

Open Access

Socio-Economic Impact of Industrialisation and Mining on the Local Population: A Case Study of NALCO Industrial Area, Koraput

Prasant Kumar Behera*

Department of Economics, Central University of Orissa, Koraput, Odisha, India

Abstract

National Aluminium Company (NALCO), Damanjodi is a govt. own Navaratna Company located in the major bauxite mining district of Odisha. The vast majority of the local population around NALCO are ST's and SC's and most of them are employees of the company. On the other hand, it has a displacement effect on tribal's and also creating water, air and sound pollution. Considering the above, this paper attempts to explain the significance of industrialisation and its impact on the local economic development through a case study in three peripheral villages of NALCO industrial area. In view of the specificity of the topic we relied on primary data. The relevant information have been elicited from 100 residents of three surrounding villages of NALCO namely Kapsiput, Analabadi and Goudaguda through a special questionnaire. The findings showed both positive and negative effects of mining, refinery, aluminium smelter and industrial effluents of NALCO on human and ecological health, pattern of livelihood, income, education and settlement of local population etc and finally it suggest alternatives and improvements to prevent environmental and health degradation and, to actively promote education, health and economic development around industrial sites.

Keywords: Industrialization; Mining; NALCO; Socio-economic impact; Development

Introduction

The industrial development provides better job opportunities to the people and improves the overall infrastructure of the region. On the contrary of these positive impacts, there are some negative impacts also. Industrialisation affects the traditional local economic pattern, creates health hazards by polluting the environment and alters the demographic orientation by inviting skilled labour from outside followed by income inequality among the people. Related to this, there is mining activity which may generate employment but on the other hand causes instability of the ground surface and causes pollution (contamination of soil, groundwater and surface water by chemicals from mining processes).

Koraput is the major bauxite mining district of Odisha and produces 98.82 percent of the state's total production. National Aluminium Company (NALCO), Damanjodi is a govt. own navaratna company and called as the pride of Odisha located in the major bauxite mining district of Odisha (Panchpatmali bauxite deposit of Koraput). The vast majority of the local population around NALCO are ST's and SC's and most of them are employees of the company. On the other hand, it has a displacement effect on tribal's and also creating water, air and sound pollution. Considering the above, this paper attempts to explain the significance of industrialisation and mining and its impact on the local economic development through a case study in three peripheral villages of NALCO industrial area.

Background of the Study

The result shows that affected people were not able to get back their livelihoods as a result of cash compensation policy. As the job allocations were confined to one member per family, reducing others as mere dependents. Other infrastructural facilities promised by NALCO were also not adequately provided. Stanley gives a clear account of the displacement, compensation and rehabilitation in the NALCO Bauxite Mine and Plant at Damanjodi. According to him, 597 families in 254 villages got displaced, out of which 42.55 percent are tribal. Out of the total acquired land of 10,058.76 crores, 69.52 percent was used for the construction of the plant followed by the township. Stanley also examined the compensation package given by NALCO. Out of the displaced families, 74 percent were rehabilitated and 59 percent received jobs in compensation. Compensation per acre of land was Rs.2000 and compensation per tree was Rs.100. However, there was no compensation for the Common Property Resources (CPRs). According to him as there was no scarcity of land in the 80s, NALCO should have adopted a land to land policy.

In the villages located in the vicinity of Aluminium smelter plant discharge hundreds of tons of fluoride in to the environment contaminating the ecosystem around the plant. Metallic shiny aluminum powder dust can be seen deposited everywhere in the villages, i.e., on the roofs, on walls, on trees and vegetation and in wells of drinking water. The villagers had no option, but to resort to the NALCO polluted rivulet for their drinking water requirements by digging shallow puddles near the stream. Gas and fumes emitted from smelters of NALCO are causing damages to hundreds of acres of paddy fields with standing crop getting burnt (dried and shriveled). As a policy, NALCO started allocating 0.5% of its net profit every year for Periphery Development (PD) activities, since 1998-99. Till 2011-12 fiscal, NALCO has allocated Rs.157.56 crore under PD programme, which is 2% of the Company's net profit. But the NALCO, with its huge profit base, could have done much better to these marginalized people. Impact assessment of industrial and mining activities on the socio-economic life of local people is an important tool, help decision-makers, make choices about alternatives and improvements to prevent environmental, health and economics degradation and, to actively promote education, health and economic development around industrial sites. Hence, in the present paper, an effort has been made to assess the impact of mining and industrialisation in three selected

*Corresponding author: Behera PK, Department of Economics, Central University of Orissa, Koraput, Odisha, India, Tel: 06852 288 210; E-mail: prasantkumarbehera5@gmail.com

Received June 25, 2015; Accepted July 10, 2015; Published July 15, 2015

Citation: Behera PK (2015) Socio-Economic Impact of Industrialisation and Mining on the Local Population: A Case Study of NALCO Industrial Area, Koraput. Int J Econ Manag Sci 4: 273. doi:10.4172/21626359.1000273

Copyright: © 2015 Behera PK. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Page 2 of 9

peripheral villages of NALCO industrial area.

Review of literature

Stanley [1] explained how displacement in the NALCO area changed the occupational pattern of the local people and led to the division of society into social groups based on class, caste, tribe and sex. According to the study, mining added to the process of marginalisation. Women's economic status deteriorated as they were forced to stay at home and were no longer considered as an economic asset. Aroca's [2] study shows that mining is the most important sector of the Chilean II region. The main linkages of the mining sectors are with the three sectors with the highest backward and forward linkages; when these linkages are considered along with the level of production from mining, mining emerges as the most important sector. Maconachie [3] investigated the economic, social, cultural, health and environmental impacts of medium and large-scale mining operations on local communities. They compared the developed countries (Canada and Spain) with the developing countries (Latin American countries of Bolivia, Chile, and Peru). They concluded that the relationship between mining operations and local communities is undergoing a largely positive evolution. Bury [4] examined how mining activities are affecting land-tenure patterns and livelihoods in the Cajamarca gold region of Peru. Gold mining activities have contributed to significant shifts in land-tenure patterns, land-tenure institutions, and land use values throughout the region. Livelihoods are being transformed as household access to economic, human, natural, and social resources are rapidly changing in the areas surrounding mining operations.

Kitula [5] reported the socio-economic and environmental impacts of mining in Geita District, Tanzania. These impacts include land degradation, damage to water quality, pollution, and harm to livestock and wildlife biodiversity. Krishnaswamy et al. [6] compared historic data with recent data and found out that mining and associated activities in Kudremukh National Park are the greatest sources of sediment entering the Bhadra River, which now carries considerably more sediment than before the mining activity started damaging the river ecosystem and disrupting downstream water resources. Khatua and Stanley [7] studied the lifestyle and livelihoods of affected communities, land use patterns, impact on natural resources, and climate change in the context of mining. They focused on NALCO and its relationship with resource exploitation.

Objectives

1. To study the impact of NALCO on the socio-economic profile of the peripheral villagers of Kapsiput, Analabadi and Goudaguda.

2. To assess the environmental impacts and challenges of NALCO mining.

Data Sources and Methodology

This study is based on primary data and collected through a specific

questionnaire. The study area has been divided into mining zone, refinery zone, and Ash and Red Mud Pond (ARMP) zone and one village from each zone namely Kapsiput, Analabadi and Goudaguda have been selected. Data from 100 samples were collected in view of the socio-economic effects of NALCO industrialisation and mining. The criteria for selection of villages are more tribal population, pollution, crop loss, approachable, low compensation, health hazards, etc. To assess the positive and negative impacts of mining and industrialisation, Social Impact Assessment (SIA, also called Social Impact Analysis) has been used. It refers to the processes and procedures for understanding and managing the social consequences of development activities Lahiri-Dutt, Nair and Dowling [8].

Socio-economic impact analysis of the households

In this section, household-level analysis of the various issues, namely demographic features, housing particulars, income and expenditure particulars, and access to common property resources, basic infrastructure available in the villages and NALCO's role in the provision of basic facilities are presented. Besides the possible impacts of NALCO industrial and mining activity on the financial capital (household income), physical capital (land, house, livestock, and other physical assets), human capital (health and literacy), social capital (displacement and social network), and natural capital (water, air and noise) have been analysed through the following tables. This analysis is useful to understand the effects of the NALCO Project on the communities. Further it will be clearer to know whether or not the project has made significant contribution to the livelihoods of the people affected by the company.

In terms of the social composition of the households in the mining area, ST households are predominant (97% in the mining zone/Kapsiput village). Similarly, in the refinery area/Analabadi village also ST HHs (51%) are predominant. In the ARMP zone/Goudaguda village, the proportion of HHs in the 'Others' category (67%) [9] is predominant in as maximum people belongs to 'Gouda'. There is a mix average of males and females in all the three villages (Table 1).

The data on the housing particulars show that in the mining zone, all the HHs (100 percent) of Kapsiput village live in semi-pucca houses. It is significant to know that very few HHs in the mining area have pucca houses. In the refinery zone, a large majority (83 percent) of the Analabadi HHs live in semi-pucca houses. The ARMP area is also dominated (88 percent) by semi-pucca houses. On the whole, it may be observed that in all project areas, a large majority live in semi-pucca houses, while very few HHs live either in pucca or thatched houses (Table 2).

Ration cards give poor households a sense of food security, for they ensure a minimum quantum of basic food items at subsidized rates. The data regarding the HHs possessing ration cards reveal that a substantial number of HHs possesses pink cards (74 percent in the Kapsiput village and 72 percent in the Goudaguda village). It is surprising that a

Area	Gender Distribution			Caste Distribution					
	Male	Female	Total	SC	ST	OBC	Others	Total	
Mining (Kapsiput)	51	49	100	3	97	0	0	100	
Refinery (Analabadi)	51	49	100	13	51	14	23	100	
ARMP (Goudaguda)	52	48	100	10	3	20	67	100	

Source: Author's own survey.

 Table 1: Demographic features of sample households (In Percentage).

Type of House	Mining Zone (Kapsiput)	Refinery Zone (Analabadi)	ARMP Zone (Goudaguda)
Thatched	0	1	7
Semi-Pucca	100	83	88
Pucca	0	16	5
Grand Total	100	100	100

Source: Author's own survey.

Table 2: Housing particulars of the sample HHs (In Percentage).

Area	No Card	White	Pink	Anthyodaya	Total
Mining (Kapsiput)	21	5	74	0	100
Refinery (Analabadi)	58	14	26	2	100
ARMP (Goudaguda)	20	5	72	3	100

Source: Author's own survey.

Table 3: Households having ration cards (In Percentage).

Educational Status	Mining Zone (Kapsiput)		Refine (Ana	ery Zone labadi)	ARMP Zone (Goudaguda)	
	Male	Female	Male	Female	Male	Female
Illiterates	38	63	31	50	24	61
Below Primary	10	15	11	20	13	21
Primary	25	9	18	4	33	12
Secondary	24	8	30	23	19	4
Higher Secondary	1	5	9	3	9	2
Graduation and Above	2	0	1	0	2	0
Total	100	100	100	100	100	100

Source: Author's own survey.

Table 4: Educational status of the households (In Percentage).

good number of HHs (21 percent in the Kapsiput village; 58 percent in the Analabadi village; and 20 percent in the Goudaguda village) do not have ration cards at all. Further, only a small proportion of the HHs possesses white cards, which give poor households most subsidized provisions (Table 3).

The data on educational status of the sample households indicate that illiterates are still large in number among both males and females. As compared to males, female illiterates are much more in number in all regions of the bauxite project (63 percent in the mining zone; 50 percent in the refinery zone [10], 61 percent in the ARMP zone). Secondary school literacy is slightly better among males than females (24 percent in the mining zone; 30 percent in the refinery zone; 19 percent in the ARMP zone) [11]. It is further observed that literacy achievement up to higher secondary and graduation level is extremely poor. In the absence of the necessary literacy skills, employment opportunities in the factory are scarce. Hence, most households are engaged in non-skilled, casual, and contract jobs (Table 4).

The various economic activities of the individuals of the sample households reveal that the members are engaged in diverse occupations in all the regions. The analysis of economic activities of the persons reveals that agriculture is still the most predominant activity among the population in all the regions of the NALCO project (in the mining zone, 62 percent of the people have agriculture as their main occupation, followed by contract wage labour under NALCO at 34 percent). However, in the refinery areas, although agriculture is a significant economic occupation for 37 percent of the people, permanent employment with NALCO is considerable as it is the main occupation for 28 percent of the members in the refinery area, followed by NALCO wage/contract employment for 23 percent of the population. This picture is more or less similar also in the ARMP area, except that there is a slight decline in the proportion of permanent employment with NALCO (16 percent) and NALCO contract employment (15 percent), as shown in Table 5.

Possession of livestock gives incremental and additional income to the rural families, which is very common. In the mining zone, nearly half of the households (57%) own livestock and the rest (43%) do not possess any livestock. In the refinery zone a slightly lesser number of households own livestock (31%), while the remaining (69%) do not have any livestock. In the ARMP region, about 55 percent of the households own livestock, while the remaining do not own livestock (Table 6).

The sample households were asked about their food security during a typical year in order to estimate the extent of their food security in a year. Majority of the households (94 percent in the mining zone; 95 percent in the refinery zone; 100 percent in the ARMP zone) expressed that they have food security for 6-12 months in a year. Some households (6 percent in the mining zone and 5 percent in the refinery zone) have some surplus to sell in the market, besides meeting their domestic needs (Table 7).

It is a generally known fact that in rural areas, most of the households spend a large part of their income on food, and very less goes to non-food items in subsistence conditions. As the income of the rural households expands, their expenditure on non-food items-especially on health, education, recreation/entertainment, etc., will also grow. From this perspective it is observed that in our study villages around 60 percent of the expenditure of the sample households across all the regions, except in the refinery zone, is spent on food followed by expenses on recreation. In the refinery zone, 47 percent is spent on food and 33.5 percent on recreation. Sadly, the expenditure on health and education is not substantial across the regions of the company (Table 8).

Qualitative assessment was made in the project area, based on which the health status was categorised as 'excellent', 'good', 'fair', and 'partial'. A large majority of them have expressed that their health status as 'good' (84% in the mining zone; 67% in the refinery zone; 53% in the ARMP zone) followed by 'fair'. Very less number of HHs has expressed their health status as 'partial' (Table 9).

Health problems in the project area include asthma, skin rashes, breathing problems, blood pressure, joint pains, heart problem, gastric problem, diabetes, typhoid, etc. The data on ailments and related treatments of the sample households show that some HHs did face acute ailments for which treatment was taken. The data on source of treatment reveal that government hospitals are the chief source (56 percent) in the mining area. In the refinery zone and ARMP zone, the hospital run by NALCO (42%) was the principal source of treatment (Table 10).

The views of the sample households on the influence of the plant in the project area shows that only a small proportion mentioned that it is beneficial (11 percent in the mining area and 7 percent in the ARMP area). A large majority of them expressed that there are no problems with the plant/mining (75 percent and 82 percent respectively in the mining and refinery zones; and 38 percent in the ARMP zone). There are a few households in the areas of mining and refinery and 52 percent of the ARMP area viewed that the influence of the project as 'partially hazardous' (Table 11). Citation: Behera PK (2015) Socio-Economic Impact of Industrialisation and Mining on the Local Population: A Case Study of NALCO Industrial Area, Koraput. Int J Econ Manag Sci 4: 273. doi:10.4172/21626359.1000273

Page 4 of 9

Occupation	Mining Zone (Kapsiput)			Refinery Zone (Analabadi)			ARMP Zone (Goudaguda)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Agriculture	22	40	62	15	22	37	23	35	58
Wage Labour	1	2	3	3	3	6	4	5	9
NALCO Employee	0	0	0	26	2	28	16	0	16
NALCO Contract Labour	30	4	34	19	4	23	14	1	15
Others	1	0	1	4	2	6	0	2	2
Total	54	46	100	67	33	100	57	43	100

Source: Author's own survey

Table 5: Economic activities of the individuals (In Percentage).

Answer	Mining Zone (Kapsiput)	Refinery Zone (Analabadi)	ARMP Zone (Goudaguda)
Yes	57	31	55
No	43	69	45
Total	100	100	100

Source: Author's own survey

Table 6: Households having livestock in the study area (In Percentage).

Zone	Up to 6 Months	6-12 Months	Surplus to Sell	Total
Mining (Kapsiput)	0	94	6	100
Refinery (Analabadi)	0	95	5	100
ARMP (Goudaguda)	0	100	0	100

Source: Author's own survey

Table 7: Food security (In Percentage).

Expenditures Area	Food	Education	Travel	Health	Recreation	Other	Total
Mining (Kapsiput)	63	3	.5	2	25	2	100
Refinery (Analabadi)	47	9	2	2.5	33.5	6	100
ARMP (Goudaguda)	61	6	1	2	25	5	100

Source: Author's own survey

Table 8: Monthly expenditure of households on food and non-food items.

Zone	Excellent	Good	Fair	Partial	Total
Mining (Kapsiput)	0	84	13	3	100
Refinery (Analabadi)	0	67	29	4	100
ARMP (Goudaguda)	0	53	45	2	100

Source: Author's own survey

Table 9: Household health status (In Percentage).

Illness Type and Hospitals	Chronic	Acute	Others	Govt.	Pvt.	Traditional	NALCO	Govt. and Pvt.
Mining (Kapsiput)	5	87	8	56	15	7	0	22
Refinery (Analabadi)	17	77	6	13	18	4	26	39
ARMP (Goudaguda)	5	76	19	14	12	6	42	26

Source: Author's own survey

Table 10: Nature of illness and source of treatment (In Percentage).

With regard to the improvement in literacy level compared to the pre-mining situation, the majority of the households across all the regions expressed that there is improvement (97 percent and 93 percent respectively in the mining [12] and refinery zones and 90 percent in the ARMP zone), as better schooling infrastructure has been created both by NALCO as well as by the Government of Odisha (Table 12).

Citation: Behera PK (2015) Socio-Economic Impact of Industrialisation and Mining on the Local Population: A Case Study of NALCO Industrial Area, Koraput. Int J Econ Manag Sci 4: 273. doi:10.4172/21626359.1000273

Page 5 of 9

Area	Beneficial	Partially Helpful	No Problems	Partially Hazardous	Total
Mining (Kapsiput)	11	0	75	14	100
Refinery (Analabadi)	0	10	82	8	100
ARMP (Goudaguda)	7	3	38	52	100

Source: Author's own survey.

Table 11: Views on existence of plant and its influence (In Percentage).

Area	Yes	No	Total
Mining (Kapsiput)	97	3	100
Refinery (Analabadi)	93	7	100
ARMP (Goudaguda)	90	10	100

Source: Author's own survey.

Table 12: Improvement in literacy rate after mining (In Percentage).

Area	Agriculture	NALCO Wage/ Contract Salaries	Wage Workers	Others	Total	Average Monthly Income (Rs.)
Mining (Kapsiput)	18.5	73.5	3	5	100	5,949
Refinery (Analabadi)	6	87	2.5	4.5	100	18,235
ARMP (Goudaguda)	8	85	3	4	100	10,162

Source: Author's own survey.

Table 13: Details of household income from various sources (In Percentage).

	New House Received from NALCO			If 'No', Reason for not receiving		
Area	Yes	No	Total	HH Not Affected	Pending	Did Not Lose Home
Mining (Kapsiput)	0	100	100	52	0	48
Refinery (Analabadi)	73	27	100	41	4	55
ARMP (Goudaguda)	40	60	100	22	3	75

Source: Author's own survey.

Table 14: Details of housing provided by the NALCO (In Percentage).

The income details of the sample households from various sources clearly show that NALCO wage/contract salaries (73.5 percent in the mining zone; 87 percent in the refinery zone and 85 percent respectively in the ARMP zone). Income from agriculture, wage works, and other sources is not very significant. The average monthly income of the sample households reveals that those in the refinery zone have highest income at Rs.18,235, followed by ARMP zone (Rs.10,162) and mining zone (Rs.5949) (Table 13).

The data on the houses allotted to the sample households by NALCO clearly show that only in the refinery zone (73 percent) and ARMP zone (40 percent) a significant portion of the households received new houses from NALCO. These houses were constructed by NALCO and are semi-pucca (tinned roof) houses. Regarding the reason why a significant number of households in other regions did not receive the houses, the data shows that they were not affected by the factory in terms of losing home and homestead. The NALCO constructed houses only for those who lost their houses for the factory (Table 14).

The data of various sources of drinking water for the sample

households in the project area indicate that among water sources, well and water supply system except mining zone, followed by hand pump, are the chief sources of water supply. In mining zone stream and pond are the principal sources of water. In terms of impact of pollution due to mining on the water sources, the data reveal that water is much polluted in some zones (cent percent in the mining and zones; 78 percent in the refinery zone; and 55 percent in the ARMP zone) (Table 15).

Creation of basic infrastructural facilities is the key for the displaced population to settle down in the new habitations cohesively without being disintegrated. NALCO and the Government of Odisha have promised to create basic infrastructure for the project affected population when they embarked on commissioning the project. From Tables 16 and 17 it may be interpreted that most of the facilities such as electricity, roads, schools, health centres, drinking water, irrigation facilities, etc., have been provided by either NALCO or the Government of Odisha. During our interactions with the respondents in the field, it was observed that although facilities were provided, access to them is not universal; for e.g., in the vicinity of the mining area, although health centres were established by NALCO, all the villagers were not given health cards, even though they were all indirectly affected by

Citation: Behera PK (2015) Socio-Economic Impact of Industrialisation and Mining on the Local Population: A Case Study of NALCO Industrial Area, Koraput. Int J Econ Manag Sci 4: 273. doi:10.4172/21626359.1000273

Page 6 of 9

		Source				Impact of Pollution		
Area	Well and Water Supply System	Streams and Pond	Hand Pump	Total	Not Polluted	Polluted	Total	
Mining (Kapsiput)	0	71	29	100	0	100	100	
Refinery (Analabadi)	60	22	18	100	22	78	100	
ARMP (Goudaguda)	65	0	35	100	45	55	100	

Source: Author's own survey.

Table 15: Source of drinking water (In Percentage).

Area	Electricity	Providers	Roads	Providers	Education	Providers
Mining (Kapsiput)	Yes	Govt.	Yes	Govt.	Yes	Govt.
Refinery (Analabadi)	Yes	NALCO	Yes	NALCO	Yes	NALCO and Govt.
ARMP (Goudaguda)	Yes	Govt.	Yes	Govt.	Yes	NALCO and Govt.

Source: Author's own survey.

Table 16: Availability of infrastructure facilities-electricity, roads, education in the sample villages.

Area	Health	Providers	Drinking	Providers	Irrigation	Providers
Mining (Kapsiput)	Yes	Govt.	Yes	Govt.	Yes	Govt.
Refinery (Analabadi)	Yes	NALCO and Govt.	Yes	NALCO	Yes	Govt.
ARMP (Goudaguda)	Yes	NALCO and Govt.	Yes	NALCO and Govt.	Yes	Govt.

Source: Author's own survey

Table 17: Availability of infrastructure facilities-health, drinking, irrigation in the sample villages.

Area	Availability of CPRS	Impact on CPRs	Details
Mining (Kapsiput)	Streams, forest, and common lands	Yes	Streams are logged, forest is restricted, and common land totally acquired
Refinery (Analabadi)	Canal, Streams, village forest, and grazing lands and graveyard	Yes	NALCO occupied all the common lands streams and grazing lands for the roads, conveyer belt and R and R colony
ARMP (Goudaguda)	Canal, stream and forest	Yes	Stream and canal are contaminated due to caustic water and septic water

Source: Author's own survey

Table 18: Details of the Common Property Resources (CPRs).

Area	Migration	Type of Work	Place of Migration	Age Group	Caste	Nature of Migration	Terms of migration
Mining (Kapsiput)	No						
Refinery (Analabadi)	No						
ARMP (Goudaguda)	Yes	Construction and other agricultural works	Urban	15-50	Mostly dalits/ STs	Seasonal/ temporary	Daily wage and contracts

Source: Author's own survey

Table 19: Details of out-migration in the sample villages.

the factory. Primary schools and upper primary schools exist in all the villages, while 'Girijan Vidya Vikas Kendra' (run by Integrated Tribal Development Agencies (ITDAs) do not exist in any of the villages - the people have to go to either Koraput or Semiliguda to avail this facility. Further, although hospitals (territory level) do not exist in any of the sample villages. The situation regarding other infrastructure, such as metalled roads and 'all weather roads', is better in the sample villages.

In tribal and hilly habitations, CPRs play an important role in the subsistence of the livelihoods of the poor and the marginalized. In particular, these regions, unlike in the plain areas, access and availability of CPRs to the village communities in terms of basic needs, such as grazing pastures, ponds, streams, and minor forest produce (from forests) plays an important role for their livelihoods. Access to these is usually free and unrestricted, since CPRs are open access resources. However, from Table 18, it may be observed that though various CPRs are available in the sample villages, most of them have been affected by the refinery and ARMP areas. NALCO acquired most of the CPRs such as common lands, streams and grazing land for laying roads, constructing the conveyor belt, and building colonies, particularly in the refinery areas. Due to the factory activities, the streams have been logged and forest access to the community is very much restricted. In some villages, the streams and canals are contaminated due to emissions from the plant.

The households usually migrate out in search of employment when opportunities are not found on a regular basis in their village. Out migration may be seasonal (short term), medium term, or long term. The incidence of out-migration mostly for construction and non-agriculture works was observed only in ARMP zone. The castewise details of the HHs indulging in out-migration reveal that those who migrate out are mostly dalits and STs and the nature of payments received is daily wage (Table 19).

The data on job benefits offered to HHs by NALCO show that only in refinery zone affected persons were given permanent employment. In other villages, no permanent jobs were offered by NALCO. According to NALCO, jobs were offered only to those villages whose lands and homesteads were lost. In the process, partially or indirectly affected villages were not benefitted by NALCO jobs even though they lost employment opportunities in their native villages. The nature of jobs offered was also mostly unskilled - like messengers, peons, helpers, operators, etc. However, since it is government employment, the monthly income (salaries) given to these job holders is substantial (Table 20). Although NALCO did not offer large scale permanent employment, it is offering contract employment in all the villages. However, the number of HHs getting contract employment varies across the sample villages [13]. This may be due to the vicinity factor of these villages to the refinery location. The type of jobs offered, as in the case of permanent employment, are skilled, semi-skilled, and unskilled, and the wages offered are uniform across all the villages ranging between Rs.180-280 per day while their monthly income works out around Rs.5,000 to Rs.6,000 (Table 21). The important village development needs were elicited from the communities and were then ranked accordingly. It can be seen from Table 22 that drinking water was accorded number one rank in Kapsiput and Goudaguda villages, whereas jobs to all displaced families ranked first in Analabadi village. This means that drinking water is still scarce in these villages. Further, it is observed that second rank was given to irrigation (Goudaguda), additional water tank (Analabadi), high school (Kapsiput), etc. Facilities such as health centre, internal roads and roads were accorded third rank by the communities.

The expectations of the affected households from the NALCO are mostly 'job regularization' for those who are on contract (66 percent in the mining zones; 65 percent in the refinery zone; and 46 percent in the ARMP zone), followed by 'job offer for all affected people'. 'Others', include adequate water facility, access to free education, new houses for R and R colony, free electricity, monitoring of drainage, cleanliness of the roads, etc. (Table 23).

Major findings and suggestions

The company has issued health cards to only those affected people, who got permanent employment in the NALCO. This is very unfair; NALCO has to issue permanent and free health cards to all the affected people as well as to the contract/wage employees and their families.

Due to the mining activity the stream water is contaminated; and due to the conveyor belt, the people are also suffering from sound pollution. In the refinery and ARMP areas, the surrounding villages are affected by smoke, caustic water, and fluids. Hence, the water is contaminated, the agriculture fields' fertility is affected, and crop production has been affected. Hence, NALCO has to take some more preventive measures to reduce air, soil, sound and water pollution.

With the emergence of the NALCO mining industry, the occupational profile of the households has changed from predominantly farming to NALCO contract/wage employment. Even though permanent employment in NALCO gives good income in terms of assured salaries, the contract/wage employment and the income accrued from it is far from satisfactory. The data in the previous sections show that NALCO does not take any initiative to involve women in its works. In this context, it is important for NALCO to appoint a special recruitment/welfare cell to clear pending employment issues and other problems, and also monitor contract/wage labour employment.

During 1984-85, NALCO started the Peripheral Development Programme-the area, which is 10 km from the refinery and mining areas, is considered as a peripheral area. Under this programme, NALCO promised to provide all facilities including health, education,

Area	Permanent job in NALCO	If No-state reason given by NALCO	Nature of Job	Type of Job	Monthly Income (Rs)
Mining (Kapsiput)	No	Jobs were offered to those who have lose home and homestead			
Refinery (Analabadi)	Yes		Messengers,helpers, peons, operaters etc.	Semi-skilled and unskilled	5,000-6,000
ARMP (Goudaguda)	No	Jobs were offered to those who have lose home and homestead			

Source: Author's own survey

Table 20: Job benefits offered by NALCO.

Area	Contract Job Offered	Type of Job	Average Wage Rate (Rs)	Monthly Income (Rs)
Mining (Kapsiput)	Yes	Skilled, Semi-skilled and unskilled	180 to 280	5,000-6,000
Refinery (Analabadi)	Yes	Skilled, Semi-skilled and unskilled	180 to 280	5,000-6,000
ARMP (Goudaguda)	Yes	Semi-skilled and unskilled	180 to 280	5,000-6,000

Source: Author's own survey

Table 21: Details of the contract/seasonal employment offered by NALCO.

Area	Villages	Development Needs						
		1	2	3				
Mining	Kapsiput,	Drinking Water	High School	Health Centre				
Refinery	Analabadi	Jobs to all displaced families	Additional water tank	Internal Roads				
ARMP	Goudaguda	Drinking Water	Irrigation	Roads				

Source: Author's own survey

Table 22: List of villages and development needs.

Area	Job for all affected people	Access to Health Card for all	Job Regularisation	Local Priority for all works	Others	Total
Mining (Kapsiput)	19	11	66	0	4	100
Refinery (Analabadi)	20	4	65	5	6	100
ARMP (Goudaguda)	20	21	46	6	7	100

Source: Author's own survey

Table 23: Households' expectations from NALCO (In Percentage).

roads, drinking water, and infrastructure development (school building, etc.); but in practice, NALCO failed to provide the above services satisfactorily to the peripheral area.

Another issue of concern is that NALCO is getting water from the Kerandi River, which is 8 km away from the refinery, through a pipeline. Because of the water pipeline, some of the villages have lost their agriculture lands. In the Goudaguda Village there are two pipelines here adjacent to this village: one is a caustic soda pipeline and another is a septic water pipeline. Due leakages in these pipelines, the caustic mud and septic water flows into the agriculture fields; and as a result, the fertility of the agriculture fields is affected and in turn the crop production decreased.

During the land acquisition, NALCO had promised to provide employment to all the affected persons in the household. However, NALCO later disagreed to provide employment opportunity to every affected person in the household. Such unequal distribution of the employment opportunities created tensions among the households. This issue becomes clear when one observes that only one person from each household was offered job; the others are rendered totally dependent.

Regarding the health status, the data shows that compared to earlier times, health infrastructure has developed, but the quality of the services is very poor in both government and NALCO hospitals. It was a pity that the affected households became addicted to certain social evils such as liquor and drugs (particularly the youth) as a result of cash compensation. It was found that in the Analabadi rehabilitation colony, most of the employees are addicted to alcohol and tobacco chewing, etc., and due to these addictions many people died at an early age.

Another issue of concern in the study area is that the percentage of illiteracy is very much high, It is clear that the people are not aware of the importance of education and its benefits. However, the schools are not functioning properly. Therefore, child education is adversely affected. Sadly the parents do not bother about the school. If NALCO provides free education to the affected villages, then there will be much more benefit to the girl child.

Due to continuous deforestation the livestock are adversely affected, and there has been a decline in their population. NALCO does not provide any skill development training to the affected people for the creation of alternative livelihoods. It was mentioned in the text that technical education such as ITI diplomas and a little higher education is nearly absent in the NALCO areas, thus making the local people unfit ineligible to become skilled workers in the NALCO. In this context, it is important for NALCO to contemplate the imparting of skills/trainings to ready the local people for better opportunities.

Conclusion

The NALCO, with its huge profit base, could have done much better to these marginalized people. The data shows very clearly that the most vulnerable sections, viz. the Scheduled Tribes and Scheduled Castes, who have lost lands, houses, and other assets, were not able to get back their livelihood status as a result of the cash compensation policy. The other infrastructural facilities promised by NALCO were not adequately provided, and there are still loose ends in the whole approach.

Though NALCO has undertaken some initiatives for the affected people in terms of providing jobs, shelter, free education, and free health and infrastructure including community hall, school building, roads and drainages, etc., there is still a feeling among the affected population that problems such as job security to all, shelter, access to free health and education facilities, basic amenities, and other infrastructure facilities, remain. It is time for the NALCO to rethink about the affected people's problems and conduct some welfare activities for them in terms of livelihoods promotion, health and education, skill development activities, infrastructure facilities, etc.

References

- Stanley W (1996) Machkund, Upper Kolab and NALCO Projects in Koraput District, Orissa. Economic and Political Weekly 31: 1533-1538.
- Aroca P (2001) Impacts and development in local economies based on mining: The case of the chilean II region. Resources Policy 27: 119-134.
- Maconachie R, Binns JA (2007) Farming miners or mining farmers? Diamond mining and rural development in post-conflict Sierra Leone. Journal of Rural Studies 23: 367-380.
- Jeffrey B (2005) Mining mountains: neoliberalism, land tenure, livelihoods, and the new Peruvian mining industry in Cajamarca. Environment and Planning 37: 221-239.
- Kitula AGN (2006) The environmental and socio-economic impacts of mining on local livelihoods in Tanzania: A case study of Geita district. Journal of Cleaner Production 14: 405-414.

Page 9 of 9

- Krishnaswamy, Jagdish, Bunyan M, Mehta K, Jain N, et al. (2006) Impact of iron ore mining on suspended sediment response in a tropical catchment in Kudremukh western ghats, India. Forest Ecology and Management 22: 187-198.
- Khatua S, Stanley (2006) Ecological debt: A case study from Orissa India, World Council of Churches, Trioka Press, Quezon City, Philippines.
- Lahiri-Dutt K, Nair A, Dowling S (2008) Social impact assessment: A manual for mining projects, resource management in Asia Pacific programme, Australian National University, Canberra.
- http://www.ordistricts.nic.in/district_home.php?did=krhttp://www.ordistricts.nic. in/district_home.php?did=kr%20%20
- Patra HS, Murthy A (2012) Fact finding report of NALCO (Based on the visit to the Refinery Plant of NALCO, Damanjodi and Panchapattamali Bauxite Mines.
- 11. http://www.freewebs.com/epgorissa/NALCO%20Report[2]-1.pdf
- Reddy MG, Mishra PP, Nagaraju C, Ramana SV (2013) Bauxite mining in Koraput region of Odisha: A socio-economic impact analysis, RULNR Monograph - 15, CESS, Hyderabad, India.
- 13. http://censusindia.gov.in