

# A Status of Health and Safety to Small Scale Mineworkers in Singida Region, Tanzania

Japhet Ringo<sup>1\*</sup> & Robert Kingu<sup>2</sup>

<sup>1</sup>Department of Geography and Environmental Studies, University of Dodoma, P.O. Box 395, Dodoma, Tanzania.

<sup>2</sup>Williamson Diamond Limited P.O. Box 23, Shinyanga, Tanzania.

DOI: 10.29322/IJSRP.8.3.2018.p7550

<http://dx.doi.org/10.29322/IJSRP.8.3.2018.p7550>

**Abstract-** Mining is viewed as one of the lucrative economic activities which have the potential of contributing to the development of economies. At the same time, health and safety impacts of mining to the mineworkers have been a major concern to governments, the general public, stakeholder organizations and individuals. While the contributions of mining activities to economic development of Tanzania is well acknowledged, others contend that, the gains from the mining sector to the economy is achieved at significant health and safety costs to the mineworkers in the country. The research examines the health and safety impacts of Londoni gold mining to the mineworkers in Manyoni District. In total, 90 small scale gold mineworkers were involved for data collection through questionnaire survey. In addition, 10 key informants from institutions and organizations which hold stake in the mining and related health and safety issues were involved through key informant's interviews. Likewise, 10 people were involved to give information through Focus Group Discussions. Furthermore, field site visits and documentary review were used to get data. The research revealed that, gold mining has resulted in health and safety problems to the mineworkers due to lack of miners protective gears, poor mining technology, and unsafe sexual intercourse. These have led to the loss of lives and properties due to spreading of both pandemic and epidemic diseases, ergonomic problems, and machine accidents. As a recommendation, there is a need for the mining company to make regular pits and equipments checkups, supply adequate and quality person protective equipments, and raising community awareness on health and safety aspects in mining extraction.

**Index Terms-** Gold Mining, Health, Safety.

## I. INTRODUCTION

To achieve rapid economic development, many countries resort to various activities to exploit natural resources. One of such activities is mining. The mineral sector plays a major and important role in the development of nations endowed with minerals (Saxena, *et al.*, 2005; URT, 2014). Currently, mining industry is the rapid developing sector due to increasing mineral extractions following the increasing demand for mineral products in the world (URT, 2003; TSM, 2012). However, until fairly recently, sustainable mineral extraction has been a matter of concern to the public domain as the health and safety of mineworkers and the surrounding communities have been

negatively affected by mining. This has paved a way for discussions on the trade-offs between mining and human health. Discussions have routinely termed that, mineral sector is the most risky and hazardous sector worldwide. The discussions builds that, mineral sector involves many works-related accidents and diseases. This is acknowledged by Jennings (2000) that, about 250 million of accidents occur in a year and at least 335,000 people die as a result of mining accidents and about 160 million cases of mining occupational related diseases are reported.

In developing countries similarly, mineral is the leading sector encompassing risks (Mpedi & Nyenti, 2015). Many accidents and fatalities in mineral sector have been occurred and increasing each year affecting both directly and indirectly mining workers (MOHSW, 2011). Most of the mining activities are inherently risky to workers health and safety as they work at long height, working underground, working in confined spaces and close to falling materials, handling heavy loads manually, handling hazardous substances, noises, dusts, fire and direct exposure to electric cables (TSM, 2012). In practice, the problems of health and safety to mineworkers have increasing notably due to lack of appropriate technology and insufficient health and safety awareness to mineworkers (Lockhart, 2002).

Furthermore, Tanzania is one of the countries in Africa which is highly endowed with minerals resources. In terms of mineral resources the country is ranked fourth after South Africa, Democratic Republic of Congo and Ghana (URT, 2014). Mining activities in the country are categorized into three main types of large scale, medium and small scale operations. The Economic Commission for Africa of 2008 and Ministry of Energy and Minerals, (2011) pointed out that, the small scale mineworkers are found in many areas in the country including Sambaru Londoni in Singida Region.

Moreover, in Tanzania, health and safety of mineworkers are also associated with extreme fragile conditions which expose mineworkers to physical, chemical, psychosocial, and mechanical shortfalls (Dolbear, 2012). These problems exist regardless whether it is a small scale or large scale mining project. As with many small scale mining projects in the country, Londoni gold mine project in Singida Region host many mineworkers (JICL, 2008). Gold extraction in Londoni started way back in 2004 (URT, 2014). However, few contemporary studies have focused on health and safety problems in small scale mining projects in Tanzania including Singida Region. Many studies (Maliganya & Paul, 2016; Lugoe, 2012; Magai &

Márquez-velázquez, 2011) have paid more attention to the socio-economic and governance aspects, yet health and safety impacts are termed to be escalating. These health and safety effects of mining activities have been attracting attention recently, hence, need to be addressed. To unveil this gap, this study assesses (i) causes of health and safety problems to the mineworkers (ii) impacts of health and safety problems to the mineworkers, and (iii) suggest strategies to curtail health and safety problems in the study area.

## II. MATERIALS AND METHODS

### 2.1 The study area

Manyoni District is one of the Districts of Singida Region in Tanzania mainland. The District is located at 05°45'S and 34°50'E. The District is rich in minerals including gold (URT, 1997). The District is bordered to the North by the Ikungi District, to the East by the Dodoma Region, to the South by the Iringa Region, to the Southwest by the Mbeya Region and to the West by the Tabora Region (URT, 2008). Londoni gold mining project is situated at Londoni Village in Manyoni District. The project covers 2 km<sup>2</sup>.

The geology of the area encompassed the Archaean granitoid terrain of Tanzania which is underlain by Archaean greenstone rocks similar to those dominating in the Lake Victoria goldfield. Greenstone rocks in the area include mafic volcanic, micaceous schist, intermediate schists, mafic schist, banded iron formation (BIF), quartzites and gneisses. Sandstone and unsorted colluvialarkose occurs at the immediate northern vicinity of the tenements. All these units are set in an extensive basin like-graben which is locally known as *Mpondi* fault graben exhibiting undulating structural trend with a prominent NW-SE and NE-SW strike.

### 2.2. Data collection and analysis

Data was gathered using questionnaire surveys and complimented with key informants interviews, documentary reviews, field site visits, and focus group discussions.

#### 2.2.1. Questionnaire survey

Researchers administered face to face questionnaires to 90 respondents. The questionnaires consisted both closed and open-ended questions. Open-ended questions gave respondents room to give their own views without being influenced by researchers. On other hand, closed-ended questions gave options to respondents and were good in collecting quantitative data, hence simplified data analysis. Mineworkers and residents resided close to mining sites were interviewed. Respondents were randomly picked from the households which were very close to Londoni gold mine project and to the mineworkers in the mining sites. Questionnaires pre-testing were done to check wording, sequencing and lay out. Issues asked to the respondents involved socio-economic characteristics, existed safety and health problems to the mineworkers, factors led health and safety problems to the mineworkers, measures taken to overcome those problems, and suggestions to overcome the problem.

#### 2.2.2. Key informants interviews

Key informants interviews were held with key people. These people were Londoni Gold Mine Project Director, Ward Development Officer, Ward Executive, Ward Health Officer, Village Head, and the Chairperson of the Village Health Committee. Interviews were guided by checklists which encompassed various topics including health and safety problems faced mineworkers, effects of those problems to the mineworkers, ways used to overcome them, and the way forward to ameliorate the effects.

#### 2.2.3 Documentary review

Review of both published and unpublished reports, conceptual materials, and debates relevant to the topic under study was carried. This helped to triangulate the gathered primary data from other methods of data collection.

#### 2.2.4. Field site visits

Researchers visited mining sites to observe visible issues which were stated in the questionnaires, focus group discussions and interviews. Visits were held at the mining pits, village government office, and to the ward health center. At the same time, researchers were able to meet people who were affected by gold extraction in the study area. Camera was used to take photos. Visits were organized in collaboration with mining officers and local government leaders.

#### 2.2.5. Focus group discussions

Discussions with different people were held. The discussions considered inclusion of various categories including sex (male and females), age (18-35, 36-59, and >60), and occupation (mineworkers, health officers, and development officer). These groups were involved in order to capture views as they perceived issues differently even for the same problem or issue. During the discussions, the researchers were mainly facilitators and this has the advantage that, participants were able to discuss issues freely without fear. Issues discussed were the existed health and safety problems to mineworkers, factors exacerbated those problems, their impacts, measures taken to address those impacts, and the suggestions to overcome those problems.

### 2.3 Data analysis and presentation

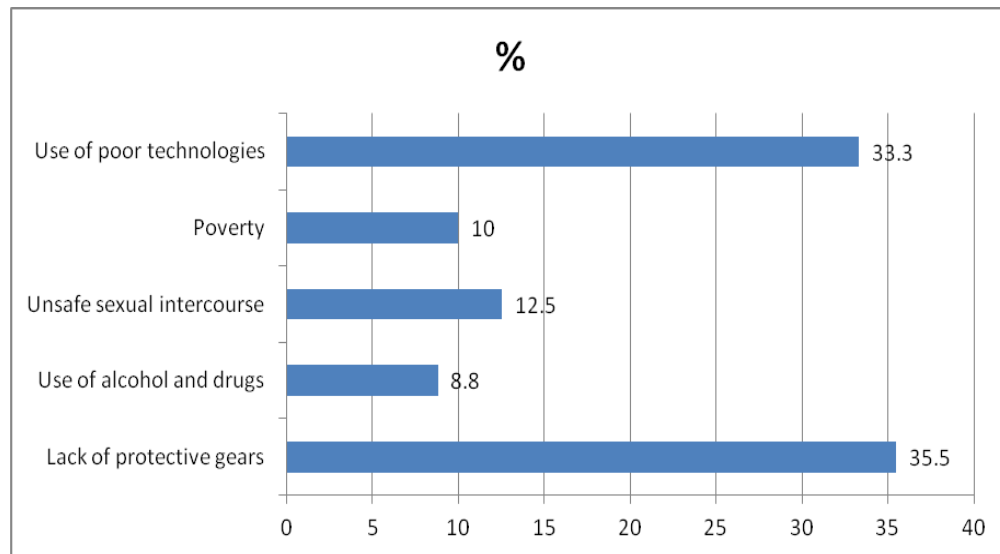
The collected data were mostly qualitative in nature hence necessitated the use of qualitative data analysis including content analysis and memoing. Statistical Package for Social Sciences (version 16.0 for windows) was used in the analysis particularly to the data from household questionnaires. Qualitative data from Key Informants Interviews and Focus Group Discussions were analyzed through themes and content analysis. The analyzed data were presented in chart and graphs.

## III. RESULTS AND DISCUSSIONS

### 3.1 Causes of health and safety problems to mineworkers

Factors exacerbated health and safety problems to mineworkers were assessed. Results unveiled that, lack of protective gears and inappropriate mineral extraction and processing technologies were the main factors. Other factors

were unsafe sexual intercourses and use of alcohol and drugs (Figure 1).



**Figure 1: Causes of health and safety problems to mineworkers.**

Results indicated that, mineworkers were exposed to health and safety risks due to lack of protective gears. Respondents revealed that, these protective gears include earplug for noise, gloves for dusts and chemicals contamination, nose and mouth masks to reduce dust and toxic gases, etc. Discussions with the Ward Health Officer and the Chairperson of the Ward Health Committee added that, mineworkers were faced with skin cuts, grazes or rashes from hazardous chemicals, fire burns, frostbite, sunburn, and wind burn just to mention a few. Intensity of these events was influenced by lack of protective gears. In the light of these arguments, provision of adequate protective gears was decisive to be in place. Africa Newsletter, (2011) holds that, person protective gears shall be adequately provided to the mineworkers to maintain sanitary and reliable condition wherever it is necessary by reason of hazards protection of human, environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

Furthermore, respondents disclosed that, technologies used in gold extraction were rudimentary consequently exacerbated health and safety problems to the mineworkers. Discussions with Manyoni District Development Officer and Londoni Gold Mine Project Director revealed that, most of the tools used by the mineworkers were manual hand equipments which required massive physical strengths of the mineworkers. During site visits, simple tools like hoes, ropes, and hammers, were observed used to extract gold. Further, mineworkers affirmed that, these tools were tiresome and less productive. Jennings, (2012) corroborate that, there has been an increase in serious injuries in to less development countries due to the use of unsophisticated technologies in minerals extraction. Also, reports by Lockhart, (2002) and ILO, (2006) holds that, worldwide in the mineral sector, workers safety and health are compromised by the application of poor technology.



**Figure 2: A miner using a rope to come out of pit in the study area.**

Moreover, results portrayed that, unsafe sexual intercourses in the mining sites have also influenced the spreading of Sexual Transmitted Diseases (STDs). During the course of key informants' interviews, it was aired out by the Ward Health Officer and the Chairperson of the Village Health Committee that, transmission of STD's was fueled by alcoholism in the study area consequently influenced prostitution. In the same way, smoking of marijuana was mentioned to escalate prostitution. Likewise, in the course of focus group discussions (FGD), female participants aired out that, women faced practical challenges and safety issues on a daily basis, such as verbal harassment and physical abuse in the form of rape, which either goes unreported hence influenced spreading of STD's. This concedes the argument presented by one of the female respondent during FGD who remarked:

*"In some instances, women in this area have to perform sexual favors to get income and those who refuse, they fall to be victim of sexual harassment...." "We are mindful that, women are*

exposed to harassment and abuse from males due to patriarchal tendencies”.

These views are echoed by Peterson, (2010) which has emphasized that, unprotected sexual intercourse in mining camps result into unwanted pregnancy and exposure to STD's including HIV/AIDS which affect more women than their counterpart men. Meanwhile, studies on mining communities suggest that, women in mining are more vulnerable to STD's due to socio-economic problems. This has also observed by (Nancarrow, Lockie, & Sharma, 2008; Oxfam, 2009; Sharma, 2010) that, the conditions under which women showed greater vulnerability to STD's encompass economic dependency on their husbands, less pays on jobs they did, and poor quality of family life. These views correspond with URT, (2009) where it was noted that, women face economic and socio-cultural barriers which restrict their effective involvement in mining activities, as a result they receive minimal benefits and fall into health menaces.

Additionally, results revealed that, mineworkers were working in the small scale mining project which was associated with health and safety risks because of poverty. During an interviews with Londoni Gold Mine Project Director and Ward Development Officer, it was unveiled that, most of the mineworkers were migrants to the area who came to extract gold so as to get income. In the same manner, youth respondents put straight during FGD that, they were extracting gold so as to avoid thieving which could associate with their poverty. Further to that, poverty could have influence them to engage in prostitution and alcoholism which could result to diseases and accidents. These

views are in line with the arguments corroborated by Petkova, (2006) and Kyessy, (2011) that, the poor are associated with earning their livelihood in a precarious way in the formal and mostly informal sectors.

Not only poverty, but also the use of alcohol and drugs have caused health and safety risks to the mineworkers. Discussion with Londoni Village Chairman hold that, most of the mineworkers used to mix different alcohols in a single bottle locally called “Mpiko” (cocktail). As a result, this has influenced their brains to act unconditional consequently their thinking capacity reduced hence fall into accidents and unnecessary fights. Subsequently, the study went further to explore if mineworkers were tested if they took drugs and alcohols. Discussions with Londoni Gold Mine Health and Safety Officer revealed that, attempts to control presence of drugs and alcohol through testing were not widespread across the mining sites. In practice, whilst the mining legislation does not specify testing as a control measure, many sites have chosen testing as the primary control measure. WorkSafe Victoria report, (2009) goes to great length to emphasize that, testing of drugs and alcohol to the mineworkers is crucial to ensure good condition of health and safety. Similarly, the report pinpointed out that, testing can be done to the mineworkers' urine, breathing, and saliva.

### 3.2 Impacts of health and safety problems to the mineworkers

Impacts associated with health and safety problems to the mineworkers were explored. Results disclosed that, spreading of pandemic and epidemic diseases, ergonomic problems, and machine accidents were remarkable (Figure 3).

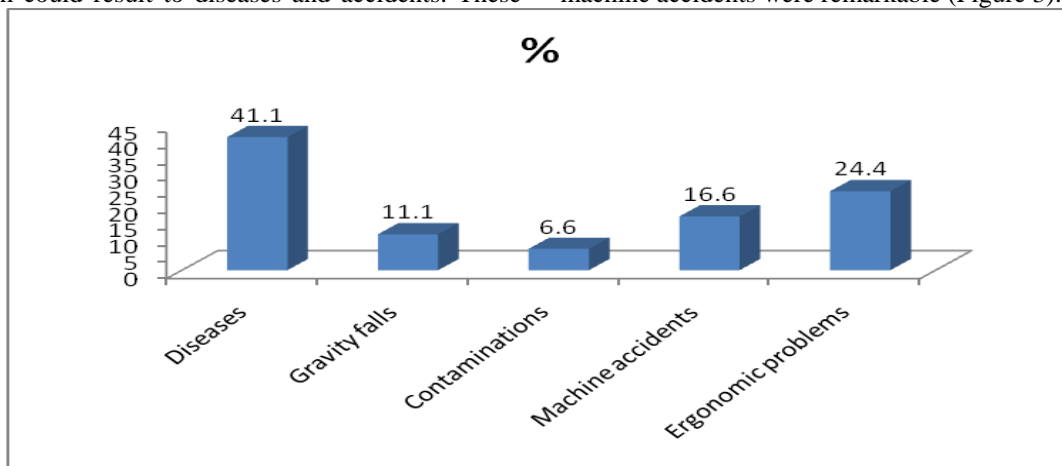


Figure 3: Impacts of health and safety problems

Results depicted the occurrence of epidemic and pandemic diseases in the study area including STD's, diarrhea, flue, and backbone pains. As for diarrhea, Ward Health Officer asserted that, when diarrhea erupt in the mining sites, it affect both mineworkers and the villagers living close to the mining sites. Similarly, STDs including HIV/AIDS have also noted to spread in the Village and in the mining sites because of high population in a small geographical area and moral decay. In addition, results indicated that, mercury have affected mineworkers' health through chemicals contamination. During focus group discussions, it was disclosed that, mineworkers were exposed to mercury through inhaling and direct skin contact. In that case, Londoni Ward Health Officer reported that, mercury have caused

respiratory diseases such as TB, Asthma and frequent flues to mineworkers. Researchers (i.e Jennings, 2000; Carolyn & Mike, 2001) have found that, mineworkers are most vulnerable to health risks due to their exposure to toxic gases, pollutions, chemical contaminations, and moral decay.

Moreover, respondents revealed that, there was a gravity fall of the materials into the mining pits. This was locally called 'shutu'. These materials were sands, debris, and stones which were carried out the pits by the mineworkers. The factors which were aired out to cause falling of these materials were the nature/design of the pits (longevity, cornering and thinness of the pits), careless of the mineworkers, and use of rudimentary technology. Under these circumstances, when these materials

fallen back to the pit, there were two things involved; firstly, either causing injuries to the mineworkers or secondly, causing death. These results concede with the argument by Jennings, (2000) that, among the economic sectors which cause deaths and disabilities is mineral sector. The author further ascertained that, deaths and disabilities in mineral industries have been exacerbated by natural and man-induced factors.

In the same way, results portrayed that, mineworkers were facing ergonomic problems and machine accidents. Respondents posed that, ergonomic risks were felt differently by the mineworkers depending to their ages (years old) and longevity of the time (years) spent in mining extraction. Discussions with gold mineworkers during FGD disclosed that, the use of rudimentary tools, alcohol, and drugs have influenced ergonomics problems and accidents in the mining pits. What is more, results unveiled that, ergonomic shortfalls and machine accidents were diverse at both mineworkers and the surrounding community. In spite of their diversity, it is perhaps not too far from the truth to say that, each of these problems is in some way connected with moral decay (use of alcohol and drugs), technological shortfalls, and physiographic setting of the mining pits. These views are clearly corroborated by a report by Drake, *et al.*, (2001) and Thomas, (2003) that, ergonomic related risks in mining sites included awkward body posture, manual materials handling, repetitive motions, force and vibration due to working in an awkward posture, handling manual materials, and working in a confined space.

#### 4.4. Remedies to safety and health problems to the mineworkers

Mineworkers and key informants suggested various measures to be in place to improve health and safety conditions to the mineworkers. The main measures included regular pits and equipments checkups, supply of adequate and quality person protective equipments, and to raise community awareness on health and safety aspects in mineral extraction (Figure 4).

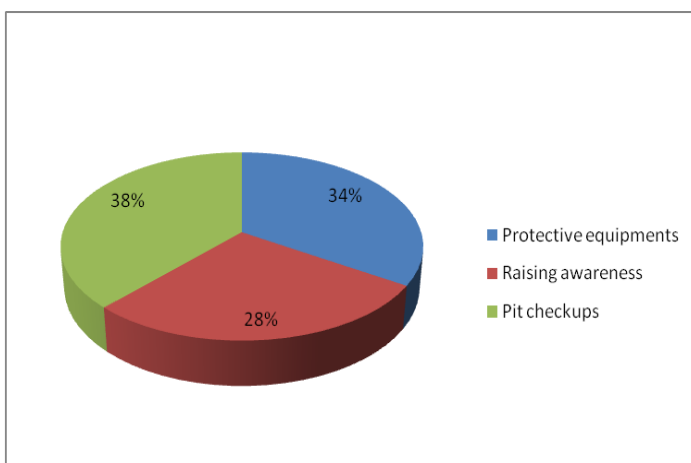


Figure 4: Measures to ameliorate health and safety problems

Frequent pits and equipments checkups are instrumental to reduce the occurrence of health and safety risks. Not only reduction of the occurrence of health and safety risks, but also the reduction of the intensity of health and safety risks in case happened. Mining Health and Standard Officers have to be in

place to check the pits before mineworkers enter in to the pits and when mineworkers come out the pits. Where necessary, when these officers detect any health or safety shortfalls have to prohibit mineworkers to get into the pits. Similarly, the detected health or safety shortfalls have to be addressed timely. Additionally, there should be regular checkups of the quality of water and air quality in and outside the mining pits.

Person protective equipments are crucial to be adequately supplied to the miners. These include masks, gloves, boots, glasses, helmets, radio calls, etc. These instruments are crucial to share timely information when emergency/hazards are occurring or are likely to occur. Similarly, they are decisive to protect mineworkers from the problems of skin, noise, dusts, and chemical contaminations among others. Londoni Gold Mining Company management is the one responsible to ensure that mineworkers are getting adequate and quality protective equipments.

Raising health and safety awareness to the mineworkers and the surrounding community is vital to curb health and safety problems. Awareness has to be strongly provided on the negative repercussions associated with the use of alcohol, drugs, and unsafe sexual intercourse to the mineworkers and their repercussions to the mineworkers' health, mining company facilities, as well as on gold extraction. Awareness in the study area can be provided by the available man power including Health Officers at Ward, Village, and mining company levels.

#### IV. CONCLUSION

Health and safety effects associated with mining activities are noteworthy. The research revealed that, extraction of gold mine in Londoni project has associated with health and safety problems to the mineworkers. Further, the study unveiled complexity of the occupational health and safety risks faced by mineworkers, both from the products they mine, the processes they use, and the other products they encounter as they mine. This have revealed that, in the establishment of development interventions, there are trade-offs in which there are winners and losers. This shows that, there is still a long way to go before mining becomes a healthy work or a healthy development activity to take place in a community. There is also a long way to go before the mining industry, the workers and the community agrees over the real health impacts of the sector and the real responsibility of each of the actors in the sector. In most cases, a way forward is to remedy the situation by balancing gold mining and safety of the workers and the community living around them.

#### REFERENCES

- [1] African Newsletter, (2011). Occupation and health safety. Volume 21.
- [2] Dolbear, B. (2012). Small-Scale Mining and Sustainable Development within the SADC Region. MMSD, London.
- [3] Drake, P., Rojas, M., Reh, C., Mueller, C., Jenkins, F. (2001). "Occupational exposure to airborne mercury during gold mining operations near El Callao, Venezuela." International Archive of Occupational and Environmental Health 74(3): 206-12.
- [4] Carolyn, S. & Mike, A. (2001). Worker and community health impacts related to mining operations internationally. A rapid review of the literature. International institute for environment and development. England.
- [5] JICL Consultant, (2008). Geological Report.

- [6] ILO Convention 187, Promotional Framework for Occupational Safety and Health Convention, (2006).
- [7] Jennings, (2000). Social and Labor Issues in Small-Scale Mines'. Report for discussion at the Tripartite Meeting on Social and Labor Issues in Small-Scale Mines, Geneva.
- [8] Jennings, (2012) Use of self-rescuers in hot and humid mines' Health and Safety Executive.
- [9] Kyessi, A. (2011). Community Participation in Urban Infrastructure Provision Serving Informal Settlements in Dar es Salaam. Spring Research Sries No. 33. Second Edition.
- [10] Lockhart, N. (2002). Advances in Coal Preparation. London: World Energy Council.
- [11] Lugoe, F. (2012). Governance in mining areas in tanzania with special reference to, (ESRF Discussion Paper No. 41).
- [12] Magai, P. S., & Márquez-velázquez, A. (2011). Tanzania's Mining Sector and Its Implications for the Country's Development, (4). Retrieved from [http://www.lai.fuberlin.de/homepages/Alejandro\\_Marquez/Publicationen/w\\_p\\_2011\\_04\\_Magai-Marquez\\_Tanzanias-Mining-Sector.pdf](http://www.lai.fuberlin.de/homepages/Alejandro_Marquez/Publicationen/w_p_2011_04_Magai-Marquez_Tanzanias-Mining-Sector.pdf).
- [13] Maliganya, W., & Paul, R. (2016). The impact of large-scale mining on the livelihoods of adjacent communities: willy maliganya and renatus paul october 2016 Research Report (Vol. 17). Dar es Salaam, Tanzania. Retrieved from [http://www.repoa.or.tz/documents/RR\\_17\\_1.pdf](http://www.repoa.or.tz/documents/RR_17_1.pdf).
- [14] Management of Health and Safety to Worker (2011). Metal mining industry report.
- [15] Nancarrow, H., Lockie & Sharma, S. (2008). Intimate Partner Abuse of Women in the Bowen Basin and Mackay Region of Central Queensland. A report submitted to the Criminology Research Council, Australian Institute of Criminology, Australia. Queensland Centre for Domestic and Family Violence Re-search, Central Queensland University, Australia.
- [16] URT, (2003). Occupational Health and Safety Act of United republic of Tanzania.
- [17] Oxfam Australia (2009). Women, Communities and Mining: The Gender Impacts of Mining and the Role of Gender Impact Assessment. Available at <<http://www.oxfam.org.au/resources/filestore/originals/OAus-MiningAndGender-1209.pdf>>, last accessed 1 December 2016.
- [18] Mpedi, P. & Nyenti, M. (2014). Mineworkers Workshop Employment-Injury-Protection-Eastern-and-Southern-Africa- Harare.
- [19] Peterson, N. (2010). Environmental conflicts and women's vulnerability in Africa.
- [20] Petkova, P. (2002). Mineral-resource abundance and violent political conflict:A critical assessment of the Rentier state model.
- [21] Saxena, N., Singh, G., Pathak, P., Sarkar, B. & Pal, A. (2005). Mining Environment Management Manual, Scientific Publishers, Jodhpur, Rajasthan, India.
- [22] Sharma, S. (2010). The impact of mining on women: lessons from the coal mining Bowen Basin of Queensland, Australia. *Impact assessment and project appraisal*. Australia.
- [23] Thomas, H., Felix, H., & Michael, P. (2003). Artisanal and Small-Scale Mining Challenges and Opportunities. London.
- [24] Toward Sustainable Mining, (2012). Health and safety status report.
- [25] United Nations Economic Commission for Africa, (2008). Promoting mineral clusters: The case of Tanzania.
- [26] United republic of Tanzania (1997) Singida regional profile.
- [27] United Republic of Tanzania (2014). Mineral sector Environmental Impact Assessment Guideline. Ministry of Energy and Minerals. Govt Printer, Dar es Salaam.
- [28] WorkSafe Victoria, (2009). A handbook for the earth resources industry. Management of alcohol and drugs in mines. Edition No. 1

#### AUTHORS

**First Author** – Japhet Ringo, Department of Geography and Environmental Studies, University of Dodoma, P.O. Box 395, Dodoma, Tanzania., Email: [japhetelis@yahoo.com](mailto:japhetelis@yahoo.com)  
**Second Author** – Robert Kingu, Williamson Diamond Limited P.O. Box 23, Shinyanga, Tanzania.