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Community perceptions on socio-economic impacts of uranium exploration in Selous Ecosystem, Tanzania

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Large-scale mining has positive and negative effects that impact people differently leading to varying perceptions. This study assessed perceptions of local communities on socio-economic impacts of uranium exploration in Selous Ecosystem, Tanzania. The study was guided by three main research questions (i) Are local communities aware of the impacts of uranium exploration? (ii) What are the socio-economic impacts of uranium exploration? and (iii) What are perceptions of local communities on uranium impacts? A simple random sampling technique was used to select 51 households for questionnaire survey. Additionally, 22 key informants were interviewed and 2 focus group discussions were conducted. Moreover, secondary information such as government policies, legislations, and previous published and unpublished reports were reviewed. The quantitative information was analysed through Statistical Package for Social Science. For the purpose of this study, descriptive statistics was used while qualitative information was analysed using content analysis technique. In terms of awareness, 51% were unaware on negative impacts of uranium mining. The positive socio-economic impacts reported were employment opportunities, improved quality of life, road accessibility and economic opportunities. However, the majority of people interviewed (70 %) claimed that they have not received individual benefits from uranium exploration activities. Perception differed significantly, with 72% of those employed in the mine having positive perceptions, compared to 62% of the unemployed individuals who had negative perceptions. This study recommends a community-based bottom-up approach for awareness raising on uranium impacts. In addition, the mining company should implement effectively its corporate social responsibilities because, the negative perceptions may stand as a hindrance for accomplishment of its goals. The findings of this study provide preliminary baseline for future studies to monitor the impacts of uranium in particular radioactivity pathways associated with uranium mining.

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INTRODUCTION

Minerals extraction has a potential contribution to the countries' economic growth and livelihood improvement of the local communities (Sosy, 2013). The existence of a mine in any area is believed to have positive effects on the surrounding communities through employment opportunities, provision of social services such as water, schools, road networks, health centres, electricity, and communication facilities (Morris and Baartjes, 2010). However, studies reveal that countries with mineral deposits derive limited benefits from those resources (Labonne & Gilman, 1999). Large-scale mining industries have positive and negative effects that impact the livelihoods of the local people leading to varying perceptions. Uranium mining poses a great threat to people and their surrounding environment due to the possibility of releasing radiation and chemicals that are detrimental to people (Kitula, 2006; Mbogoro and Mwakipesile, 2010). Mining takes away large tracts of land that can be used for various activities such as sensitive ecosystems, water sources, agriculture, grazing and forest plantations (Fisher, 2007). Other negative effects include displacement of people from their fertile lands and pollution of water resources. Some of the environmental and social effects might be irreversible.

Historical experience from uranium mining sites worldwide show that unregulated uranium mining practices maintain a significant negative impact on water, soil, as well as putting the public at risk leading to high environmental clean-up costs (Novianti et al. 2017; Novianantya et al., 2017; Haddaway et al., 2019; Novianantya et al., 20179; Wale et al., 2021). In some countries, such as Tanzania, uranium mining is a new experience; thus, little has been documented regarding any socio-economic impacts to the surrounding communities. Uranium mining is more hazardous than other mining types, and has extremely long-term effects; thus, it requires good laws, excellent law enforcement, dedicated governments and institutions (Mbogoro and Mwakipesile, 2010).

Under Tanzania current regulatory and policy frameworks (e.g. TAEC 2003, MEM 2010, TAEC 2011), among other things, there is an emphasis on the contribution of the mineral sector to the national economy, secured employment, and providing alternative sources of income, particularly for the rural population, as well as environmental protection and management (URT, 2009), whereby support the government efforts to improve the overall quality of life in regions where mining take place through taxes, royalties and fees. Despite good statements given in the mining policy and the Act, the situation on the ground is quite different when it comes to law enforcement (Muhanga,

2019). While Tanzania has legal framework and relevant infrastructure to manage and control occupational and public exposures and waste, there are still challenges to effectively monitor uranium mining (Banzi et al., 2014).

More than 25 companies conducted uranium exploration in different geological environments in Tanzania based on the previous results from radiometric surveys conducted in 1970s. Therefore, it is crucial to establish baseline socio-economic data before actual mining commences. This is because, lack of comparable data can prevent efficient monitoring and evaluation of mining impacts during and after the mining operations (Banzi et al., 2014).

Various studies have shown that mining areas have turned into conflict areas; and there is persistence of complaints and minimal benefits to the affected local communities (Lugoe, 2012). Also, negative impacts of the mining industry are normally experienced locally, particularly by the surrounding communities. It is paramount important to assess impacts (both positive and negative), concerns, expectations and perceptions, and level of awareness that can be of great value to the government and the mining company, perhaps averting unnecessary adverse impacts and work stoppages with the resulting loss in income. Thus, communities' perceptions on mining and its impacts can affect their relationship with mining companies in their environment. The negative perceptions of local communities on mining is one of the major factors of most conflicts between local communities and mining companies (Dagvadorj et al., 2018). Thus, for mining operations to be successful, collaboration between the mine and surrounding communities is important.

Although there has been the continued extraction of minerals in the country as one of the major sources of income and employment, limited cross-sectional studies have been done to examine the perceptions of local communities on socio-economic impacts of

uranium explorations in Tanzania. Therefore, this study examined the socio-economic impacts and perceptions of local people in one mining edge community within the vicinity of mining exploration site of Selous Ecosystem, Tanzania. To that end, the study provides new insights into the effects of uranium exploration in Tanzania and local perspectives. The findings will contribute in developing policies that enhance mitigating negative effects of uranium mining activities, and enhance positive perceptions.

MATERIALS AND METHODS

Description of the study area

The Mkuju River Uranium Project (MRP) is found in SEKA Zone, formerly, one of eight administrative zones of Selous Game Reserve (now part of Nyerere National Park) in Namtumbo District in Ruvuma Region, Tanzania. It lies at latitudes 9° 59' 50" to 10° 07' 15" S and longitudes 36° 30' 00" to 36° 37' 55" E. (Figure 1). According to Kideghesho and Abdallah (2010), the MRP area covers about 200 km² in the southern part of Selous Ecosystem. A viable uranium deposit of sandstone type of about 25,200 tU is found in the area. It is estimated that there will be a production of 1,600 tU in a year at its maximum capacity for over a minimum of 13 years (MSL, 2011).

The Namtumbo District's population was 271,368, specifically 132,035 males and 139,333 females (NBS, 2022). The number of households was 63,274, and the average household size was 4.3 (NBS, 2022). The climate of the District is characterized by two rainfall seasons, where the first rainy season commences in January and ends in April. The average annual rainfall is approximately 70 mm, with temperatures ranging from 11 to 29 °C. The dry season commences in May and ends in December. The temperatures usually range from 14 to 37 °C (Banzi et al. 2014). The closest village (most exposed population) to the site was identified to be Likuyu- Sekamaganga which is situated 53 km from the mining site.

Figure 1: A map of the study area showing the location of Mkuju River Project



The project is operated by the Uranium One Inc. The Tanzanian Ministry of Energy and Minerals issued a mining licence in 2013; however, mining activities has not started due to the depressed uranium spot price. Currently, by 2024, the project maintained an active status as preparatory operations are underway.

Data collection

A cross sectional survey design was employed in this study. The study was conducted in one village namely Likuyu Sekamaganga, purposely selected, as it is the only village located very close to the mining site. Both qualitative and quantitative methods were used to collect primary data. Household questionnaire was used to collect quantitative data while focus group discussions and key informant interviews was used to collect qualitative data. In addition, secondary information from published and un-published reports was reviewed. Simple random sampling was used to select the households. A list of all households from the updated village register book in the study

villages was the sampling frame while households was a sampling unit.

Household questionnaire survey

A simple random sapling technique was used to select 51 households from the village register. Some studies (e.g. Mbwambo, 2000; and Kaswamila, 2009) show that sample size in socio-economic studies can be decided by the researcher depending on the nature of study but should be at least 30 units. A questionnaire that consisted of both open and closed ended questions was used to interview household heads. Aspects covered include awareness of impacts of uranium, socio-economic impacts of uranium exploration activities, perceptions of various stakeholders on mining, what should be done to improve the current situation. The questionnaire was pre-tested to verify the validity and reliability aspects. Results obtained from the pre-test were used to improve the questions. Prior to data collection, the research permission was sought from the Village Government and District Government authorities.

Focus Group Discussion

Focus group discussions usually reveals in-depth information on issues, perception, and ideas. A total of two groups, each with 12 individuals (male and female, of at least 18 years and above) were held. Purposive sampling was used to select different categories of people such as sex (to include males and females), age (to include youths and elders), and working experience in mining (to include people who are not working and those who have worked in the mine). These groups were included intentionally to diversify information on the subject matter. The discussion covered socio-economic impacts of uranium exploration, community awareness and perceptions, and recommendations for the future. Both men and women were given an opportunity to express themselves freely. The discussions lasted for 45 minutes to 1 hour.

Key Informants Interview

A total of 22 key informants who were broad stakeholder population were interviewed. The informants were selected based on knowledge and/or participation in the uranium exploration activities in the area and its impacts. These included Mantra representative, Selous Game Reserve representative, park rangers, game scouts, district level representative, political leaders, Wildlife Management Area management, village game scouts, village leaders, workers in the mine, and individuals who have stayed in the area for a long time. Topics covered in the checklist were the impacts of mining on health, water, income, community awareness on the uranium impacts, as well as legal documents governing uranium mining. Key informant guide was used to guide the interviews.

Secondary information

Documents related to mining such as legal documents, scholarly journal articles, media sources, unpublished reports, and newspapers were reviewed. Information retrieved from these

documents complemented the information collected through the primary data sources.

Data analysis

For qualitative data from focus group discussions and key informant interviews, I actively utilized field notes and transcribed data from audio recorder. During and soon after visits to locations in the field, notes were written to cover information obtained, activities and events observed, important statements and remarks as well as reflections and thoughts while on the field. The qualitative data collected through focus group discussions and interviews were analysed through content analysis technique where raw data was organized, and condensed into categories in relation to the objectives of the study. Moreover, field notes were carefully organized to suit the objectives of the study as well as to enhance smooth analysis. The collected data through questionnaires survey were coded and analysed through the Statistical Package for Social Science (SPSS). In this study, descriptive statistics was of interest in the analysis. It gave a general picture of data such as frequencies, percentages of variables like age, marital status, sex, education level, and income.

RESULTS AND DISCUSSION

Characteristics of respondents

Most respondents were males (68.9%, n=35) few were females (31.1%, n=16), most (74%, n=38) belonged to age group of 18-44 years. About 92% were married with one spouse (97 %, n=34) (Table 1). Most people had elementary education (84.65%, n=43), 5.65%, (n=3) had no formal education and very few (9.7%, n=5) had ordinary secondary school education. Almost all interviewees (92 %, n=47) were born in the villages; few (8%, n=4) were immigrants from Tunduru and Namtumbo towns, and Mchomoro Village. The reasons for migration were: arable land for agriculture, business opportunities, marriage, and searching for jobs. Main economic activities conducted by respondents were crop production (maize, cassava, beans,

paddy, millet, pigeon peas, sesame, and groundnuts), livestock keeping (cattle, goat, sheep, and poultry), employment, small-scale business,

bodaboda (motorbike rider), food vendors, masonry activities, beekeeping, mechanics and shoe making.

Table 1: Age, marital status and number of spouses

Age group			Marital status			Number of Spouses		
Age group	Frequency	%	Marital status	Frequency	%	No. of Spouses	Frequency	%
18-44	38	74.5	Single	2	4.1	1	34	97.1
45-60	11	21.6	Married	45	91.8	2	1	2.9
≥ 60	2	3.9	Separated /Divorced	2	4.1			
Total	51	100	Total	49	100	Total	35	100

Community awareness on uranium effects

The findings from key informant interviews (KIIs) show that the company conducted awareness raising to the community members on uranium effects and precaution measures. However, the findings show that about 51% (n=26) of respondents had poor understanding of radiation, potential impacts of uranium mining, and mines' compliance commitments and Corporate Social Responsibility contributions. The 49% (n=25), were aware and concerned about the uranium impacts and had an opinion that mining will impact water, wildlife, plants, food and healthy. Lack of awareness for some of community members might be related to the fact that most did not receive the trainings or attend the awareness campaigns. Also, some respondents claimed that the trained individuals in the community did not disseminate the information properly to the lower levels. Some studies (e.g. Yilmaz and Taş, 2018) show that exposed and educated people can be more aware of issues than their counterparts.

With regard to sex, most females (70%, n=11) interviewed were not aware on impacts of uranium. This might be due to that most of the mining jobs are gender-oriented, demanding the services of more males than females. Regarding awareness on laws, policies and regulations pertaining to mining, none in the sampled 51 (100%) respondents were aware of any legal document pertaining to mining operations. Ramoshaba (2019) reported similar

findings where communities were not aware of mining company compliance and social commitments.

The findings from KII and questionnaires revealed that before any work commencement in the mine, the company usually conducts training on safety measures to protect its workers from radiation. The findings show that about 30 % (n=3) of local employees did not follow all safety measures while working in the mine despite the mining company training on risks (exposure to radionuclides including uranium itself). About 80% of uranium workers were recruited from the surrounding communities and nearby towns. These workers held low cadre positions due to low education levels. Few interviewed were still largely ignorant about the dangers posed by radioactive contamination during mining operations. They claimed that their main focus is financial gain, so they don't care much about dangers as the impacts will take a long time to be realised. They were enthusiastic about mining activities as it is a good opportunity to acquire well-paying jobs and thus, improve their living standards. By the time of data collection, the company did not have a measure in place against staff endangering their lives through direct contact with the soil during drilling process.

Socio-economic impacts of uranium exploration

Immigration

Data from the village register show that the human population has increased since 2010 due to birth and immigration. The immigrants came from

Mchomoro Village, Tunduru and Namtumbo towns. The immigration in the village was directly linked to mining activities at Mkuju River. Findings from KII show that immigrants in the village have built more than 16 houses, thus, reducing demand for rental houses.

Table 2: Village population and immigration

Year	No. people	Immigration	Guest houses	Houses for rent	Shops
2010	6135	No data	-	-	Magenge ¹
2012	7991	16	-	12	6
2014	-	3	-	-	-
2015	-	11	-	-	-
2016	10,041	100	3	4	7

With regard to road expansion and telecommunication, the findings from interviews and direct observation show that the company expanded the 22 km road from Namtumbo to Likuyu Sekamaganga. Also, telecommunication network coverage has increased in the area. Thus, the population increase coupled with road expansion has facilitated easy movement of people to the area, hence encouraged agricultural production and expansion of farms due to availability of reliable transport and market for the produce. Interviews revealed that grazing areas have decreased because most land parcels are used for agriculture.

Possible impacts on water

The findings from KII show that company was conducting a trial of the in situ leach mining technology by using sulphuric acid and taking samples of water at different distances to see whether there are impacts of chemicals on water. Preliminary results show that the water Ph at the closer distance from the drilling point has dropped up to Ph1. Thus, there is a risk of spills, leaks and contamination of groundwater and surface water. These findings are similar with those of Schultz (2021) who found out that diesel and acid spills contaminated creeks and drinking water. This is because, the control of chemicals underground is

not easy thus, the contamination of water during mining may occur as the mining site is the origin of four rivers (with several tributaries that supply water to community for domestic uses) and over 14 springs of water (EIA Report, 2012).

The distance from the village to mining site is about 53 km. A study by Banzi et al. (2014) shows that on “average the radioactivity in the concession was about 89, 5 and 3 times higher than those in the vicinity. The hazards indices indicate that soils from the concession have relatively a significantly risk by range of factors about 27 to 29 and 40 to 42 times high than in the vicinity for the external and internal hazards, respectively.” These findings indicate that soils in the vicinity of the mining areas could pose less radiological risk to human health when compared to soil in the mining area. However, these findings did not focus on possibility of uranium particles carried away by water and thus affecting nearby communities, livestock and fishes in rivers. Interview with mine representative did not admit any negative impacts of uranium exploration activities to environment and people so far. These findings concur with those of Leonard and Lebogang (2018).

Impacts on health

The questionnaire results indicated that few mine workers (20%, n=2) experienced sexual impotence after engaging in mining activities. Interviews further revealed that there are some mine workers who have become weak sexually, affecting wives to seek help from outside; the situation that may lead to the spread of STDs. These findings are supported by those of Githiria and Onifade (2020) that most mining sites across many developing world is affected by issues relating to sexually transmitted infections (STIs). But they contrast those of Tynan

et al. (2017) who reported alcohol consumption as the main health issue in mining areas.

Another concern raised was infertility (17.5%) where some men who have worked in the mine claimed they could not impregnate their wives. However, these claims cannot be attributed directly as effects of mining activities as there are other factors that can contribute to it, unless tested medically. Other effects are highlighted in the Table 3 below. Cancer cases were reported by 5% (n=2) of respondents, although these effects could not be attributed directly to mining as there might be other causative factors.

Table 3: Negative impacts reported

Negative impact	Frequency	%
Infertility	7	17.5
Cancer	2	5.0
Reduced sexual ability	8	20.0
Skin diseases	5	12.5
Paralyzing	3	7.5
Miscarriage	2	5.0
Air pollution	1	2.5
Bearing disabled children	4	10.0
Loss of body parts	1	2.5
Water pollution	1	2.5
None	6	15.0
Total	40	100.0

Nevertheless, studies conducted elsewhere on health effects of uranium mining reported cases of still birth and cancer (50%) which was higher than of people far from mines (Schultz, 2021).

In Namibia, after cancer and lung diseases, body disabilities caused by vibration, loss of hearing due to excessive noise, spine damage, and non-malignant skin diseases, were the most frequent health concerns reported by uranium mine workers (Bebbington et al., 2008).

Economic benefits

The findings from the Mining Company representative show that the company expects that

at full operation it would employ 1,600 people during construction process and 750 when the mining operations starts. But, the new technology (in-situ leaching) would require minimal human operations and people who can master it, most likely will be few and outsiders as most people surrounding the area had elementary education (84.65%, n=43), a situation that does not give community an avenue for employment in a sophisticated job.

The findings show that the company have employed drillers, drivers, cooks, and cleaners outside the concession area (from Mwanza, Sengerema, Arusha, and Mbeya regions). Also, it

has offered temporary jobs to nearby community. The average monthly income of a person employed (i.e. formal jobs and casual labour) by the mine from the village was 580,000 TZS (\$266). For instance, by 2016, there were two women employed by Mantra, who provided services such as accommodation, laundry, cleanliness and food. The minimum salary was 800,000 TZS (\$367) per month. Some women in the mine were employed by companies that had tender with Mantra for

provision of goods and services. From February to June 2016, there were about 250 people in the mining site doing various jobs such as drilling, sample packing, environment cleaning among others. There were some community members who were also benefiting indirectly through the trickle-down effect (Table 4). The number of people in the mine fluctuated depending on the magnitude of work on the sit

Table 4: Mean income from employment in the mine

Village name	Source of income	Mean in TZS (USD)	N
Likuyu Sokamanga	Employment	580,000 (266)	11
	Indirect-from mine worker	90,000 (41)	5
	Total	670,000 (307)	16

Presence of mining in the area has opened avenues for some community members to take an advantage of the markets. For instance, one man who was supplying vegetables to the company stated that: “*I am cultivating vegetables and sell them to the*

company. I have earned a lot of money. This time I have received more than 11 M TZS (\$5,046). I have managed to employ young people to take care of my gardens. I get good money ...” (Interview no. 13, 2017).

Table 5: Percentage of those who have benefited from mining activities

Type of benefit	Frequency	%
None (not benefited)	36	70.5
Employment	11	21.5
Indirect	4	8.0
Total	51	100.0

The revenue accrued by people employed in the mine has aided in building and roofing houses, buying motorcycles and television, paid for children school fees, supported family needs, used as business capital, and buying livestock. Apart from individual benefits, the whole community benefited through social aid given for the development projects. Dikgwatlhe and Mulenga (2023) reported similar results where mining activities in the communities increased employment opportunities (both direct and indirect) and improved people's quality of life.

Findings from questionnaires show that many people (70%, n=36) have not benefitted from the

mining (Table 5). The reasons given on why some community members have not benefited are indicated in the Table 6. However, one major reason pointed out was that the company employed people from outside the village the situation that minimises employment opportunities for people from Likuyu Sekamaganga Village.

Table 6: Reasons for not benefiting from the mining company

Reasons	Frequency	Per cent
Women are not allowed to conduct mining activities	3	5.8
I am too old to be employed	3	5.8
I have been here not so long	3	5.8
I don't have work experience	5	9.8
The company brought its own people		37.2
Company rarely support the village	3	5.8
We live far from mining area	3	5.8
Unfulfilled promises	9	17.6
Very small salary	3	5.8
Total	51	100.0

Perceptions of different stakeholders

Perceptions from workers and casual labourers

Findings from KII and focus group discussions show that most people who had positive attitude towards mining were those who have benefited through employment opportunities. On the question whether uranium mining is good or bad, most people who worked in the mine were positive on uranium mining (72%, n=8) while few (28%, n=3) had negative perceptions on uranium. When asked whether uranium mining should continue, most people who were currently working or had worked in the mine in the past (84.6%) wanted the mining activities to continue. Gyekye 92006) reported similar findings where miners recorded significantly better perceptions than their non-mining counterparts. Findings from key informants' interview show that mining activities has contributed positively to workers' lives, as one emphasized: *"Uranium has given me the challenge to work hard; I have learnt a lot of things. It is good to have a mining company in our village. Our village have started to develop, people have constructed aluminium roofed houses, even I too"* (Interview no. 21, 2017).

Those who supported the mining had an opinion that Mantra pays good salary to its employees. The money earned has been used for constructing houses, buying motorcycles to mention a few.

Most interviewed workers (n=8), had worked in the mine for over 8 years. However, some stated that they focus on monetary value received, thus, they paid less attention to negative impacts, as one stated *"We get good money from the mine; it is hard to leave the money because of negative impacts. We can die because of money. There is a local saying that 'it is better to die and leave money than dying poor.' Impacts on people are regarded as nothing at all"* (Interview no. 14, 2017). Another one added *"through uranium mining, we have built good houses, bought our own transport. Yes, uranium has negative impacts, but many things have negative impacts even food that we eat"* (Interview no. 16, 2016). To show a dire need for a job, most people who have worked in the mine previously wanted to work there again despite of negative impacts as one former employee stated *"When the company starts mining, if I get a job I will work again because there are no safe paying jobs here. It is only problems that take us there. For now, impacts are not much"* (Interview no. 19, 2016).

Some former workers had negative perception based on benefits. For instance, a game scout from the Community based Wildlife Management Area (WMA) who was not participating in security activities anymore stated that *"In the past we used to get benefits when we patrol the mining site. ... but now there are no benefits because they do not take game scouts from the WMA for patrols, only*

game rangers from Selous Game Reserve... the company does not benefit us, they only disturb our wildlife and the environment” (Interview no. 6, 2017).

Community perceptions

The community members were asked to give their perspectives in relation to uranium mining, awareness on its impacts, benefits, and impacts on the environment, tourism and people. The findings show that the community perceptions on whether mining is good and should continue show that more than half (62%) stated that uranium mining is not good and wished the activities to stop due to its impact on environment and people. This is common in mining environments as the prevalence of negative perceptions about mining usually dominate (cf. Selo- and Ngole-Jeme, 2022). Dikgwatlhe and Mulenga (2023) reported similar findings that local community usually experience negative impacts of mining such as increased migration, inadequate benefits and poor services.

In relation to environment and wildlife, they have an opinion that “...*the habitats for our wild animals are fragmented, we don't see animals. We don't have a clear evidence of how land will recover after mining activities*” (Interview no. 9, 2017). These findings concur with those of Aigbedion and Iyayi (2007) who reported that mining may scare wildlife away from mining environments due to noise produced by quarrying, crushing of rocks and blasting. In some instances, wild animals in the area might relocate to other areas with more vegetation and security.

Community perceived that the future impacts during mining might be much, a situation that need preparation as one interviewee stated: “*It seems there will be a lot of impacts if there are no proper preventive mechanisms in place, thus the company should not start the mining process without proper preparations*” (Interview no. 10, 2015). These findings are supported by those of Schultz (2021) who found out that community opposed mining

proposal and its operation due to its negative impacts. Community's perception regarding the effect of the mine on water quality was negative as they believe in future there will be spill-over of uranium on water sources. Similar studies by Maest et al. (2006) and Bud et al. (2007) linked water pollution with mining activities.

When asked their perceptions on awareness of uranium, one interviewee stated that “*the sensitization meetings on uranium impacts should be given to the entire community. Our leaders should be aware and participate in everything that is happening in the area especially issues concerned with people. All people should know negative impacts and the means to protect themselves*” (Interview no. 5, 2015). With regard to benefits, they suggested that “*The village should have a way to do follow up to make sure what was promised is fulfilled. If the mining company is not beneficial to people it should be stopped*” (Interview no. 20, 2015).

Perceptions on effect of uranium mining on tourism

The findings revealed that some community perceive that uranium mining is going to affect tourism as it will block the access routes to tourist attractions, and influx of workers could increase noise and chase wildlife away. The hunting company claimed that for the time being, the exploration phase did not affect the tourism activities much and there was a good cooperation. The company has measures against littering where the penalty for workers it was job dismissal.

When comparing responses on the benefits from uranium and hunting tourism conducted by the Game Frontiers of Tanzania Ltd (GFT), there were mixed responses. One FGD participant responded that “*tourism is better than uranium mining because at least it does not destroy environment and living things*” (FGD 1). Another member claimed that “*although mining company is employing many people than the GFT, we prefer hunting operations*

as they are less destructive to the environment and our health.” The same added: “*hunting tourism is sustainable as we can continue to gain benefits unlike the mining that will end after few years of extraction, leaving us with a lot of damage*” (FGD 1). They perceive that tourism was better than uranium mining as one stated: “*We think tourism is better. We get our share from the investor; some days ago we got 8 Million TZS (\$3670). The hunting tourism company is doing better than uranium company because when we have a problem and call him he responds.*” (FGD 2). There were ten (10) people employed by the hunting tourism company. Only 2 people were from Likuyu Sekamaganga Village. These findings concur with those of Leonard and Lebogang (2018) who reported the challenges faced by the neighbouring communities and tourism destination as the result of the issuance of mining permits.

Perceptions on cooperation with key stakeholders

The interview with district level official indicated that the relationship between the District and the Mining Company was better at the time of field work compared to few years back. Although there has been some collaboration, but the District staff were not informed of the planned development activities in different villages by the mining company. The situation made it difficult for the

Namtumbo District to incorporate company’s development plans into District plans. The District officials claimed that the situation caused a collision of the development activities, sometimes skipping some villages.

At community level, most people interviewed claimed that the mining company does not cooperate with them (71%) (Table 7). There was an agreement that many workers will be hired from the Likuyu Sekamaganga Village but the promise was not fulfilled. Villagers complained that the company hired outsiders from Mwanza, Arusha, and Shinyanga regions, the situation that made them uncomfortable, and did not perceive the importance of the mining nearby their village. The KII revealed that the company’s management has failed to collaborate with the community on issues of mutual interest. At the time of data collection, the mine had no direct relationship with the community, apart from occasional meetings between the company executives and the village leaders. These findings concur with that of Selo, and Ngole-Jeme (2022) where negative perception were linked with lack of cooperation between the mining industry and surrounding communities. Similar findings are reported by Ramoshaba (2019) on lack of community engagement and poor communication between communities and mining companies.

Table 7: Cooperation between communities and the mining company

Means of Cooperation	Frequency	%
It offers job opportunity (employment)	8	15.19
I don’t know	1	2.53
Give social services aid (build hospital, dispensary, school class room, water services)	6	11.40
No cooperation	36	70.88
Total	51	100.0

Communities’ suggestions on areas of improvement

With regard to the current situation, the researchers wanted to know the community's desires in relation to mining activities. Many wanted the company to employ more people from the village, and not bring people from afar for jobs they can do (47%). Other responses are given in Table 8. Apart from findings

from questionnaires survey, one key informant added that *“there should be a third party to monitor and see if mining regulations are followed. People who are not related with mining company should check the quality of water if it is safe for human consumption”* (Interview no. 22, 2017).

Table 8: With regard to current situation, what do you desire or recommend?

No.	Desired condition/recommendation	Frequency	%
1.	Support social services (ambulance, water services, electricity, hospital) in our village as promised	5	9.8
2.	Villagers should be involved in mining issues as they are close to the mine	7	13.7
3.	Youths should be given job related skills to tap good jobs	5	10.0
4.	Sensitization meetings should be conducted to raise community awareness on the effect of uranium	2	4.0
5.	Practicing environmental conservation (replant trees, refilling the holes after mining)	1	1.9
6.	They should employ workers from villages where the mining is taking place	24	47.0
7.	The mining activities should continue so that people can get jobs and earnings	6	11.7
8.	Stop conducting mining activities because of negative impacts	1	1.9
Total		51	100.0

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

This study has examined the community awareness, and perceptions on socio-economic impacts of uranium exploration activities in Selous Ecosystem. The positive impacts of uranium mining include infrastructure improvement such as roads and telecommunication system. Also, there are few people in the community (21.%) who have been directly employed in the mining operations thus, earning salaries. Others are indirectly benefiting through new community's amenities and services (such as shops, bars, rental houses, guest houses). There are also some trickle-down effects such as remittances and payments from those working in the mine, which are used to support relatives, and to support hinterland community development. Although employment opportunities has increased in the village, the nature of the employment available for people is the low cadre class type, as

many people have only primary school education. This finding calls for local people, especially youth, to further their studies so as to tap into sophisticated jobs during mining process.

In terms of awareness of uranium impacts, more than half of the community members and some workers are unaware on negative impacts of uranium mining. The perceptions differed amongst groups, and was mainly affected by benefits accrued. For individuals who have worked in the mine had positive perceptions than those who have not. The community perceive that the presence of the mine has not improved their quality of life. The negative community perceptions on their lives can influence on the degree to which mining is accepted among local communities (Moffat et al., 2018) and create mistrust because trust between mining companies and local people is associated with mining company's ability to attend to challenges faced by the local people (Dagvadorj et al., 2018).

Recommendations

Based on the findings from this study I recommend additional studies that will monitor the uranium impacts during the mining operations, especially radioactivity pathways in order to minimize possible adverse human health and environmental impacts associated with uranium mining. Further, the government should ensure that mining company implement effectively its corporate social responsibilities in terms of staff and community safety, local employment among others. Also, the company should be transparent in its operations and conduct regular awareness raising campaigns to surrounding communities. The findings from this study provide preliminary baseline for future studies.

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