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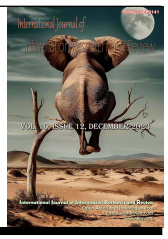

RESEARCH ARTICLE

THE SOCIAL ECONOMIC IMPACTS OF QUARRY STONE MINING IN IGEMBE SOUTH SUB COUNTY MERU COUNTY, KENYA

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ABSTRACT

The objective of the study was to determine social-economic impact of quarry stone mining sites in Igembe South Sub-county Meru County. The hypotheses, that therewas no significant relationship between quarry stone mining and social economic impacts in IgembeSouth Sub County, Meru County communities. The hypothesis was tested at 0.05level of significance. Data was gathered from five communities in Igembe South Sub County. Using PRA methodologies and process, primary data was collected from participant's notes to detect mining social economic impacts in the study area. Data was analyzed using descriptive means, median and mode statistics. The study findings revealed that the social economic impacts of stone quarrying include; development of infrastructure, revenue generation, job creation, Aesthetic value, decreased agriculture activities, social conflicts, unsustainability of natural resource and health related issues such as stress, cough and colds. The local residents and quarry workers demonstrated a lack of awareness, regarding the social economic impacts of stone quarrying on the society. Furthermore,they did not receive any training from the governmentadministration, NGOs. Or other entities regarding extraction of stone quarrying. The research demonstrated that mining has social economic well-being of the residents. In light of the county Government of Meru's efforts at restoration and intervention such as re-afforestation, mining companies and County Government of Meru are reviewing the methods of operation and providing alternatives to the affectedareas. Mining's negative impacts should be reduced by rethinking the management strategy.

INTRODUCTION

Mining is considered one of the essential economic activities contributing to economic progress. The general public, Authorities and individuals have expressed concern about the social economic impacts of mining on affected areas; Mining contributes significantly to social economic development. According to Achempong (2015). Mining is essential foundation for human growth since it generates wealth. The mining industry has made a substantial contribution to the advancement of civilization. The industrial revolution and infrastructure advanced in today's information has made nation depends on iron and bronze to support the advancement. Mining is critical for the social-economic development of nation. Chen *et al*, (2022). Mining countries have drawn their attention to sustainable mining practices. Sustainable mining practices emphasis on mining that has negative social-economic impacts. For instances, Mourinha, (2022) notes that in America, Asia and Europe mining sector emphasis has been drawn towards maximizing social-economic impacts.

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Developed countries have passed government regulations on sustainable mining practices addressingareas with waste generated during mining, Mine closure planning, managing social- economic impacts of mining, and land use planning (Kimilima , 2022). Meru County is located on the wind ward slope of Mt. Kenya, rain fed agriculture is vital to the people's survival. individuals without work are increasing turning to alternative method of income such as quarry stone mining, because their cash crops such as Khat, are not being purchased in significant amount, and their revenue from tea and coffee is how (Wanjiku, 2015) Due to the growth of cities quarry stone are becoming increasingly attractive, Quarry stone has benefited towns such as Maua, Kimongoro and Kangeta. Mining operations notably sand mining in Meru National Park have led in the creation of similar communities (Makhura, 2021). Quarry stone mining have risenrapidly as a result of establishment of the county government and the rapid expansion of towns.Human actions such as extracting natural resources and displacing workers, as described by Macfortone(2016) alter the nature of terrain. Despite recent government regulations aimed at curbing the negative impacts of mining, extant studies report glaring in effigies in mining that could impact human activities. Extant studies have not investigated the social economic impacts of quarry stone

mining sites and advantages to communities from land mining regions, therefore, did not establish the study outcome. The study was untended to fill the gaps. The objective of the study was to determine the impacts of quarry stone mining on Meru County settlement regarding social –economic factors. The hypothesis was been evaluated at 0.05 level of significance in the study. Ho_1-quarry stone mining as no significant relationship between quarry stone mining and social economic activities in Igembe South Sub County, Meru County Kenya. The research findings from this study revealed that the social economic impacts of quarry stone mining includes development of infrastructure , revenue generation , job creation, aesthetic value, decreased agricultural activities, social conflicts, unsuitability of natural resources and health related issues such as stress, cough and cold, The study will also be necessary to ministry of mining , blue economy and ,maritime affairs , who are policy makers in understanding the role played by quarry stone mining on the social economic human activities.

LITERATURE REVIEW

Gavin, (2021) investigated the social economic impacts of small scale gold mining in Accra, Ghana whereas John (2019) investigated mining development and its consequences for local community. Mining, according to the old university of queen land press in St. Lucia, is the primary source of foreign currency, creates job, revenue generation, and generate cash for the local economy in form of salaries, wages, and other payments to workers and contractors. The social economic impact of quarrying has variety of consequences. The mining sector is significant source of government revenue and foreign direct investment in most countries. According to Maldely (2019), the mining industry is spreading into places preciously restricted for legal, political and economic reasons due to scarcity of resources. Mining companies have assisted developing countries by providing jobs, paying taxes building infrastructure, increasing efficiency, producing foreign currency, and transferring technology. According to Abdurashidorioh (2020) they have been linked to human and civil rights violations such as wages inequalities and bad working conditions, as well as pollution, accidents, health and safety issues, forced displacement. According to Ahmed (2017), social economic repercussions are the hardest to foresee and manage in mining. It's normal to want to maximize mining benefits. Mining employs 56% of South Africa's mine workers, BENDI (2019). In mining locations, the most prevalent benefits of land mining sites include creating direct and indirect jobs contributing to community development, Akabzaa&Darimani (2021). Anyemedes (1992) and Darimani (1998) show how mining can considerably influence community around there or within mining sites. According to Field man etal (2020), participation is a cooperative process by which residents' achieve common goals, make collective decision and develop places, participation means negotiation over an externally established project plan. Stakeholders, investors and the impacted community participated in quarrying. Due to the rising demand for quarry stones, necessary Authorities did not supervise land excavation and miners exploited natural resources and without environmental regard, mine collapsed, injuring miner. Stone quarry firms must establish new strategies to solve challenges of social economic impacts.

METHODOLOGY

The location of the study was IgembeSouth Sub County which is between latitude 0.2664^0N to 0.379534^0s and longitude 37.953^oE to 38.001^0E. A number of questionaries' were provided to collect the data on social economic impact of mining activities. There were five (5) communities or villages, where questionnaire were administered and this survey were scattered throughout the sub county and not concentrated in single location. Self-administered respondent questionnaires were constructed using the acquired information on social economic impact of mining sites. The data was analyzed using the description of mean, median and mode where applicable. The results were presented in both qualitative and quantitative term. Quarry stone mine are found in Maua ward along Maua Meru route. The distribution of the sampled number of mining sites is shown in Table 1.

Table 1. Communities and the number of quarry stone mining sites in the area

Area	Community	Number of mining sites
1	Kanuni	70
2	Akachiu	70
3	Kiegoi	60
4	Athiru	50
5	Maua	50
	Total	300

Source: Researcher's field sample 2021

RESULTS AND DISCUSSION

The content of questionnaire was tested for variety by comparing the total number of questionnaires provided to the number of questionnaires returned since they were used to collect data on social economic impacts of mining sites. This was achieved using the CVI (Content Validity Index) test as follows:-

$$CVI = \frac{\text{Number of items declared valid}}{\text{Total number of items}} = \frac{295}{300} = 0.97$$

According to Peil& Lincoln (2011), the average index should be 0.7 and above. As a result the instrument was accepted because it content validity index was an average of 0.97. Several aspects of social economic impacts of the quarry stone mining identified as in figure 1 Positive impacts

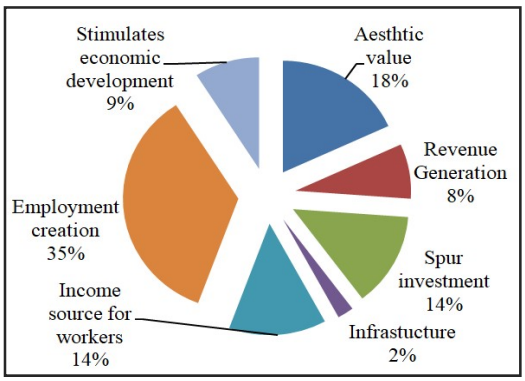

Figure 1. Positive impacts of quarry stone mining on thecommunity

Figure 1: shows the notable significance effect of local mining activity (35%) was employment creation as it absorbs most youth and middle aged men who are not gainfully employed. By engaging workers time it is a second employer of many people in the sub county. Self-employment and wage employment were common types of engagement for workers in the quarry site. Communities residing near quarry sites discovered that quarry stone mining gave full–time occupation. These individuals were able to labour and make money through stone quarrying activities, which they used to meet a variety of materials requirements and acquire assets. These findings back with MEPED'S findings from 2003, which imply that artisanal and stone mining activity in sub-Saharan Africa, employ a large number of people. Direct income accomplished for 24% as a key impacts for the quarrying activities in Igembe South Sub-county. The major quarry activities that generated income for the worker included stripping of the over burden materials, crushing stones, blasting, loading of stones and selling food and tea to the workers. Therefore income generated from the activities formed part of personal savings which they usedin satisfying their materials needs. Some of this money was used to buy cattle, retail business, providing individuals with addition income and receiving their vulnerability to economic shocks, within the mine sites, the population growth through immigration increased the demand for basic products and services providing good environment for local business to thrive. The physical infrastructure (2%) of the areas within mining sites was increased through expanded and improved roads, allowing for greater movement and interaction, thus allowing for further growth. Stone workers developed access roads to assist vehicle traffic from the main road to quarry and within the quarry itself, which not only enhanced product and services movibility but also gave revenue to the workers while they were working. As seen by the enhanced quarry site access roads, according to Midamba&Ekechi (2019), updated roads usually lead to more companies and population expansion, which adds to the development of service such as schools and health centers in the region. Better infrastructure and business operated within the mine sites by extension stimulates economic development in the area (12%). Health clinics, schools and other revenue generating business including shopping, restaurants, bars and markets were all drawn to mine sites. There is stronger demand for products and services as results of rising population. As results of the multiplier effects, land round mine sites become more as desirable, plots of land gained in value due to the demand for housing facilities.These were more transit services in the communities adjacent to quarry areas.

Revenue generated (8%) from licensing local mines, payment of chess fee by Lorries ferrying quarry tone is ploughed back into county development projects. The county government of Meru issued single trade licenses to bars, hotels and grocery stores operated within the mining sites. At times the periodic collection of trader fee was done by county officials who boosted the county revenue base. In general, all of the activities increased investment by 9%, particularly when private enterprises lease quarries and bring tools and labour to the site, which improves skill acquisition.Most workers in the informed sector learn how to extract and modify stones to specified specification through apprenticeship under the guidance of more experienced workers. New quarry entrants are mostly trained and oriented by experience workers. In terms of quarry stone mining and alluvial sand extension, the international labour organization (ILO) concluded in 2009 to that stone mining provided a backup option in the face of change in climate which has negative impact on agriculture, particularly in poor nations in Africa. Despite the fact that the study determined that quarry stone workers interacted some social networks formed, resulting in social capital. This fosters trust, reciprocity, and trade in order to facilitate cooperation, lower transaction costs and possibly provide a safe environment. Whenpast favours are retrieved, social networks are similar to personal or family networks in that they after spatiallydiversified possible methods of assistance (MidambaEkechi, 2019). In IgembeSouth sub-county social economic impacts of quarry stone mining is vital to the community when mining is taking place. A part from positive impact of quarry stone mining there was also negative impact in Igembe South Sub-County Meru County as follows:-

Adverse Effects of Artisanal Mining Activities

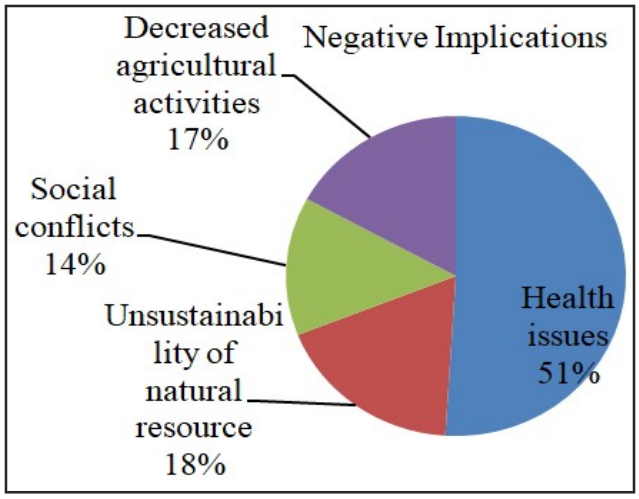

Figure 2. Adverse Effects of Artisanal Mining Activities

Stone quarry mining was found to be associated with some adverse effect as far as hazard and safety was concerned. Health issues were the main negative effects as close to 51% of the respondents pointed out various health related challenges like respirations disorders, muscles pains and diseases like malaria. Occupational health hazard was the contributor to the health issues reported across the mine sites. According to health records available at Nyambene General Hospital, 40.4% of the reported injuries arise from quarry related activities. This is exemplifies in response by one female quarry worker. "We do not have occupation safety helmets, masks and boots or glover to protect us from the dangerous of rock fall or inhaling quarry dust so most of us especially women have complications related to breathing" The frequency of diseases treated at the same hospital indicated they were respiratory in mature with likes of malaria being the major disease (53.1%) followed by pneumonia at 6.5%. case specific diseases linked to mining activities in Igembe South were outlined as fever, pneumonia ,and malaria. Ming'ate &Mohomed's(2016), influence of stone quarrying on the environment and livelihood of communities in Mandera county Kenya , revealed that stone quarrying has a negative impact on workers' health by inducing respiration and ocular problem, Excavation of land and encroachment on agricultural land was identified as a challenge towards the suitabilityof natural resources (18%) .

As the competition for the available stone quarry increase the private companies and artisanal quarry workers engage in uncontrolled quarrying leading to expansion of degraded land. As it is shown plate(1)

Plate 1. Degraded Land near One of the Quarry Site

Social conflict (14%) cross especially when new entrants invaded the existing quarries. This suspicions created mistrust more so for the immigrants from areas out side Sub County. These conflicts were manifest in terms of territorial ownership of land where the quarry occurred and the even the engagement of households labour in stone extraction. Decline in agricultural activities (17%) around the mining sites has positively been linked to the land conversion from farming to quarry site. Direct income from the sale of quarry dust, stones and concrete was forthcoming than the laborious task of preparing, tilling, planting and harvesting. As a result intensive agricultural land uses have been replaced by Khat farming and quarrying.

CONCLUSION AND RECOMMENDATION

CONCLUSION

Quarrying excavation are essential activities for local communities social economic well-being, particularly in terms of employment creation income source of workers, stimulates economic development, generation of revenue, improving infrastructure, spur investment, adding aesthetic value to the landscape and promotion of social support networks. while appreciating the social economic impacts of quarry stone mining in Igembe south sub county , most equally be mindful of the negative implications of quarrystone mining which includes but not limited to decreased agricultural activity , social conflict, health issues and unsuitability of natural resource. Following a thorough research into these issues of land degradation in mining sites and its environs, it was discovered that mining activities had resulted in soil deterioration, resulting in limited land suitable for local food production in side IgembeSouth. Pollution has also occurred, putting the areas water supply at risk. All of the area's major streams and rivers, including the Mboone , Muura and Ura rivers, have been poisoned by mining activities.

RECOMMENDATIONS

The Meru County Administration, which holds all minerals in trust for all materialsshould take deliberateaction, in collaboration with quarry stone miners, to reduce the pace at which lands of concessions are issued to mining firms in the county. This is necessary because the social economic consequences of mining activities continue to be a major source of concern particularly for residents of nearby mining villages and to a larger extent the entire county. The villagers, miners and residents of mining areas to be supported by comprehensive education to ensure that people understands the significance of social economic and negative implications of quarry stone mining. The government agencies like the Environmental Protection Agency (EPA), the mineral commission, the forestry commission and all other Meru County stakeholders to effectively perform their roles in dealing with social economic problem associated with mining activities within the affected communities in Meru County's Igembe South Sub County as well as effective collaboration and coordination of the Meru government. Mining countries must decide on ownership, operation, maintenance and funding modalities which considering a shared use of quarry stone project. The infrastructure could be owned and operated by mining firm, the county government of Meru or a third party. When a mining corporation owns the infrastructure, it can afford the large upfront expenses and has a strong incentive to keep costs down while delivering reliable infrastructure and services. Finally, regular meeting, with affected communities call for involvement of the affected families in mining activities, assess social capital and financial capital in small scale artisanal mining activities for more advice.

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