



EFFECTS OF SMALL SCALE MINING ACTIVITIES ON AGRICULTURAL PRODUCTION IN JEMA'A LOCAL GOVERNMENT AREA OF KADUNA STATE NIGERIA

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ABSTRACT

Small scale mining in the southern part of Kaduna State where agriculture is the main source of livelihood has in the last three decades brought employment and revenue generation but simultaneously impacted negatively on agriculture and biosphere of immediate environment. This study examined the effects of small scale tin and sapphire surface mining on land use for agricultural production in the study area. A multi-stage sampling technique was used to select 120 respondents from the mining communities. Data were obtained using structured questionnaire and guided interview with the community leaders. The results showed that about 75.8% of the respondents were involved in mining activities, and earned about ₦29,863 monthly while the 65% that were involved in farming earned ₦19,197 per month. About 96% opined that mining resulted to decreased crop production, land conflict (93%) and disputes (92%). This study confirms that about 1.8 hectares of farmland per family was lost to mining activities, resulting in destruction of the genetic soil profile, displacement of wildlife and habitat, alteration of land uses, and change in the general topography of the area. Hence a serious threat to food security and requires urgent government intervention to enforce laws controlling mining activities in the area.

Keywords: Mining, land use, land degradation, crop failure, habitat destruction

INTRODUCTION

Mining and agriculture may be linked through their use of land and water resources but the total amount of land used in mining is relatively small compared with agriculture. Despite the small footprint of mining as a fraction of total land use, conflict can arise at the local level where mining is perceived as competing with agriculture and livestock grazing or other traditional land uses (Mitchell, 2006 and Apoyo Consultoria, 2009) Displacement and resettlement of farmers from mining areas has also caused conflict and where comparable land could not be purchased farmers without land title were excluded (ICMM, UNCTAD, and World Bank, 2006). Other mining impacts are social problems such as massive migration of all kinds of people to the area leading to population increase because individuals converge there

to carry out small scale illegal mining, drug abuse, high cost of living, prostitution and other environmental problems like air pollution, ground and surface water pollution and physical assaults (Fusseini, 1996). The communities may enjoy few benefits but bear the greater part of the negative impact of persistent social conflicts (O'neill, 1993), high cost of living and reduction in food production (AduYeboah *et al.*, 2008), escalation of environmentally related diseases (Abugre and Akabzaa, 1997) like tuberculosis, shistosomiasis, skin infections, eye and mental illness as well as drug abuse (Adu-Yeboah *et al.*, 2008), air-borne particulate matter (Hilson, 2001), ground vibration and noise from blasting (Agbeno, 2001), and impact on ground water resources according (Songsore, *et al.*, 1994). The activities of mining companies usually come in direct conflict with other economic

activities undertaken by the people such as forestry, fishing, hunting and agriculture (Poulin and Singing 1993). According to Zo (1997), the coming of surface mining in an area does not only abuse the human rights of the indigenous people but also brings different problems about land use. Physiological disorders are largely the results of unfavorable environment with a negative impact on plant growth even though they are not infections (Guerena, 2006). Graham (1998) stated that one reason why surface or open-pit gold mining is not the best or should be condemned by residents of an area is the destruction of large acreage of land for various purposes associated with mining. The extensive land clearance associated with open-pit mining also results in the destruction of vegetation, cultural sites, biodiversity and some water and also destroys the natural habitat of wild life and the rich-tropical forest with its economic timber species (Adu-Yeboah et al, 2008). In densely populated rural areas such as vast regions of South Asia and Sub-Saharan Africa this competition for inputs directly impacts the main source of livelihood of farming households.

Recent Small scale mining in Jema'a dates back to early 1980s when surface excavations reoccurred on individual lands without proper documentation of the scale of the activities involved. Despite their linkages, the impact of mining on agriculture has not been extensively studied and available reports are conflicting. Most research on this kind of impact has traditionally focused on the broad macroeconomic level while micro impacts generally at community level are largely neglected. The rural nature of the area when coupled with the imposition of the growth of mining, adds support to this type of study particularly in the light of the concerns of agricultural producers for present and future supplies of agricultural labour. The broad objective of the study was to assess the effects of mining on agricultural production in the study area while the specific objectives included the determination of

availability or otherwise of land and labour to mining and agricultural production, and assessment of the effects of mining on the farm livelihood of farm families in the study area

MATERIALS AND METHODS

Jema'a is a Local Government Area (LGA) in Kaduna State, Nigeria with headquarters at Kafanchan which has twenty one districts and the inhabitants are predominantly subsistent farmers. It has an area of 1,661 km² and a population of 278,735 at the 2006 census. The crops produced in large quantities are maize, sorghum, rice, yam, cassava and vegetables. Small scale mining is currently a prominent activity in the area that attracting much attention at both the local and state levels. A multi-staged sampling technique was used to select participants for this study. In the first stage four districts Antang, Gidanwaya, Godogodo and Nisama were purposively selected due to the high level of mining activities taking place there. The second stage involved a random sampling of one community each from the districts. The last stage involved a proportionate random selection of thirty farming families from each community. A total of 120 respondents formed the sample size of the study. The primary data were collected through the use of structured questionnaire administered to famers/miners and guided interview with community leaders was used to obtain some information not captured in questionnaire. To achieve the objectives of this study an ten item statement on the perceived effects of mining activities on agricultural production were presented with five point likert scale with response options: strongly agree =1, agree =2, neutral = 3, disagree = 4, strongly disagree = 5 for all framed items. To group the farmers according to their perception of some effects, the mean for every item was obtained and compared with the agreement index as indicated below. If the resultant mean were <3 then it was mentioned as an agreement to the effects, if the number was =3, then effect was described as neutral, if

the number was 3, it was classed as disagreement to the effects. The scale below was used to determine the level of agreement with asserted effects.

Level of agreement	Agreement Index
Agree	<3
Neutral	3
Disagree	>3

Descriptive statistics were used to describe the data using statistical package for social science (SPSS) 20.

RESULTS AND DISCUSSIONS

Socioeconomic characteristics of farmers/miners

The result of the socioeconomic characteristics showed that the respondents were made up of males (92%) and females (08%) and about 80% were within the economically active age of 18-37 years brackets. Most (66%) of them had at least a secondary school education. The youthful ages of the respondents enabled most of them to be engaged in agriculture (65%) and mining (75%). This presents a situation that suggests a labour surplus whereas it is actually placing high demand on labour. Resultantly, it was observed that average wage rates of ₦963 and ₦2667 per man day for agriculture and mining respectively were generally high.

Effects of mining on agriculture

The effects of mining on agriculture shown in Table 3a reveal that indiscriminate felling of trees was the most important. This is further supported by the increased soil erosion in the area. From these results it was observed that mining had negative effects on agriculture but it created more job opportunities to the youths. The direct, indirect and induced jobs created by mining totaled 45,703 jobs or 2% of employments were reported by the Pricewaterhouse Coopers (2010).

Table 1. Socioeconomics characteristics of farmers/miners

Characteristics	Frequency	%	
Gender	Males	110	91.7
	Females	10	8.3
Age (y)	18-27	31	25.9
	28-37	37	30.8
	38-47	28	23.2
	48-57	19	15.8
	58 and above	5	04.2
Education	Primary	33	27.5
	Secondary	47	39.2
	Tertiary	32	26.7
	Quaranic	3	2.5
	None	5	4.1
Participation in farming/ mining	Farming: Yes	78	65
	No	42	36
	Mining: Yes	91	75.8
	No	29	24.2
Occupation with the highest monthly earnings	Farming	40	33.3
	Mining	67	55.8
	Others	13	10.8

Labour use in mining and agriculture activities

The result of this study showed that small scale mining activities in Jema'a LGA were carried out by 50-75% men while females and children make up less than 1- 25% of the participants Table 2. Labour is more intensive in mining than ion agriculture.

Table 2: distribution of labour use in agriculture compared to mining

Labour Intensity		
Low	Medium	High
36(30)	51(42.5)	33(27.5)
8(6.7)	30(25)	82(68.3)

Another important effect of mining is the lost of hectares of farm land as indicated in Table 3. This study found an average of 1.8ha has been lost from each farm family to mining. Mines may reduce supply of agricultural land through land grabbing, or increase demand for farming inputs such as unskilled labor. Under the identification assumptions discussed above, we interpret this as evidence that mining has reduced

Table 3: Effects of mining on Agriculture

S/No.	Attribute	SA	A	N	DA	SD	Mean Score	Ranking
1	Decrease in crop production	65(54.2)	50(41.7)	4(3.3)	1(0.8)	NIL(0)	1.5	2 nd
2	Land Dispute	42(35)	69(57.5)	0(0)	9(7.5)	NIL(0)	1.8	7 th
3	Land Conflict	51(42.5)	59(49.2)	3(2.5)	7(7.5)	NIL(0)	1.7	5 th
4	Causes Soil Erosion	44(36.7)	67(39.2)	5(4.2)	4(3.3)	NIL(0)	1.7	5 th
5	Land Fragmentation	67(55.8)	47(39.2)	3(2.5)	3(2.5)	NIL(0)	1.5	2 nd
6	Indiscriminate felling of trees	23(19.2)	76(63.3)	13(10.8)	8(6.7)	NIL(0)	1.3	1 st
7	Reduced land availability	46(38.3)	71(59.2)	0(0)	32.5)	0(0)	1.6	4 th
8	Reduces soil fertility	42(35)	35(29.2)	40(33.3)	1(0.8)	2(1.7)	2.8	9 th
9	Causes unemployment	21(17.5)	30(25)	5(4.2)	64(53.3)	0(0)	2.9	10 th
10	Reduces Labour for Agriculture	17(14.2)	74(61.7)	22(18.3)	6(5.0)	1(0.8)	2.0	8 th

Figures in parenthesis are percentages

agricultural productivity. This result is consistent with a study by Mishra and Pujari (2008) on mining on villages in India which found that agricultural productivity decreased due to mining activities, but livelihoods improved as workers shifted to mining. An International Council on Mining & Metals (ICMM) study suggests that mining complements agriculture, and that there are growing synergies between these sectors near Ancash, Peru and BHP Billiton's Antamina mine (Consultora Malthus Desarrollo Humano en Zonas Mineras, 2009). ICMM (2009) also reported that the amount of land under cultivation in communities near Barrick's Veladero, Argentina mine increased between 2001 and 2007 despite mine construction and operation. (Consultora Malthus Desarrollo Humano en Zonas Mineras 2009). This implies that if maize with potential of 5tons/ha were previously produced about 9tons of the maize would have been lost per house hold thus giving a total of 1080 tons lost among the respondents. This indicates a serious threat to food security to the community. This collaborates with BFAP

(2011) report on maize production where an estimated 57523 hectares of cultivated maize fields could potentially were out of production due to mining activities. Using the labour multiplier of 0.01(BFAP, 2011) for maize production, a total of 575 employees would be moved from farms and combined with their families this number could increase to 1783 (assuming 70% are married with 2 dependents).

Table 4. Approx. sizes of farmland lost to mining

S/N	Farm size lost	Frequency	Percent
1	0	30	25
2	1	37	30.8
3	2	23	19.2
4	3	10	8.3
5	4	7	5.8
6	5	2	1.7
7	≥6	11	9.2

In terms of partial productivity measure (yield) mining villages also lagged behind in the study carried by Mishra and Pujari, (2005). Local effects include a gradual decrease in farm production and farm employment as the land is stripped,

Table 5: Mining effects on livelihoods

S/N	Attribute	SA	A	N	DA	SD	Mean Score	Ranking
1	Establishment of Schools	11(9.2)	7(5.8)	2(1.7)	42(35)	58(48.3)	1.2	5 th
2	Road Constructions	2(1.7)	14(11.7)	5(4.2)	55(45.8)	44(36.7)	1.0	2 nd
3	Empowered to pay school fees	68(56.7)	38(31.7)	6(5.0)	6(5.0)	2(1.7)	0.9	1 st
4	Modern houses	12(10)	56(46.7)	22(18.3)	26(21.7)	4(3.3)	1.1	4 th
5	Purchase of modern household items	10(8.3)	50(41.7)	23(19.2)	33(27.5)	4(3.3)	1.0	2 nd

Figures in parenthesis are percentages

associated changes in service industries, and changes in requirements in public services and costs (Walter 1945). Studies on the effects of mining on agricultural hired labour in the North Great Plains between 1970 to 1978 showed that agricultural employment decreased by 23% while wage rate increased by 123% (Adams and Menkhaus, 1980)

Mining effects on livelihood

The farmers earned approximately ₦230375 with the highest earning of two million (₦2000000) while those involved in mining earned ₦358358 the highest earning ten million (₦10000000) per annum. Apart from this, we observe a shift in livelihood from agriculture to mining related work. This social change is an indicator of rural development as was observed in coal field area despite of reduction in agricultural productivity. Such rural development in terms of increased earning through mining activities in the study area has always a trade-off with reduction in agricultural productivity (BFAP,2012) Mining has empowered participants to pay their children school fees, build new houses and purchase modern house hold items (Table 5)

CONCLUSION

Small scale mining in Jema'a LGA has affected agricultural production more negatively than it had done positively. It reduced land available for production and it has drawn much labour force away from agriculture. However it has created more employment opportunities for the youths in

the area. This may be a short time solution to some problems but more likely problem of for instance food security might have been created as well.

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