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COMPLIANCE OF LARGE-SCALE MINING COMPANIES TO REGULATORY FRAMEWORK FOR SUSTAINABLE MINING: A CASE OF BUZWAGI GOLD MINE, KAHAMA DISTRICT, TANZANIA

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Abstract

The mining sector in most developing countries including Tanzania has become an important sector for the economy. However, the sector still faces many challenges to realize its full potential. This paper assesses whether mining companies complied with the regulatory framework of the mining sector based on community perspectives in Kahama District. A total of 215 households were sampled for the study based on Bailey's method using a sampling per cent of 9.3%. Within villages, respondents were selected using simple random sampling technique. Data were collected using questionnaire, focus group discussions, observations and document reviews. While content analysis was used to analyse primary qualitative data, factor analysis was employed to reduce variables which were then analyzed to find extent of compliance of large-scale mining companies with regulatory framework for sustainable mining, and documentary review was used to analyse secondary data. The findings show that consultation for views on issues, publication of anticipated effects and benefits in communities were positively attained by the mining companies. However, mining companies' operations to a large extent have negatively affected the qualities of water, soil, air and use of the available resources within operation areas. The paper concludes that although large mining companies are required in Tanzania, addressing the existing challenges would lead to achieving sustainable mining practices.

Keywords: Mining policy, Regulatory framework, Mining companies, Mining sector, Local communities

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1. INTRODUCTION

The developing regions of Latin America, Asia and Africa are abundantly endowed with mineral resources that are essential for modern production and consumption worldwide (Besada et al., 2015).

Africa, for example, hosts over two-thirds of the world's reserves of platinum which is essential in the electronic industry; Latin America accounts for over half of the global production of copper; and Asia accounts for over half of the world's coal and more than a third of global iron-ore deposits used for energy and steel production (Besada et al., 2015). Africa also accounts for about 12% of the world's oil reserves, 40% of gold, 80% to 90% of the chromium and platinum group of metals, 85% of phosphate reserves, more than half of cobalt and one-third of bauxite (African Development Bank, 2013; UNECA and AU Commission, 2012). African Progress Panel (2013) estimates also show that Africa expanded its metal and minerals extraction by 78% between 2010 and 2017. In this regard, richness in terms of natural resources, the mining and extractive industry constitutes a major share of exports and tax revenues for countries in the Global South and holds enormous potential to finance rapid economic development for poverty reduction.

Despite the expected advantages, harnessing these benefits remains problematic as many countries do not reap the full potential of their resource endowments. Rather than providing for broad-based and sustainable economic growth, resource revenues often end up benefiting only a small segment of local elites and foreign investors partly due to lack of compliance and/or weaknesses in the legal frameworks. While a number of studies (Lange and Kinyondo, 2016; Poncian, 2015; Kahyarara, 2015; Kabote and Niboye, 2013 and Lange, 2008) have been carried out in relation to the general contribution of the sector to the economy; studies on the compliance of mining companies in the context of the legal framework, especially in the perspectives of local communities remain limited. While the reasons for the prevalence of this situation are many and varied, literature suggests that the situation has greatly been attributed to the unsatisfactory state of affairs due to non-compliance of foreign investors with the national regulations, coupled with lack of companies' compliance with stated legal frameworks for effective governance in the host countries. Consequently, failure to manage national resources properly has given rise to the troubling questions on how the continent can be so rich in natural resources, yet so poor in terms of human development (Besada and Martin, 2015; Adjei, 2007).

In Tanzania, despite a remarkable history of its mineral endowments, the country has not succeeded in translating its mineral wealth into overall economic development. Factors such as lack of transparency and accountability for the realization of economic, social and environmental aspects in the sector have allowed for the vast imbalances between the wealth created through resource exploitation and poor human and economic development especially among the local population. Governance related issues such as lack of transparency and accountability pertaining to various payments and royalties made by multinational corporations to governments have for some time not been fairly aligned to host countries'

demands (Maliganya and Bengesi, 2018; Kahyarara, 2015; Mwaikenda and Wambua, 2014; Lugoe, 2012).

However, efforts undertaken by the Tanzania's fifth phase government (2015- 2025) are essentially well placed towards realization of a natural resources growth-based economy. Moreover, since the 1980s, Tanzania was preoccupied with regulations which essentially were meant to attract foreign mining investment. Currently, the country has taken serious steps towards improving accountability in the extractive companies; these efforts have been accelerated with significant amendments of the Mining Act in 2017 and 2018 with a purpose of gaining greater control over and value from Tanzania's natural resources extraction (Markel and Foubert, 2019). Consequently, these efforts have become well aligned with the need for an effectively monitored legal and regulatory framework which is important for the country, which is rich in natural resources.

While some governments have recognized the potential role the mining sector could play towards economic growth and development, there have been numerous resource conflicts between communities, government and private companies (Lugoe, 2012; Collier, 2010; Lange, 2008; Collier, 2007). More importantly, recent new discoveries of natural resources such as natural gas and oil, along with the rise of local and global environmental, economic and human rights activism have led to increased demands for the government to respond to the needs of Tanzanian citizens. The predominance of public discontent against natural resource investors has been witnessed in different areas such as in Mtwara, Mara and Geita, to mention a few. As a consequence, the Tanzanian population in general, not only those directly affected by mining operations, is extremely resentful of large scale mining (Venables, 2016; African Progress Panel, 2013; Lange, 2011; Collier and Hoffler, 2005).

Furthermore, the net impact of the mining sector for Tanzania's development has remained limited. Interestingly, this fact has been recognized by the government and is also manifested through increased public discontent towards the sector's unsatisfactory performance (Lange and Kinyondo, 2016; Poncian, 2015; Kahyarara, 2015; Kabote and Niboye, 2013). While the potential benefits of large mining operations have been widely acknowledged, few studies have attempted to assess how and the extent to which mining companies respond to the regulatory frameworks for local impacts. The questions on whether large mining companies respond accordingly to the existing regulatory framework for sustainable development outcomes remain unanswered. This paper attempts to assess compliance of mining companies to the available regulatory framework for sustainable mining practices in Tanzania.

If this situation is not well addressed, it may lead to a far reaching impact not only at the national level but, also on community's context with proximity to large-scale mining operations. On the basis of the

above, this paper examines large-scale mining (LSM) company's compliance with the Tanzania's regulatory framework using the case of Kahama District. The paper illustrates the mining sector's challenges by assessing the response of mining companies to Tanzania's mining regulatory framework. In addition; the paper suggests some practical recommendations for policy options on how Tanzania could best implement sound and well monitored mining regulations for sustainable development outcomes. In light of this, the paper essentially sheds light on previous and current efforts towards sustainable exploitation of resources in the respective sectors for realization of sustainable development goals as stipulated in the national legal documents. In view of the above, section 3.3 presents the theoretical review. Section 3.4 presents the methodology used for this paper, section 3.5 presents the findings and discussion. Lastly, section 3.6 presents the conclusions and policy recommendations.

2. THEORETICAL REVIEW AND COMPLIANCE PRACTICES TO THE REGULATORY FRAMEWORKS

2.1 The institutional theory

This study is guided by the Institutional Theory that predicts processes by which social and political structures including rules, norms and routines become established as an authoritative guideline for behaviour that governs interactions in society. The theory asserts that authoritative guidelines for behaviour are created and adopted over time (Scott, 1995). This implies that for organizations including mining companies to survive and thrive, they must conform to the rules and belief systems prevailing in the environment. Kraft and Furlong (2017) contend that the institutional theory is a policy making mechanism which emphasizes on the importance of formal and legal aspects of government directives be complied to.

Viewed in the context of this paper, the theory is ideal as most of what happens in the mining sector of any country Tanzania included is regulated, allowed to survive and thrive under the countries' rules, norms and values. Indeed, the policy framework of the mining sector in which these actors operate is defined by both a national legal framework and corporate practices which establish norms pertaining to accountability measures, revenue sharing, and local employment and investment requirements as well as social and environmental safeguards. This theory is useful in that it helps one to assess what is the idea and what is really happening on the ground.

2.2 Compliance practices to the regulatory frameworks in developing countries

Since the 1980s, Peru, Chile and Mexico were pioneers in developing the Latin American Mining Law Model (Noras, 2016). The model emphasizes on reduced discretion in granting rights, greater security

of title and tenure and freedom to transfer rights and use them as collateral and distinction between maintenance obligations and operating obligations. Proven success factors of the model involve an enabling investment environment and modernization of the country's mining sector (Noras, 2016; Kaufmann, 2012; Grindle, 2004). Countries such as Bolivia, Ecuador and Mongolia all possess extensive natural resource bases that can play key roles in their economic growth and poverty reduction. However, development of the mining sector in these countries has suffered from unstable regulatory regimes and a lack of administrative capacity.

In Mozambique, as the size of the extractive industry expanded, the country strengthened the legal frameworks and fiscal regimes for the mining sector by increasing transparency in operations and reporting. For example, in 2009, Mozambique applied to the Extractive Industry Transparency Initiative (EITI) and was declared fully compliant with EITI rules in 2012. Mozambique also endorsed the Global Partnership for Social Accountability in 2012, which aimed at improving development results by supporting enhanced citizen participation and feedback (Clement and Peiris, 2008). As a result, Mozambique became one of the fastest growing economies in Sub-Saharan Africa over a period of 20 years, with an average growth of 7.4%. This strong performance was aided by the determined implementation of credible macro-economic policies and structural reforms, a favourable external environment, donor support and, in recent years, discovery and exploitation of natural resources. In this regard, Mozambique has been performing better on governance with improvement in key areas such as government effectiveness, regulatory quality and the rule of law (Poncian and George, 2015).

Experience from Namibia, as one of the resource driven development economies, differs from the above-mentioned countries' experience in the superiority of its governance structures and institutional arrangements. In addition, Namibia's constitution states that all natural resources belong to the state. Moreover, Namibia's Mineral Prospecting and Mining Act of 1992 entrusts all rights and control over minerals to the state. The Namibian Government has developed its mineral policy to ensure development of the mining industry. Nonetheless, the policy is designed to attract both foreign and local investments in mining (Amupadhi, 2017). In addition, the policy also seeks to provide opportunities for the Namibians to benefit from their country's mineral resources in line with the government's policy of improving socio-economic conditions for all citizens. It is generally said that Namibia's policy document is remarkably clear in its intent and allows for greater state participation in mining production to secure direct benefits from mineral production for Namibians. As a result, the Namibian mining sector performed impressively, recording a GDP share of 12% from mining by the year 2012. Generally, Namibia has been regarded as one of the role models for Sub-Saharan African countries as she has

expanded her economic development by strengthening the mining sector (UNECA and African Union Commission, 2012; UNECA, 2012; Global Witness, 2010).

The above indicates that, when well-managed, the mining sector can create jobs and generate valuable foreign exchange earnings thus, providing governments a financial base for the development of infrastructure and the provision of social services. However, many governments have mismanaged their mining revenues; consequently, they have suffered to varying degrees in relation to the resource curse whereby poor policy choices, coupled with corruption, have exacerbated the cycles of poverty and conflicts. It is increasingly becoming clear that good mining sector governance begins with sound management and transparency along the full spectrum of the chain of environmental governance, from the awarding of contracts to the monitoring of operations, to the collection of taxes, to sound distribution of revenues and finally to the achievement of sustainable development for the economy as a whole (Woodroffe et al., 2017; Simon, 2016; Venables, 2003; Collier and Hoffer, 2002).

In Tanzania, the Mining Act No. 14 of 2010 is the main legislation so far that governs all mining and mineral activities from exploration to extraction (URT, 2013; 2009). The act regulates all activities related to mineral prospecting, processing and payment of royalties to the government by the mining companies. However, apart from other provisions on the regulation of the mining sector such as mineral rights and payment of royalties to the government, the law is silent on the operations of multinational corporations. Although a body of literature indicates that a successful legal and regulatory framework for natural resource extraction, that is, one that effectively translates natural resource wealth into broad-based economic development (Collier and Venables, 2011), a systematic assessment on how mining companies comply with regulatory frameworks of host countries for sustainable mining practices remains unclear.

Furthermore, in the case of Tanzania, the general effects of large mining operations have been widely acknowledged (Makene et al., 2012). However, little evidence exists on how and the extent to which mining companies comply with specific provisions stipulated in the regulatory frameworks. It is on this background that this study was conducted in order to assess the compliance of mining companies to the regulatory framework of the mining sector in Tanzania.

3. METHODOLOGY

3.1 Research design and sampling procedures

The study employed the cross-sectional and case study designs. While a cross-sectional design was applied to collect data at a single point in time, case study design involved a thorough look into the social and environmental fulfilment of the mining company (Buzwagi Gold Mine) to the community.

Furthermore, a review with regard to legislation pertaining to mining and community setting was done in this study.

In this study the sample was selected purposively and randomly. For purposive sampling, three villages were selected based on the researcher's judgment based on information obtained from district officials during the pre-survey phase. Therefore, three villages namely Mwime, Mwendakulima and Chapulwa were desirably selected to provide the required information as these were close and highly affected by mining operations of Buzwagi Gold mine.

The utilization of large sample size was important in this study as it focused on the description of variability for potential factors of legal provisions in the mining sector over the community. Given the nature of this study, Bengesi (2013) and Field (2009) concluded that 300 cases could be adequate for studies that employ the analysis of potential factors; yet, Pallant (2007) suggests a minimum of 150+ cases.

Since this research was largely documentary by which most of work involved a pre- analysis of legal documents that contained information about the interaction of mining operations and societies, then Bailey (1994) method of sampling was adopted. A documentary research method is used when exploring and categorizing physical sources, most commonly written documents, whether in the public or private sphere (Payne and Payne, 2004). According to Bailey (1994), a sample of at least five percent could have an adequate representative of the community in social studies. Given this combination of methods and the requirement for the analysis, this research drew up to nine percent of households in each of the study villages as representative cases for the general findings. However, to omit biasness of households in selected villages, a simple random sampling procedure was further used to obtain a representative household as shown in Table 1 below.

TABLE 1. SAMPLE SIZE DISTRIBUTION BY VILLAGES (N = 215)

Village	Number of households	Sampling percentage	Random Sampled households in village
Mwime	1404	9.3	131
Mwendakulima	686	9.3	64
Chapulwa	214	9.3	20
Total	2304		215

3.2 Methods of data collection and analysis

Systematic review of literature was done to gather information from policies and legislation in Tanzania and best practices elsewhere. Household survey and key informant interviews with technical personnel from government and mining company officials were also conducted to determine the extent at which communities understood issues of compliance and social responsibility in areas where mining

operations were being undertaken. In addition, FGDs were used to gather information on how the Buzwagi gold mining company and the government engaged with local communities, and whether they demonstrated willingness and interest in implementing social inclusion policies in relation to mining operations in the area. In each study village, three (3) FGDs comprising both male and female participants were conducted with 10 members to capture a wide range of perceptions.

With respect to data analysis, exploratory factor analysis was used to reduce the attributes assessed against compliance to dominant factors explaining the phenomena by using principal components. A statistic was tested to assess the adequacy of sample population and correlation of compliance variables following Kaiser-Meyer-Olkin (KMO) and Bartlett's test respectively. Reliability analysis was further performed to draw validity of the research instruments and consistence of variables used to assess compliance of the mining company. Under this stage, a Cronbach's Alpha (α) was used as a measurement value to draw consistence of variables such that, a value greater than 0.7 for dominant factors, was regarded as denoting higher consistence of underlying variables on compliance (Chen and Popovich, 2002). Moreover, literature shows that Cronbach's alpha is a statistic commonly used to measure internal consistency or a set of scale or test items of the measurement instrument (Benges and Le Roux, 2014a; Bengesi and Le Roux, 2014b; Bengesi, 2013; Kaiser, 1970). Therefore, the analysis was given by the following relation:

$$\alpha = N * x / (\bar{u} + (N-1) * x)$$

Where

α = Value for a Cronbach's measure (Cronbach's alpha),

N = the number of variables,

x = the average inter-item covariance among variables, and

\bar{u} = the average variance.

Content analysis was used to analyse data obtained from key informant interviews and FGDs. Data were recorded and transcribed prior to data analysis. Transcription was carefully done in order to maintain the original meaning of the information. Thereafter, data were coded to help identify themes and sub-themes related to extents to which communities understood issues of environmental sustainability, community engagement and social responsibility. On the basis of the objectives, these were compared and contrasted based on each piece of data with the rest in order to find whether there were similarities and differences in how people perceived mining companies' operations in the area. The essence of this approach was to have an understanding of common patterns within human experience. The aim was to interpret the findings in order to capture people's opinions and judgment.

In addition, in order to analyse documents related to the policy environment of the mining sector in Tanzania, content analysis technique was also employed to analyse information captured in various documents. This involved several stages, namely reading the data (literature), coding the data (organizing the material into chunks or segments), identifying themes or categories, comparing different themes to see their similarities and differences and finally making interpretations of different themes.

4. RESULTS AND DISCUSSION

The study on which the paper is based assessed the response of LSM companies to the regulatory framework for improved local livelihoods in Kahama District. The aim was to explore the perceptions of communities living in and around mining areas to ascertain how mining companies comply with the Tanzania's regulatory framework. Using factor analysis, the results are presented in the following sections.

4.1 Sampling adequacy

Compliance score based on pre-stated system of governance in the national legal and regulatory frameworks was drawn using exploratory factor analysis (EFA). Under this, the Kaiser-Meyer-Olkin test resulted in a maximum value of 0.77 indicating an adequate sampling adequacy employed in the Factor analysis that is beyond the cut-off point of 0.5 (Field, 2009; Kaiser, 1970). In addition, there was a significant correction of attributes in the measure of compliance items (p -value < 0.01) given by Bartlett's Test of Sphericity that the null hypothesis for original correlation matrix assumes no correlation exists between test attributes (Field, 2009). In order for factor analysis to work, there must exist in some relationships between test items (Pallant, 2011). Since results yielded a significant value, it shows that that the original correlation matrix of attributes was significantly different from an identity matrix. Therefore, suiting the data collected for factors analysis (Table 2).

TABLE 2. KMO AND BARTLETT'S TEST

Statistical test		Test value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.771
Bartlett's Test of Sphericity	Approx. Chi-Square	2.237E3
	Df	171
	Sig.	0.000

4.2 Initial extraction of compliance attributes

The amount of variance explained by each compliance test attribute was initially used to determine its suitability subject to a reduction process in factor analysis. Attributes that rated below 0.3 were

suppressed for further analysis (Pallant, 2007; Thompson, 2004). Based on this procedure, it was found that all compliance attributes subjected to respondents were suitable and explained from 0.483 to 0.865 of variances (Table 3).

TABLE 3. COMMUNALITIES (N = 215)

Attributes	Initial	Extraction
- The mining company consulted for views on issues	1.000	0.865
- Publicity of anticipated effects and benefits before project	1.000	0.847
- Public meetings were held with the affected parties and communities to explain the effects before mining operations began	1.000	0.817
- Mining operations affect the quality of water in our area	1.000	0.705
- Mining operations affect the quality of air in our area	1.000	0.734
- Mining operations have induced noise and vibration pollution in our area	1.000	0.633
- Mining operations affect the quality of soil in our area	1.000	0.723
- Mining operations affect light in our area	1.000	0.719
- Mining operations interfere with radio waves	1.000	0.583
- The mining company abides by the conservation of plants and animals in surrounding areas	1.000	0.747
- The mining company uses the available natural resources sustainably	1.000	0.804
- Mining activities have resulted in a release of modified organisms	1.000	0.636
- The mining company abides to the conditions to rehabilitate degraded land after operations	1.000	0.788
- The mining company abides by the restoration of the environment for affected living organisms (plants and animals) in and out operation areas	1.000	0.801
- The mining company offers relocation areas to people affected by mining project operations within the mining areas	1.000	0.730
- The mining company offers compensation to people affected by mining project operations within the mining areas	1.000	0.734
- The mining company procures goods and services available in your area	1.000	0.483
- The mining company offers employment to local people from the community	1.000	0.529
- The mining company keeps demarcated mining area to avoid conflict	1.000	0.664

Extraction Method: Principal Component Analysis

4.3 Strength of correlation among compliance attributes

The strength of correlation was deployed through the correlation matrix among attributes. The aim of this analysis was to find strong attributes that are fit into further processes of factors analysis; such that the attribute that rated a correlation of below 0.3 in relation to other attributes was excluded in the factor analysis (Benges, 2013; Field and Miles, 2010). Table 4 below shows the attributes excluded from factor analysis.

TABLE 4. ATTRIBUTES EXCLUDED FROM FACTOR ANALYSIS

Attribute No	Attribute -Total Correlation	Description of Attribute
C1	0.480	The mining company consulted for views on issues
C2	0.413	Before the start of the project, the mining company publicized its anticipated effects and benefits by posting posters in strategic public areas
C3	0.488	Public meetings were held with the affected parties and communities to explain the effects before mining operations began

Attribute No	Attribute -Total Correlation	Description of Attribute
C4	0.445	Mining operations affect the quality of water in our area
C5	0.443	Mining operations affect the quality of air in our area
C6	0.448	Mining operations have induced noise and vibration pollution in our area
C7**	0.266	Mining operations affect the quality of soil in our area
C8**	0.250	Mining operations affect light in our area
C9**	0.234	Mining operations interfere with radio waves
C10**	0.235	Mining company abides to conservation of plants and animals in surrounding areas
C11**	0.273	The mining company uses the available natural resources sustainably
C12**	0.211	Mining activities have resulted into release of modified organisms
C13**	0.093	The mining company abides to the conditions to rehabilitate degraded land after operations
C14**	0.141	The mining company abides to restoration of the environment for affected living organisms (plants and animals) in and out operation areas
C15	0.366	Mining company offers relocation areas to people affected by mining project operations within the mining areas
C16	0.439	Mining company offers compensation to people affected by mining project operations within the mining areas
C17**	0.166	Mining company procures goods and services available in your area
C18	0.351	Mining company offers employment to local people from the community
C19	0.457	Mining company keeps demarcated mining area to avoid conflict

** Indicates attributes excluded after Factor analysis

From the analysis (Table 4 above), nine out of 19 of the screened compliance attributes were excluded for further processes of factor analysis due to weak correlations with other attributes.

4.4 Extraction of factors

Principal component analysis was adopted during the extraction process of factor analysis using variances explained by response attributes; such that, dominant factors were those with Eigen values above 1.0 (Bengesi and Le Roux, 2014b; Pallant, 2011). From the analysis, 3 factors were extracted, and they explained 75.7% of the total variance; factors factor, 1, 2 and 3 explained 38.0%, 22.5% and 15.2% respectively of the variance (Table 5).

TABLE 5. TOTAL VARIANCE FOR COMPLIANCE FACTORS (N = 215)

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.805	38.048	38.048	3.522	35.222	35.222	2.394	23.940	23.940
2	2.250	22.498	60.546	1.911	19.107	54.329	2.250	22.504	46.444
3	1.518	15.184	75.730	1.261	12.611	66.940	2.050	20.496	66.940
4	0.673	6.726	82.455						
5	0.481	4.812	87.267						
6	0.399	3.988	91.254						
7	0.269	2.688	93.942						
8	0.256	2.556	96.498						
9	0.207	2.073	98.571						
10	0.143	1.429	100.000						

4.5 Factor rotation

Rotation of factors was achieved by Oblimin method (Oblique) with Kaiser Normalization in the hypothesis that the factors extracted were related. Respective values of variances, after rotation, are presented in the Rotation Sums of Squared Loadings column (Table 6). Rotation tends to optimize the structure of dominant factors so that they are relatively equalized. Results show that, before rotation, factor 1 had relatively higher variance explained (38 %), but after rotation it decreased to 23.9%. Consequently, factors 2 and 3 had relatively lower variances of 22.5% and 15.2% but, after rotation they normalized to 22.5% and 20.5% respectively.

4.6 Pattern and structure matrices after oblique rotation

Pattern matrix and structure matrix were presented to show whether there is a definitive factor structure; and, approve if there exists any correlation among compliance attributes after oblique rotation (Field and Miles, 2010). Results of the Pattern matrix (Table 6) show a similar pattern of loadings for dominant factors. Also, according to author's existence of double loadings in the structure matrix confirm the presence of correlation among factors.

TABLE 6. PATTERN MATRIX

Attributes	Component		
	1	2	3
- The mining company consulted for views on issues	0.927		
- Before the start of the project, the mining company publicized its anticipated effects and benefits by posting posters in strategic public areas	0.938		
- Public meetings were held with the affected parties and communities to explain the effects before mining operations began	0.878		
- Mining operations affect the quality of water in our area			0.869
- Mining operations affect the quality of air in our area			0.919
- Mining operations have induced noise and vibration pollution in our area			0.821
- Mining company offers relocation areas to people affected by mining project operations within the mining areas		0.899	
- Mining company offers compensation to people affected by mining project operations within the mining areas		0.875	
- Mining company offers employment to local people from the community		0.686	
- Mining company keeps demarcated mining area to avoid conflict		0.729	

Extraction Method: Principal Component Analysis

Rotation Method: Oblimin with Kaiser Normalization

TABLE 7. STRUCTURE MATRIX

Attribute	Component		
	1	2	3
- The mining company consulted for views on issues	0.939		0.346
- Before the start of the project, the mining company publicized its anticipated effects and benefits by posting posters in strategic public areas	0.929		
- Public meetings were held with the affected parties and communities to explain the effects before mining operations began	0.900		0.324
- Mining operations affect the quality of water in our area			0.863
- Mining operations affect the quality of air in our area	0.308		0.924
- Mining operations have induced noise and vibration pollution in our area	0.311		0.837
- Mining company offers relocation areas to people affected by mining project operations within the mining areas		0.871	
- Mining company offers compensation to people affected by mining project operations within the mining areas		0.872	
- Mining company offers employment to local people from the community		0.684	
- Mining company keeps demarcated mining area to avoid conflict	0.446	0.795	

Extraction Method: Principal Component Analysis

Rotation Method: Oblimin with Kaiser Normalization

4.7 Reliability of factors

The reliability output was done to show whether the data used to assess compliance was credible. At this stage Cronbach's alpha was computed and used to study the internal reliability of data. Under normal circumstances, a Cronbach's alpha value above 0.8 represents an acceptable level of internal reliability (Matotola and Bengesi, 2019; Bryman and Bell, 2007; Thompson, 2004). In some cases, a Cronbach's alpha value of 0.70 or greater is desirable (Taber, 2017; Le Roux and Bengesi, 2014; Gorsuch, 1983). Results (Table 8) show that the factors of compliance measured a range of Cronbach's alpha value of .848 to 0.916 that was above 0.8. In that case, it is concluded that the research instrument employed in this study satisfied the measure of compliance perceived upon the mining company in the community.

TABLE 8. STATISTICS FOR RELIABILITY TEST

Factor Statistics	Factors		
	1	2	3
Number of Attributes converged	3	4	3
Variance explained (%)	38.05	22.50	15.18
Mean	3.941	3.535	3.637
Cronbach's alpha	0.916	0.822	0.848
Eigen value	3.805	2.250	1.518

Based on Pattern matrix, the factors (Table 9) were then summarized into collective themes that according to the study were named as Social Accountability (Factor 1), Compensation and Resettlement (Factor 2) and Pollution Control (Factor 3).

TABLE 9. COMPLIANCE FACTORS AND ATTRIBUTES (N = 215)

S/N	Factor	Loading	Attributes
1	Social Accountability	0.927	The mining company consulted for views on issues
		0.938	Before the start of the project, the mining company publicized its anticipated effects and benefits by posting posters in strategic public areas
		0.878	Public meetings were held with the affected parties and communities to explain the effects before mining operations began
2	Compensation and Resettlement	0.899	Mining company offers relocation areas to people affected by mining project operations within the mining areas
		0.875	Mining company offers compensation to people affected by mining project operations within the mining areas
		0.686	Mining company offers employment to local people from the community
		0.729	Mining company keeps demarcated mining area to avoid conflict
3	Pollution Control	0.869	Mining operations affect the quality of water in our area
		0.919	Mining operations affect the quality of air in our area
		0.821	Mining operations have induced noise and vibration pollution in our area

4.8 Compliance on social accountability

Social accountability was one of the components perceived important for compliance by mining companies in the Tanzania's regulatory framework. A localised social accountability is regarded crucial especially if the mining companies are to behave in a socially responsible manner. This entails creating an enabling environment that enables local communities to practise their role in it (Rutenge, 2016; Natural Resource Institute, 2014). In light of this, mining companies were perceived as legally bound to be socially responsible in compliance with various aspects which were affecting the local communities in the study areas. As per the study findings, social accountability was positively explained on the involvement for views in decision making on issues related to the mining company from the community. The case was closely connected to when the company started to address missions as it kept the society aware of the benefits and negative effects anticipated during operations through public meetings and by use of posters in strategic public areas. In addition, a positive realization of social accountability was highly observed in areas with higher likelihood of effects whereby several public meetings were held to explain the effects before mining operations began.

However, positive accountability was more realized at the initial stage of the planning process of the mining company. Nevertheless, in practice the accountability was not realized by the community surrounding the mining company in response to enhancing social accountability. For example, the local authorities were perceived to have less power to act on behalf of the local communities in pursuing their

interests with the mining companies especially on the compensation process. This was pointed out in one of the FGDs as cited below:

“...We are not happy with the village government and District Council. They are not on our side because they side with the investor. This is affecting our rights which are supposed to be protected. The government is supposed to make a balance between the interests of the investor and the villagers. But, this is not happening in our village. That’s why even the compensation we receive is very small” (FGD, Mwendakulima Village, March, 2017).

This scenario has; therefore, put the mining companies to wield lots of power hence, not coming on to complying with legal requirements in response to contributing to the communities’ priority needs. According to Kessy et al. (2017), building positive relationships between investors, government and local communities has been regarded as a fundamental aspect of natural resource management. Evidence shows that poor management of community expectations can contribute to social unrest and even civil conflicts as it has been witnessed in the Democratic Republic of Congo, South Sudan to mention a few (Rutenge, 2016).

4.9 Compliance on compensation and resettlement of local communities

One of the basic gains of mining operations in any area are the compensations and financial flows of revenue from the mining company that in essence act as a catalyst for change and poverty reduction on the nearby communities (Venables, 2016; Kumi, 2014). People who get resettled to make way for large-scale infrastructure development are widely acknowledged as vulnerable to a range of impoverishment risks in the field of development-caused displacement and resettlement. Global policy safeguards and standards aim to protect affected populations by requiring project developers to avoid displacement where possible, mitigate and manage harm through resettlement (Keenan et al., 2016). However, depending on a country’s practice, mining contracts may contain basic obligations that companies must comply with in relation to issues such as resettlement plans, environmental requirements, mine closure, community development and employment of locals.

In Tanzania, the Mining Act No. 14 of 2010 is regarded as the major framework for the management of all mining activities including compensation in the country (URT, 2009). In this Act, relocation and compensation have been aligned with the requirements of the Land Act No. 4 of 1999. This requires provision of fair and prompt compensation before local communities are relocated by a mining project, in accordance with Section 14 (4d) of the Land Act No. 4 of 1999. The aim of the Mining Act is to ensure that involuntary resettlement is avoided and where it cannot be avoided, to ensure that locals in the area secure sufficient investment resources to be able to share in the project (URT, 2009).

According to the findings (Table 8), compensation and resettlement were positively reported in different ways to the attendance of households affected by mining operations on resource compensation. In the meantime of operation, the company tended to offer relocation areas to people affected by mining project operations within the mining areas. Likewise, compensation to people affected by mining project operations was offered by the company. However, in some cases, distortions of household income due to displacement were compensated by offering direct employment to local people of the affected community. In addition, to avoid any conflicts that would impose insecurity, the company made clear demarcations from local settlements. This was one of the key aspects that were considered by the local communities and was fulfilled by the mining company in the study area.

However, despite such recognition of compliance on some of the aspects as indicated by the study's findings, field observations show that there were a lot of complaints about inadequate recognition of traditional land uses, compensation for loss of land resources and access rights which constituted major grievances within communities. Community responses indicated that some of the property items were not compensated for, such as crops. Even those which were compensated for were inadequately considered for in terms of packages provided. The results further show that some of the property items which were to be offered as payment for destructed assets, such as houses and land, were regarded by the mining company as part of the compensation process due to lack of close monitoring by the government, local authorities and lack of awareness among local communities. The above was confirmed during one of the FGDs as shown below:

"... In this village there are many complaints about the way compensation was done. First, it was not participatory in a sense that people were not given clear explanations on how they would be compensated. As a result, people received very little compensation compared to the value of the property they had. For example, some people were supposed to leave their farms and some of them had not yet harvested their crops. Second, the compensation exercise was not done on time. Therefore, this was not fair" (FGD, Mwime Village, April, 2017).

With respect to environmental management and social concerns, the mining policy of Tanzania recognises that LSM could lead to relocation of communities and disruption of their livelihoods. It also recognises that where relocation is inevitable, the government is considered responsible for valuing the land and property items of the affected communities, while the investor would be responsible for payment of compensation, relocation and resettlement (URT, 2009). Despite these guidelines by the policy and thus, the legal framework, there is a need to ensure that there is transparency in compensation procedures, proper valuations of land and other property items, adequate compensation

rates and prompt payment of compensation (Maliganya and Bengesi, 2018; Bengesi, 2014; Bengesi et al., 2009).

According to Kumi (2014), the nature of compensation to which an owner or lawful occupier may be entitled to may include, without limitation to the cost of resettlement, the annual land rent, and work the holder has carried out on the land and improvement. However, many concerns were being raised that the provision failed to consider livelihood restoration of caretakers or squatters in the project area of the land, who are considered to be normally hard hit by the project impacts. According to the World Bank (2009, 2004) people living in squatters are generally among the poorest people, and that resettlement programmes should direct special attention and support to them, to prevent further impoverishment. It is further argued that performance standard stipulates that there should be consultation and informed participation of affected persons and communities in decision-making processes related to resettlement or compensation. In view of the above, it was generally perceived that the impacted people have no capacity to achieve a win-win negotiation outcomes or adequate compensation (IFC, 2012; World Bank, 2004). The World Bank (2009) equally observed that indigenous local people lack the skills to negotiate their interests effectively and as such bear the high cost of the depletion of their natural resources without the benefits of economic development thus, threatening their lives and livelihoods.

4.10 Compliance on pollution control

The regulatory framework governing the mining sector in section 4(1) of the Environmental Management Act No. 20 of 2004, provides for the right to clean, and ensure safe and a healthy environment. Section 7(1) provides further for the principles of environmental management, enhancement, promotion, protection, conservation and management of the environment. Section 106(1) provides for pollution prevention and control (Muza, 2018; Odeku, 2017; URT, 2009). Despite these elaborative provisions in the regulatory framework, the study findings show that the environment was highly interfered with mining activities that led to a failure of control in different ways. According to Table 8 the environment was positively impacted with pollution, highly on deteriorations of quality of water and air. Findings further show that human inaudibility was reported to have been resulting highly from noise and vibrations due to blasting activities.

Further to the above, findings from, key informant interviews and observations also showed that mining activities had far reaching environmental impacts that affected the livelihoods and health of communities due to pollution, especially on water sources. The effects were felt more in the adjacent communities such as Mwendakulima village and those residing some distances from the mine due to noise and air pollution. This was also reported by one of the key informants that:

"I do not oppose the idea of having mining companies in our community. However, my concern is that, there are no measures so far taken to control environmental pollution resulting from mining operations. Every person in this village is aware of noise, dusts and chemicals discharged in the river" (Key informant, Mwendakulima Village, March, 2017).

Similarly, there was more emphasis by another key informant that:

"... The water in this river is polluted. One does not need to be told, just go down to the river you will see the polluted river even the colour of water is showing the situation. If you ask livestock keepers reveal about animal diseases resulting from the use of water from the river they will tell you of the effect. This situation did not exist before the experienced establishment of Buzwagi Gold mining company. Moreover, the area was covered by a natural forest. This is what has been making us unhappy with mining in this village" (Key informant, Mwendakulima Village, March, 2017).

Overall, the findings of this study show that, despite the indications that the mining company was complying on some aspects, community responses were largely not in agreement with this due to the environmental problems which resulted from mining operations that were mostly noted in relation to water, noise, air pollution, waste management and land degradation.

In Mara Region, a study by Bitala et al. (2009) showed that contamination of water from River Tighite and Nyabigena and sediments soil and the environment in the vicinity of North Mara Gold Mine between Kwimanga and Kwinyinyi was due to the presence of chemical contents of heavy metals and cyanide leakages from large-scale mining operations. The study further revealed that the levels of heavy metals and cyanide in water and sediments of River Tighite were found higher than they were in 2002. The levels of Ni rose 260 times, Pb was 168 times and Cr 14 times posing both environmental and health problems to humans and their livestock. Consequently, this was considered beyond the maximum permissible concentrations as a pollution of environment. Likewise, the presence of gaseous materials such as Sulphur Dioxide, Carbon Monoxide, Carbon Dioxide whose concentrations were then compared to standards by WHO, Tanzania and US Environmental Protection Agency (EPA) were found to be higher for people's health and sustainability of the ecosystem in the respective areas. This was an indication of non-compliance as a result of the on-going gold mining in the respective areas.

Likewise, in Zimbabwe, Chaumba's (2017) study which was conducted at Shurugwi Mine operations indicated that contamination of river water and underground water reserves was due to chemicals from mining activities. According to the study, the situation had resulted in the death of livestock and chemical effects to fish and children. However, for all the livestock that died as a result of such poisonous water, the owners were not adequately compensated. In this situation, waste management

was one of the key drivers of negative environmental effects of mining activities in the areas under study. In the same way, Maliganya and Renatus (2017) also came up with similar observations in a study conducted in Geita District in the villages of Nyakabale and Nyamalembo in which the communities had dug open wells near the mining operations while most of the boreholes were downstream.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The study on which this paper is based was conducted in order to assess compliance of large-scale mining companies with Tanzania's national regulatory frameworks in Kahama District, Tanzania. Based on the study findings, it may be argued that large-scale mining companies are important for Tanzania's sustainable economic development. However, exiting challenges, especially on the need to ensure a balance needs to be revisited on the basis of existing interventions. While in some cases mining operations and programmes were complying with some pertinent issues such as compensation and resettlement, social accountability and pollution control more particularly at the beginning phase, failure with compliance was encountered on issues regarding management and control of both aerial and terrestrial pollutants and sustainable environmental management systems of the mining area.

Since this paper was designed to assess whether large scale-mining companies comply with the regulatory framework for sustainable mining practices, the paper makes useful contribution to the institutional theory. The theory puts more emphasis on the need for mining companies to conform to the rules and regulations in relation to the management and use of mineral resources benefits. In this regard, the study provides an avenue for theoretical and practical improvements, as there are still existing gaps between formulated policies, rules and regulations and their actual practice on the ground.

5.2 Recommendations

This paper has explored how mining companies comply with the regulatory framework for sustainable mining practices in Tanzania. Based on the study's findings and conclusions, the following are recommended:

Since it was evident that some strength in the mining operations existed with regard to the policy and legal framework, this paper recommends to the government to conduct a periodic evaluation of the extent to which the mining companies abide by the regulatory framework so as to enhance the monitory system of operations.

In order to reduce negative outcomes, including prolonged decline of natural resources induced by unsustainable conservation practices of animals and plants, it is recommended that the government should put in place a checking system for restructuring all issues pertaining to sustainable environmental management system within the operational mining areas programme.

In addition, given a number of cases reported on failures in response to the mitigation of pollution, this paper recommends further analysis on the extent of impacts with associated levels of pollution raised in the study villages is recommended.

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