trend.

The percentage of households facing health problems is very high in Jindal Mining area (84.31 percent) followed by the households in Anrak Refinery area (61.45 percent). This percentage is 22.46 in Jindal Refinery area (see Table 6). In both the refinery areas, all households are receiving treatment. However, in the mining area, two to three households have not received treatment. The reasons they cited are lack of money and no facilities near their village. In the mining area, the source of treatment is public (44 percent) followed by private (28 percent) and traditional (16 percent). However, in both the refinery areas, the main source of treatment is private (61 percent in Jindal Refinery and 73 percent in Anrak Refinery) followed by public (35 percent in Jindal Refinery and 24 percent in Anrak Refinery). Few households also have access to both private and public source of treatment.

6.2 Social Capital

In the context of the sustainable livelihood framework, social capital is taken to mean the resources upon which people draw in pursuit of their livelihood objectives. These are developed through networks and connectedness, membership of more formalized groups and relationships of trust, reciprocity and exchanges that facilitate co-operation, reduce transaction costs and may provide the basis for informal safety nets amongst the poor. They are all inter-related.

In all the study areas, 90 to 95 percent of sample households are members of Public Distribution System (PDS) (see Table 7). The second highest membership is in Development of Women and Children in Rural Area (DWCRA). It varies from 59 to 67 percent. Old age pension takes a third place. In both the refinery areas, households' involvement in *Anganwadi* is very less. However, this is relatively higher in the mining areas. Most of the households stated that they have benefitted from the programmes and have not faced any difficulties. They are aware about the programmes in which they are members.

Majority of the people in Jindal Mining area and Anrak Refinery area believe that most people can be trusted (see Table 8). However, in Jindal Refinery area, people are too careful in dealing with other people. In terms of trust in lending and borrowing, they are comparatively better. In the other two areas, the people greatly trust others in matters of lending and borrowing.

6.3 Natural Capital

Natural capital can be defined as the stock of natural resources and environmental assets, including water, soils, air, flora, fauna, minerals and other natural resources. For rural people, natural capital is very important because they derive all or part of their livelihoods from farming, fishing and collecting forest products.

All the study areas are naturally very rich. In Jindal Mining area, all the households have agricultural land (see Table 9). Nearly 94 percent of them are practicing *podu*¹¹ and 33 percent are using forest land for cultivation. All households except a few are collecting NTFP from

¹¹ Shifting cultivation (slash and burn method) locally known as *Podu*.

forests. However, their income from NTFP collection is not a major source, and agriculture is the major source of income. In both the refinery areas also most of the households have agricultural land. They do not practice *podu*. In Jindal Refinery area, few households (2.90 percent) use forest land for agricultural purpose. As the forest is close to their village, they collect fuelwood from the forest and sell it. This percentage is nil in Anrak Refinery area as they do not have any nearby forest. As majority of the households in all the study areas have agricultural land, it is important to know the size-class distribution of the households¹².

In Jindal Mining area, all the households have agricultural land. The percentage of medium farmers is highest (35.29 percent), followed by large farmers (33.33 percent) and small farmers (27.45 percent) (see Table 10). Therefore, their income from agriculture is also very high unlike the refinery areas, where the primary source of income is wage labour. Marginal farmers have a very less percentage (3.92 percent). In both the refinery areas, the percentage of marginal farmers is the highest. In Anrak Refinery area, not a single sample household has agricultural land more than 5 acres. Even small farmers have a very less percentage (6.63 percent). In Jindal Refinery area, this percentage is comparatively higher (21.74 percent). They also have a few medium farmers and a single large farmer.

In both refinery areas, pond and tamarind are the major CPRs (see Table 11). Villages use the pond water for agricultural purpose and also for bathing and washing. Tamarind is used for household consumption and for selling. In Jindal Refinery area the people also collect fuelwood for daily cooking purposes, and they sell a part of it. In Anrak Refinery area, they have canals and they use that water for agricultural purposes. On the other hand, as Jindal Mining is in a forest area, people have access to a number of NTFPs (see Table 11). They use them both for consumption and selling purposes.

In Jindal Refinery area, surface water is the major source of drinking water followed by piped water (see Table 12). Some households use both (14.39 percent). In Anrak Refinery area, tube well is the major source of drinking water followed by surface water and a combination of piped water and tube well. However, in Jindal Mining area, they are dependent on streams. Majority of the households use a combination of piped water and streams, followed by only streams.

6.4 Physical Capital

Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods. The components of infrastructure which are usually essential for sustainable livelihoods are: affordable transport; secure shelter and building; adequate water supply and sanitation; clean, affordable energy; and access to information. Infrastructure such as roads, rails and telecommunications are important for the integration of the remote areas where many of the poor live.

¹² Large Farmers (>10 acres), Medium Farmers (5.1 to 9.9 acres), Small Farmers (2.51 to 5 acres), Marginal Farmers (0.1 to 2.5 acres), Landless (0 acres).

Most of the sample households own a house except a few households in Jindal Refinery area who live in rented houses (see Table 13). In the refinery areas, many households are *pucca* as they were constructed after getting compensation from the companies. In the mining villages, the majority households have semi-*pucca* houses. In all the houses, the number of rooms varies between one and two. Only in the refinery areas, a few households have more than two rooms. Apart from house, the households have also other physical assets (see Table 14). In both the refinery areas, many households have cycle, fan, watch, *almirah* and TV. In Jindal Mining area, all the households have agricultural assets. This percentage is also high in Anrak Refinery area (65.66 percent). However, in Jindal Refinery area, the households do not have agricultural assets.

6.5 Financial Capital

Financial capital denotes the stocks and flows of financial resources that people use to achieve their livelihood objectives. There are two main sources of financial capital. They are available stocks and regular inflows of money. Savings are the preferred type of financial capital. They can be held in several forms like cash, bank deposits or liquid assets such as livestock and jewellery. Financial resources can also be obtained through credit providing institutions. Regular inflows of money include pensions, or other transfers from the state, and remittances.

The mean household income and mean per capita income is very high in the mining areas (see Table 15). As all the households have agricultural land, practicing *podu*, collecting NTFP, and three months of regular wage labour job in the coffee estate increases their income. On the contrary, in the refinery areas, many of them are small farmers and majority of their income comes from wage labour. The mean household size is small in the refinery areas compared to the mining areas. With the help of Herfindahl Index, income diversification is calculated (see Table 16).

It is seen that the households of Jindal Mining area have highly diversified livelihoods, followed by Jindal Refinery and Anrak Refinery. On an average, all the three areas have diversified source of income and not a single occupation plays a monopoly role.

In all the three study areas, majority of monthly expenditure goes to food (65 to 76 percent) followed by health and adult education (see Table 17). However, the difference between expenditure on food and health expenditure is very high. Children education, travel for work, travel for education and recreation have a very small percentage. As the major percentage of household expenditure is going to food, it is important to know whether the households have food security or not (see Table 18).

In Jindal Refinery area, more than half of the households do not have food security (see Table 18). Only 22 percent of households have food security for nine to twelve months. As most of the farmers are marginal, they do not have enough crop produce from their field. Income from wage labour is the remaining important option for them. In Jindal Mining area, most of the

households have food security from nine to twelve months. In Anrak Refinery area, twenty percent of the households do not have food security. Many of them have three to twelve months of food security.

The patterns of livestock holding found in the three areas are shown in Table 19. In the refinery areas, relatively few households own cattle, goats, sheep and poultry. In Anrak Refinery area, nearly 60 percent of the households have buffaloes. In Jindal Refinery area, for all the households, the percentage of livestock ownership is very less. In the mining area, the percentage of livestock holding is high (except buffaloes and sheep). Almost all the households have poultry. In the study areas, especially in refinery areas, as the households are not food secure, they do not have enough livestock, they borrow in order to cope with their situation. Table 20 shows the borrowing situation in the study areas.

As the mean household income is less in the refinery areas, the percentage of households having debt and the percentage of households borrowed over last one year is high in both the places. In the mining area, this percentage is comparatively less. In Jindal Refinery area, the major source of borrowing is from Self Help Groups (SHGs) followed by both bank and SHGs, and only bank. In Anrak Refinery area, the primary source is SHGs, followed by a combination of private lenders and SHGs, and private lenders. However, in the mining area, the majority of the borrowing (75 percent) is from private lenders followed by SHGs (25 percent). In Jindal Refinery area, the majority of the borrowings are for agricultural purpose and household expenditure. In Jindal Mining area, it is purchase of residential land or building. In Anrak area, it is for agricultural purpose followed by purchase of residential land or building, debt repayment, non-farm business, medical purpose and marriage.

7. Conclusion

As the previous section shows, the households in the refinery areas are not rich in any other form of capital except natural capital. Most of the households have agricultural land and their livelihoods revolve around that piece of land. As income from agriculture is not enough, they work as wage labour. In spite of that, they do not have food security for most of the year. They are illiterate and without any skill. Once the refinery starts and these people are displaced what will happen? Definitely all of them will not be absorbed by the company. Cash compensation will go for a year or two. What is the next step? This will result in migration, which is not a permanent solution. Will the company do something to help the people to cope with this situation? These are some unanswered questions.

The situation in Jindal Mining area is different. Here all the households have agricultural land, their primary income is from agriculture and they have food security for a year. This is a forest area and people collect and sell NTFP to add to their household income. They are comparatively rich in all forms of capital. Land acquisition has not started in this area. However, once it starts where will these people go? They will lose their agricultural land and the forest will be destroyed. The streams will get dry. What will be their new source of livelihoods?

Uprooting people in the name of development is going on everywhere. These people are voiceless and they lose everything. Only the concerned company with the help of the government should try their best to help them to cope with this and start a new livelihood, which should be sustainable. Only time will decide if bauxite mining and alumina refinery will bring a sustainable livelihood to the people of Andhra Pradesh.

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Table 1: Key Features of Sample Villages

Villages	Distance from Mines/Refinery (km)	Total Population	Social Composition	Total House holds (No)	Livelihoods	Infrastructure in Village	Electricity	Water
Jindal Refinery								
Cheedipalem	0.1	185	Tribal	55	Cultivation, NTFP sale	Primary school, all weathered road, ICDS	Available	Surface water
Chinakandepalli	1	205	BC ₁ dominated	52	Cultivation, wage labour	Primary school, all weathered road, PDS	Available	Piped water
Addateega	0.5	114	Mixed (tribal dominated)	61	Cultivation, wage labour	Primary school, all weathered road, ICDS	Available	Surface water
Rayavanipalem	1.5	145	Mixed (Tribal dominated)	41	Cultivation wage labour	Primary School, all weathered road, ICDS	Available	Surface water
Ammapalem	3	744	Mixed (tribal dominated)	209	Cultivation, farm labour	Primary school, all weathered road, ICDS, RMP	Available	Surface water
Mettapalem	3.5	77	Tribal	20	Cultivation, wage labour	Primary school, all weathered road, ICDS	Available	Surface water
Jindal Mining								
Chettamgondi	0	68	Tribal	20	<i>Podu</i> cultivation, NTFP sale	Primary school, all weathered road, ICDS	Available	Streams
Barajola	0.5	180	Tribal	40	<i>Podu</i> cultivation, NTFP sale, wage labour	Primary school, all weathered road, ICDS	Available	Streams
Eugovasova	0.2	193	Tribal	42	Cultivation, NTFP collection and sale	Primary school, ICDS	Available	Streams
Anrak Refinery								
Dharmavaram	0.5	157	BC	45	Cultivation, wage labour	Primary school, all weathered road	Available	Tube well
Kottapalem	0	613	BC dominated	150	Cultivation, wage labour	all weathered road, ICDS,PDS	Available	Tube well
G.Venkatapur	0	1300	BC dominated	362	Cultivation, wage labour	UP school, RMP, ICDS,PDS	Available	Tube well

Source: Field Survey (2009)

Notes: ₁- BC stands for Backward Caste.

Table 2: Demographic Features of Sample Villages

Village	Population			Total House holds (No.)	Sample Households (No.)				
	Male	Female	Total		SC ₁	ST	BC	OC	Total
Jindal Refinery									
Cheedipalem	85	100	185	55	1	18	0	0	19
Chinakandepalli	99	106	205	52	0	4	14	0	18
Addateega	59	55	114	61	0	14	3	2	19
Rayavanipalem	75	70	145	41	0	9	3	0	12
Ammapalem	374	370	744	209	8	42	11	1	62
Mettapalem	33	44	77	20	0	8	0	0	8
Jindal Mining									
Chettamgondi	33	35	68	20	0	10	0	0	10
Barajola	87	93	180	40	0	20	0	0	20
Eugovasova	94	99	193	42	0	21	0	0	21
Anrak Refinery									
Dharmavaram	75	82	157	45	0	0	13	0	13
Kottapalem	306	307	613	150	5	0	41	0	46
G.Venkatapuram	642	658	1300	362	2	0	104	1	107

Source: Field Survey (2009)

Notes: 1- SC,ST and OC stands for Scheduled Caste, Scheduled Tribe and Other Caste respectively.

Table 3: Primary Economic Activities of Individuals

Economic Activities	Jindal Refinery Area			Jindal Mining Area			Anrak Refinery Area		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	132 (38.94)	129 (38.05)	261 (76.99)	46 (34.07)	52 (38.52)	97 (71.85)	169 (43.22)	161 (41.18)	330 (84.40)
Farm Labour	11 (3.24)	16 (4.72)	27 (7.96)	15 (11.11)	14 (10.37)	29 (21.48)	0	0	0
Wage Labour	11 (3.24)	10 (2.95)	21 (6.19)	0	0	0	15 (3.84)	18 (4.60)	31 (7.93)
Job	19 (5.60)	0 (0.00)	19 (5.60)	6 (4.44)	3 (2.22)	9 (6.67)	1 (0.26)	2 (0.51)	3 (0.77)
Petty Business	0 (0.00)	2 (0.59)	2 (0.59)	0	0	0	3 (0.77)	3 (0.77)	6 (1.53)
Others	4 (1.18)	5 (1.47)	6 (1.77)	0	0	0	13 (3.32)	6 (1.53)	19 (4.86)
Total	177 (52.21)	162 (47.79)	339 (100.00)	67 (49.63)	68 (50.37)	135 (100.00)	201 (51.41)	190 (48.59)	391 (100.00)

Source: Field Survey (2009)

Table 4: Secondary Economic Activities of Individuals

Economic Activities	Jindal Refinery Area			Jindal Mining Area			Anrak Refinery Area		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	3 (1.17)	2 (0.78)	5 (1.95)	0	0	0	7 (2.11)	5 (1.51)	11 (3.32)
livestock	2 (0.78)	1 (0.39)	3 (1.17)	0	0	0	4 (1.21)	2 (0.60)	6 (1.81)
Wage Labour ₁	99 (38.67)	104 (40.63)	203 (79.30)	6 (4.69)	5 (3.91)	11 (8.59)	155 (46.83)	152 (45.92)	307 (92.75)
Job	7 (2.73)	0 (0.00)	7 (2.73)	6 (4.69)	0	6 (4.69)	2 (0.60)	0	2 (0.60)
Business	3 (1.17)	2 (0.78)	5 (1.95)	0	0	0	0	1 (0.30)	1 (0.30)
NTPF Collection	15 (5.86)	16 (6.25)	31 (12.11)	51 (39.84)	59 (46.09)	120 (93.75)	0	0	0
Others	1 (0.39)	1 (0.39)	2 (0.78)	1 (0.78)	0	1 (0.78)	3 (0.91)	0	3 (0.91)
Total	130 (50.78)	126 (49.22)	256 (100.00)	64 (50.00)	64 (50.00)	128 (100.00)	171 (51.66)	160 (48.34)	331 (100.00)

Source: Field Survey (2009)

Notes: 1- This includes both farm and non-farm labour.

Table 5: Educational Status of Sample Households

Educational Status	Jindal Refinery		Jindal Mining		Anrak Refinery	
	Male	Female	Male	Female	Male	Female
Illiterate	40.23	60.96	38.46	63.64	44.30	56.68
Literate ₁ (non-formal)	0.38	1.20	0.96	1.01	2.93	2.28
Literate below primary	9.20	8.37	17.31	16.16	11.73	7.49
Primary	13.41	8.76	18.27	9.09	8.47	14.33
Middle	18.01	11.55	7.69	6.06	14.01	11.07
Secondary	10.34	7.17	12.5	4.04	13.68	6.51
Graduation and above	8.43	2.39	4.81	0.00	4.89	1.63
Total	100.00	100.00	100.00	100.00	100.00	100.00

Source: Field Survey (2009)

Notes: 1- The working definition of literacy in the Indian census since 1991 is: the total percentage of the population of an area, at a particular time, aged seven years or above, who can read or write with understanding. Here the denominator is the population aged seven years or more. This study considers this definition.

According to the 2001 Census, the literacy rate of Vizianagaram District is 51.82%, with a male literacy rate of 63% and female literacy rate of 40.73%. The literacy rate of Visakhapatnam District is 59.45%, with a male literacy rate of 68.84% and female literacy rate of 49.99%. In case of rural areas only 35.21% and 36.78% of women are literate in both the districts respectively. AP has a total literacy rate of 61.11%, with 70.85% male literates and 51.17% female literates.

Table 6: Health Status of People in Study Areas

Study Areas	Households facing Health Problems	Treatment Received
Jindal Refinery	22.46	100.00
Jindal Mining	84.31	95.35
Anrak Refinery	61.45	100.00

Source: Field Survey (2009)

Table 7: Membership in Formal Institutions

Formal Institutions	Jindal Refinery	Jindal Mining	Anrak Refinery
PDS	95.65	90.20	93.98
DWCRA	62.32	58.82	67.47
Anganwadi	1.45	19.61	0.40
Old Age Pension	19.57	17.65	10.84

Source: Field Survey (2009)

Table 8: Trust in Lending and Borrowing

Study Areas	Trust		Trust in Matters of Lending and Borrowing			
	People can be trusted	Careful in dealing with people	Do trust	Do not trust	Do not know/not sure	No answer
Jindal Refinery	24.26	75.74	61.59	37.68	0.72	0.00

Jindal Mining	58.82	41.18	82.35	3.92	13.73	0.00
Anrak Refinery	86.67	13.33	89.70	9.70	0.61	0.00

Source: Field Survey (2009)

Table 9: Access to Natural Capital

Study Areas	HHs having Agricultural Land	HHs using Forest Land	HHs Practicing <i>Podu</i>	HHs Collecting NTFP
Jindal Refinery	86.96	2.90	0.00	13.77
Jindal Mining	100.00	33.33	94.12	98.03
Anrak Refinery	90.36	0.00	0.00	0.00

Source: Field Survey (2009)

Table 10: Landholding in Sample Villages (% of Households)

Study Area	Large Farmers (%)	Medium Farmers (%)	Small Farmers (%)	Marginal Farmers (%)	Landless (%)	Total HHs
Jindal Refinery	1 (0.72)	15 (10.87)	30 (21.74)	74 (53.62)	18 (13.04)	138 (100.00)
Jindal Mining	16 (33.33)	18 (35.29)	14 (27.45)	2 (3.92)	0 (0.00)	51 (100.00)
Anrak Refinery	0 (0.00)	0 (0.00)	11 (6.63)	139 (83.73)	16 (9.64)	166 (100.00)

Source: Field Survey (2009)

Table 11: Important Common Property Resources (CPRS)

Study Area	Jindal Refinery	Jindal Mining	Anrak Refinery
Major CPRs	Pond, Tamarind, Fuel wood	Pond, Canal, Tamarind, Mango, Jackfruits, Ginger, Broomsticks, Honey, <i>Shikakai</i> , Bamboo, Soapnut, <i>Jeelugu</i> , Cashew,	Pond, Canal, Tamarind

Source: Field Survey (2009)

Table 12: Sources of Drinking Water

Sources	Jindal Refinery	Sources	Jindal Mining	Sources	Anrak Refinery
Surface Water	50.76	Piped Water & Streams	43.14	Tube Well	66.07
Piped Water	21.21	Streams	33.33	Surface Water	15.48
Piped & Surface	14.39	Piped Water & Open Well	9.80	Tube Well & Piped	7.74
Tube Well	5.31	Others	13.78	Piped Water	4.76
Surface & Open Well	5.30	-	-	Tube Well, Open Well & Lake	3.59
Open Well	3.03	-	-	-	-
Total	100.00	-	100.00	-	100.00

Source: Field Survey (2009)

Table 13: Housing Status in Study Areas

Study Areas	HHs owning a House (%)	Type of House			Number of Rooms		
		Thatched	Semi Pucca	Pucca	1	2	> 2
Jindal Refinery	97.83	34.07	4.44	61.48	67.39	13.77	18.12
Jindal Mining	100.00	9.80	84.31	5.88	50.98	47.06	1.96
Anrak Refinery	100.00	16.3	31.3	52.4	37.3	50.6	11.8

Source: Field Survey (2009)

Table 14: Physical Assets

Particulars	Jindal Refinery		Jindal Mining		Anrak Refinery	
	% of HHs	Present Value (Rs.)	% of HHs	Present Value (Rs.)	% of HHs	Present Value (Rs.)
Cycle	36.96	75,850	0.00	0.00	50.00	2,62,206
Fan	44.93	61,950	5.88	2,800	64.46	1,31,400
Watch	19.57	3,900	25.49	5,050	43.98	13,715

<i>Almirah</i>	18.12	59,200	5.88	10,000	24.70	1,28,750
TV	39.86	3,25,100	21.57	94,600	29.52	4,24,600
Motorcycle	7.97	3,11,000	1.96	35,000	6.63	9,88,500
Fridge	0.72	7,000	0.00	0.00	4.82	1,60,000
Agricultural Assets	1.45	6,10,000	100.00	75,970	65.66	96,200

Source: Field Survey (2009)

Table 15: Mean Household Income of Villages

Study Areas	Mean HH Income (Rs.)	Mean per capita Income (Rs.)	Mean HH size (No.)
Jindal Refinery	52214.49	13343.70	3.91
Jindal Mining	61708.63	14176.31	4.35
Anrak Refinery	44860.58	11493.78	3.90

Source: Field Survey (2009)

Table 16: The Herfindahl Index for Income Diversification

Study Areas	Herfindahl Index	Diversification
Jindal Refinery	0.33	0.66
Jindal Mining	0.30	0.69
Anrak Refinery	0.38	0.61

Source: Field Survey

(2009)

Table 17: Household Expenditure (Percentage)

Study Areas	Food	Children Edu.	Adult Edu.	Travel for work	Travel for Edu.	Health	Recreation	Other	Total
Jindal Refinery	76.18	1.91	5.70	0.55	0.99	7.34	2.95	4.38	100.00
Jindal Mining	64.64	1.31	4.74	0.76	0.85	7.11	5.47	15.12	100.00
Anrak Refinery	74.25	2.66	5.01	1.80	1.42	7.55	2.25	5.06	100.00

Source: Field Survey (2009)

Table 18: Food Security₁

Study Area	< 3 Months (%)	3-6 Months	6-9 Months	9-12 Months	>12 (surplus to sell)	No Food Security	Total
Jindal Refinery	8 (5.80)	6 (4.35)	12 (8.70)	30 (21.74)	1 (0.72)	81 (58.70)	138 (100.00)
Jindal Mining	0 (0.00)	1 (2.00)	12 (23.5)	34 (66.7)	4 (7.8)	0 (0.0)	51 (100.00)
Anrak Refinery	6 (3.61)	27 (16.27)	40 (24.10)	45 (27.11)	13 (9.03)	33 (19.88)	166 (100.00)

Source: Field Survey (2009)

Notes: 1- Food security refers to the availability of food and one's access to it. A household is considered food secure when its occupants do not live in hunger and fear of starvation.

Table 19: Ownership Distribution by Households of Selected Livestock

Ownership Range	Study Locations		
	Jindal Refinery	Jindal Mining	Anrak Refinery
Cattle			
0	85.51	33.33	92.77
1-5	13.77	50.98	7.23
More than 5	0.72	15.69	0.00
Buffaloes			
0	84.78	90.20	40.96
1-5	14.49	9.80	59.04
More than 5	0.72	0.00	0.00
Goats			
0	97.83	62.75	96.39
1-5	0.72	35.29	2.41
More than 5	1.45	1.96	1.20
Sheep			
0	98.55	84.31	98.19
1-5	1.45	9.80	0.00
More than 5	0.00	5.88	1.81
Poultry			
0	99.28	9.80	89.16
1-5	0.00	52.94	6.02
More than 5	0.72	35.29	4.82

Source: Field Survey (2009)

Table 20: Sources of Borrowing (Percentage of Households)

Sources	Jindal Refinery	Jindal Mining	Anrak Refinery
Self Help Groups (SHGs)	46.67	25.00	50.49
Bank and SHGs	22.67	0.00	6.80
Private Lenders and SHGs	0.00	0.00	16.50
Bank	16.00	0.00	6.80
Private Lenders	8.00	75.00	8.74
Others	6.66	0.00	10.67
Total	100.00	100.00	100.00
Households having debt	52.17	35.29	58.79
Households Borrowed over the last one year	54.35	15.69	65.06

Source: Field Survey (2009)

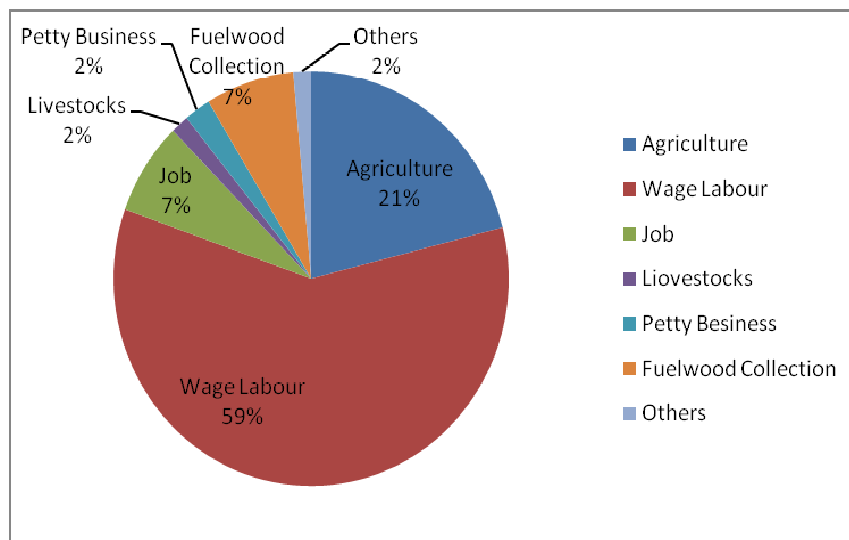


Figure 1
Primary Occupation in Jindal Refinery Area

Source: Field Survey (2009)

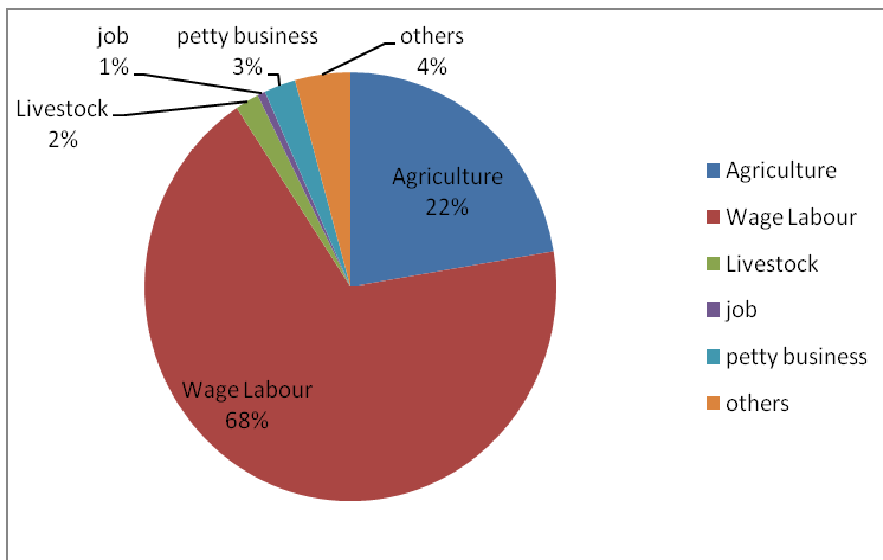


Figure 2
Primary Occupation in Anrak Refinery Area

Source: Field Survey (2009)

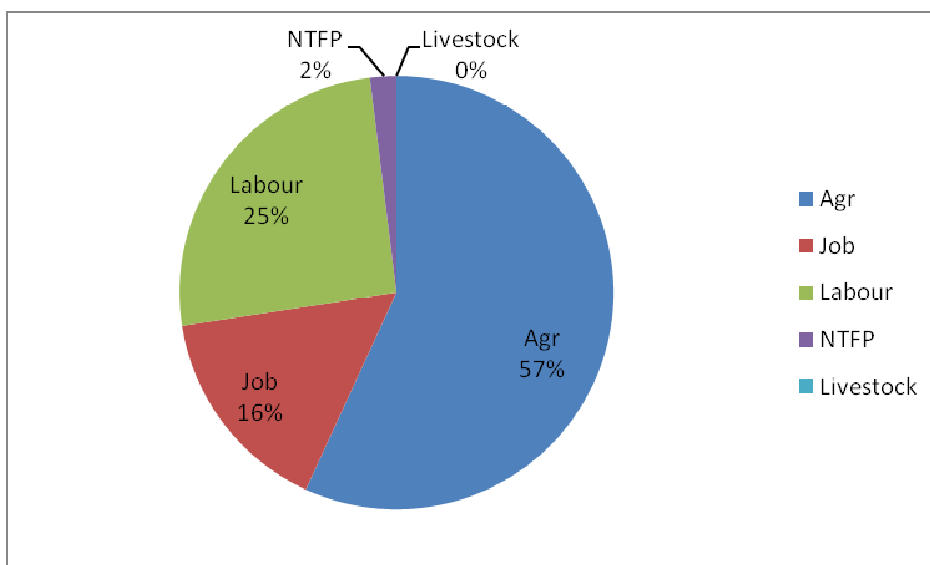


Figure 3
Primary Occupation in Jindal Mining Area

Source: Field Survey (2009)