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INFLUENTIAL IMPACTS OF PETROLEUM PRODUCTS SERVICE ON RURAL DEVELOPMENT AT NKOLOLO VILLAGE IN BARIADI DISTRICT TANZANIA

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Abstract: Petroleum products are dependable but linked to adverse environmental, social and health impacts. This paper examined the influential impacts of Petroleum Product Services development that is located at Nkololo village in Bariadi Tanzania. The objective of the study was to examine the mechanism for practices informing design, implementation, and management of environmental, social and health matters of the development. The study was a case study in design that utilised a qualitative biased approach. The study involved purposive sampling procedures that were administered to collect data through observation, documentary review; key informant interviews and, focus group discussion. Data were analysed by theme and content analysis, and expert judgment. It was found that stakeholders of the development had an opinion that the project was compliant with the requirements at the local level. It was found that there was likelihood of fire outbreak which must be checked by adhering by good practices related to fire disaster management including the installation of preparedness, onset and after disaster management mechanism. Environmental, social and health impacts associated with project involve a change of land use, air pollution, employment, population increase, influence over new culture, and spread of HIV/AIDS. It was concluded that the project possesses both positive and negative impacts of which positive impacts contribute greatly to the promotion of social and economic wellbeing of the area. It was recommended that the project required capacity development to deal with health, environmental and safety issues of concern and be able to implement the necessary environmental management and monitoring plans.

Keywords: *Petroleum, Petroleum Products Service, Rural Development.*

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1.0 Introduction

Human societies have been using petroleum products since Biblical times, yet the origin of this natural resource remains a mystery in history. As fossil evidence emerged during the 18th century that coals were derived from plant remains, many scientists proposed similar origin to explain petroleum (Walters, 2015). It was indicated that modern theories attempted to explain that petroleum originated from ancient sedimentary, organic-rich rocks that emerged during the 19th century. The relevance of petroleum to the activities of humankind, as well as the significant influence have on the economies of both oil-producing and oil-importing countries, can never be overstressed (Hassan, 2014). It is further explained that petroleum products have a far-reaching influence on the practice of development of these countries and the world at large. The discovery of oil has brought about staggering advancement to industrial growth worldwide and has helped ease transportation at both international and local levels. At the household level, petroleum energies have made life easy for mankind in such areas as cooking, heating, provision of electricity, local mobility and many more (Hassan, 2014). The global petroleum-producing countries benefiting from their products are namely, Gulf Cooperation Council: Kuwait, Qatar, Saudi Arabia, Bahrain, and the United Arab Emirates. Other oil producers are Iraq, Algeria, and Libya. Countries of Egypt, Sudan, Syria, Yemen as well as Djibout, Jordan, Lebanon, Morocco, Mauritius, and Tunisia are also producers (Hassan, 2014). The countries of the Arab world have witnessed massive social, economic, and political transformations in the past three decades due to petroleum. The oil sector and the political economy of oil have played a pivotal role in such transformations at different historical junctures (Al-Moneef, 2006). However, petroleum production, importation, distribution, storage, and consumption have been linked to a wide range of adverse environmental, social, and health outcomes, particularly when governance and institutional quality is low Olawuyi and Tubodenyefa, 2018).

In East Africa, the extractive sector in Kenya also involves oil among others. Petroleum products combined with gas contribute only about one percent of the country's gross domestic product (Institute of Economic Affairs, 2014). However, the economic and social roles of the sector have been changed by the recent discovery of oil since March 2012 when oil was discovered in Turkana by a United Kingdom firm, the Tullow Oil plc (Mwabu, 2018). In Tanzania, the petroleum involves not only upstream activities of exploration, but mainly the downstream type is the major engagement. The activities involved in the downstream are the importation, storage, transformation, export, inland

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transportation of crude oil and refined petroleum products, wholesale and retail distribution of petroleum products including liquefied petroleum gas (Nyoni, 2013). Tanzania consumes about 1.54 million cubic metres per annum of petroleum products wholly imported from the Mediterranean, Arabian Gulf and sometimes from Durban, South Africa. Effective from January 2000, petroleum downstream sub-sector was liberalised enabling Oil marketing companies to individually procure and trade petroleum products under their market requirements and setting pump prices based on the prevailing market forces (Ewura website, 2013). Due to an increase in the market demand of petroleum products several oil companies have been formed which for many years have been dealing with both importation and distribution of petroleum products (Nyoni, 2013). There are also petroleum products services stations that are governed by the Petroleum Act and the Petroleum (Bulk Procurement System) regulations of Tanzania of 2017. According to the Petroleum Bulk Procurement Agency of Tanzania, (2020) the petroleum products imported under the Bulk Petroleum System (BPS) include Motor Super Premium (PMS identified as clean petroleum products in BPS. The second is the Automotive Gas Oil (AGO) identified as clean petroleum product in BPS. The third product is the Illuminating Kerosene (IK) identified as a clean petroleum product in BPS. The fourth product is Jet-A which is identified as a clean petroleum product in BPS. The fifth one is Heavy Fuel Oil (HFO) while the sixth product is Liquefied Petroleum Gas (LPG). The seventh product involves any other petroleum products as the Minister may declare. Since Tanzania imports these products, there is a formal procedure in the implementation of bulk procurement of petroleum products that involve key players identified by the government of Tanzania. This comprises the chain of actors involving suppliers, oil marketing companies, marine surveyors and terminal owners. Regarding the distribution of petroleum products to the final consumer the status of petroleum stations as of 30th September 2019 in Tanzania were 1562 stations located in all regions (URT, 2019).

The project fulfills the objective of conducting the business of petroleum products in the local markets in Bariadi district. Given this fact, according to the Tanzania EIA and EA Regulations, the project qualified assessment of the environmental audit since it existed before the coming into force of the Environmental Audit (EA) regulations Number 20 of 2005 (URT, 2005). The study was done at Nkololo village in Bariadi District. Bariadi district is one of the councils in Simiyu region. Bariadi district council covers an area of 5,485 Km squares with a population density of 77.11/km squares. Rainfall is average in this area. Its population is 422,916 people where 201718 are males (47.7%) and

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221,198 are females (52.3%). The population age groups comprise of 0-14 years who are 220,726 people, 15-64 years are 190, 242 and 65 and above years are 11, 948 people. Urbanisation rate is 376,336 rural population and 46,580 urban residents. The project is located in Bariadi district, in Nkololo village which forms one of the five villages of Nkololo ward in Nkololo division. The project is located in the centre of the village. It is adjacent to the village's local roads junction, and shops making the main service centre of the village. Nkololo ward has a population of 24419 distributed in five villages. The distribution of population in villages of the ward indicates that Nkololo with 6794, Bubale with 4619, Mwamoto with 3615, Mwabadimu with 4153, and Chungu cha Babwawa with 5238 population (Bariadi District Council, 2018). Nkololo ward experiences various economic activities. The dominant economic activity is mainly agriculture comprising of maize, sorghum, and sweet potatoes as food crops. Cash crops for the area include cotton and sunflower. The project location in Nkololo village, which forms the headquarters of the Nkololo division and ward, has the biggest rural business centre of all centres in the ward. The business centres provide services including kiosks, petrol station, warehouses, guests, rural bars, and shops.

Theoretically, the project relates to the modernisation perspective of development in which traditional technologies should be replaced with modern ways as per project services. The project is contributing to the modernising practices of development in various arenas involving the transport sector, building subsector, communication, rural social transformation, and urbanisation process. Through this project, traditional ways of energy like the use of charcoal, firewood, and long-distance walks are being replaced progressively with the reduction of environmental degradation. Empirically, the project has a contribution to the global sustainable development goals 2030 on ensuring sustainable environmental management at the local level (Osborn *et al*, 2015). Empirically, the study process examined the project's relevant policy, legal and regulatory frameworks at local and international levels. These involved the analysis of relevant policies to petroleum stations in Tanzania. It also analysed the related legal framework to inform the requirements and compliance of the project in its activities. Various relevant protocols, agreements, and conventions had been addressed in the review. The analysis of these was important to communicate the understanding of practical issues and direction to inform the developer for action. Therefore, this section provides the synopsis about the review as analysed in the study. These involved the Sustainable Development Goals 2030 that calls for environmental and development sustainability. The Tanzania Development Vision 2025 that addresses five goals of

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development in Tanzania aimed at the transformation to a middle-income country. The project contributes to micro-level development practices. The National Five Year Development Plan 2016/2017-2020/21 informs the current development practices in Tanzania whereby this project has a micro-level value of the practices of the plan. National Environmental Policy of 1997 focused on conservation, management, and protection of environmental resources in development. National Land Policy of 1996 addresses management and land planning concerns in Tanzania. The National Population Policy, 2006 aims to regulate population to resources and development. Other policies reviewed were the Human Settlement Development Policy of 2000 promoting sustainable human settlements in Tanzania. National Water Policy of 2002 for water resources development, protection, and management. National Health Policy, 2007 that takes public health aspects of the nation. National Trade Policy of 2003 for trade development and promotion matters. The National Petroleum Policy of 2014 is central to petroleum products' services direction of conduct. The Construction Industry Policy of 2003 takes issues related to construction in rural and urban settings. The Cultural Policy of Tanzania of 1997 protects and promotes the cultural values of Tanzania. National Road Safety Policy of 2009, this promotes road safety among actors. The Small and Medium Enterprise Development Policy 2003 oversees the establishment of enterprises and the Antiquities Policy of 2008 responsible for historical issues, were also reviewed.

The national legal and regulatory frameworks of the United Republic of Tanzania as enacted in various periods were analysed. These included the Environmental Management Act N0. 20 of 2004 that requires conservation and management of the environment in Tanzania. The Environmental Impact Assessment and Audit Regulations of 2005 which requires the conduct of EIA and audit for sustainability purpose of development. National Land Use Planning Commission Act No. 3 of 1984 requires the observance of development plans in development. The Village Land Act N0. 5 of 1999 is related to village land management and administration. Occupation Health and Safety Act of 2003 aims at strengthening human resource health status at the workplace. The Water Resources Management Act, 2009 is centred towards ensuring sustained management and conservation of water resources in Tanzania. The Surface and Marine Transport Regulatory Authority Act of 2001 regulates the transportation of petroleum products on surface and marine. The Road Act No.13 of 2007 and the Road Traffic and Transportation Regulations of 2001 N0. 53, 97, 161. Others are the Petroleum (Conservation) Act G.N N0. 118 of 1981, Petroleum Act, N0. 8 of 2015 (Bill Supplement), the Weights and Measures Act (Principal legislations) GN N0. 59 of 1983, Trade Development Act N0. 4

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of 2009, Business Activities Registration Act, N0. 14 of 2007, Employment and Labour Relations Act, N0. 6 of 2004, Environmental Management (Water Quality Standards) Regulations, 2007, and the HIV and AIDS (Prevention and Control) Act of 2008. These legal frameworks related to petroleum services investment and trading projects of this nature. With these frameworks, it was expected that the developer would have been compliant with every direction provided. However, little was done to abide by the policies and legal requirements particularly on the environmental issues and requirements of employing good practices on environmental management. For instance, the development was not subjected to environmental impact assessment before its establishment as policy and legal frameworks of Tanzania.

2.0. Methodology

The study was done in Bariadi district council at Nkololo village. It was important to explore the rural perspective of the influence of the impact of petroleum development on livelihood. The study was designed to involve various issues of the methodology. These included the qualitative approach that employed a case study descriptive design. The qualitative approach was based on the need to describe in-depth about the impacts, the management and adopt enhancement and mitigation measures of relevance. The case study-descriptive design was adopted. This combination was important to address the project's context and be able to explain the issues of concern and interest inherent. It as well used the observation method and literature review. The study employed purposive sampling procedures in which a sample size of 25 participants was involved through various methods of data collection. Purposive sampling was chosen due to its ability to select only participants of interest or relevance to the study. The study involved the following criteria or factors namely: The availability and practicality of standard operating procedures in the management and running of the petroleum project, availability of trained staff in managing the petroleum project in response to regulatory requirements related to the project. Appropriately allocated resources dedicated to meeting regulatory obligations (personnel and equipment). Quality management systems to track and record activities relating to the regulatory requirements. The observation method was used in the identification of the environmental impacts of the development. This was done through direct observation of the geographical makeup of the site. These involved data on soil characteristics, vegetation, human settlement, population, and socio-economic setting. Focus group discussion was involved with 15 community members as participants. The group had an opportunity to identify and discuss over general impacts of the development. This

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was important to get the issues of concern by the public in the locality for solutions. These discussed the benefits and impacts of the project on the socio-economic, health and environmental aspects. The interviews with 10 key informants were administered to government officials at the village and district level and some community members. These were all stakeholders that were relevant to the study. Data analysis and measurement of impacts were executed by expert judgment, Matrix table and theme, and content analysis. Impacts were measured through some indicators. The first measure was the nature of the impact. This was the type of impact in terms of being beneficial or adverse. In this measure, impacts were categorised in two types namely positive and negative impacts. The second measure was the scale of impact. This measure looked at the duration of impact in influencing the socio-economic and environmental aspects of life. The third measure was the significance of the impact. This was essentially an examination of the level of influence of the impact on the development's socio-economic and environmental dimensions of the locality and beyond. The level of influence was established through two criteria. One was that of the scale through which the impact would have its effects covered. This involved the geographical coverage of the impact in which there are two namely the local and national levels of influence of the impact. The second was that the examination of the extent of adverse impact on the socio-economic and environmental aspects of the community at the local and national levels, cumulativeness and/or sustainability it possesses. This measure gave rise to two levels of influence namely the low level of significance or low level of influence and the high level of significance or high level of influence.

3.0 Results and Discussion

3.1 Bariadi District Council: The interviews with the council officials revealed that the project area is compliant to district bylaws since it is located within the area that is under the upgrading process. Therefore, it was explained that the project is convenient for the promotion of livelihoods of the community. The interviews also revealed that the project complies with the laws and bylaws of the council. However, it was observed that measures should be in place by the developer to have a fire outbreak preparedness. It was indicated that these should include a fire extinguisher system. Also, the project requires ownership of standard toilet and the ability to convene meetings with the surrounding community members from time to time to acquire any likely concerns related to project operation effects to the community. The interview further indicated that the project contributes to the provision

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of energy to the public including kerosene and petroleum services. It was insisted that the area where the project is located is suited since it is under the upgrading process by the council.

3.2. Nkololo Village Government: The study examined the impact of the development from the local authority's perspective at Nkololo village. It was found that Nkololo village authority indicated a preference in the existence of the project. It was reported that the project is suited due to the community's need for the services it offers. It was said that the enhancement of the project could further promote people's needs over petroleum services.

Table. 1: Results on Development Impacts and Measures

Impact	Mitigation/Enhancement Measure
Change in Land use	Proper use of the legally acquired land resource of the site by developer according to local and national standards.
Air Pollution	The project construction might have caused air pollution due to construction activities at the site. The operational phase involves the transportation of petroleum products to and from the site through road models. Given the aridity, and nature of soils of the site, air pollution is indispensable particularly during the dry season
Creation of employment	The project is required to possess a human resource policy to guide employment and working conditions. The elements of the policy will include issues of social security for employees, health issues including joining CHF and NHIF and occupational and safety issues to promote productivity and sustainable human resources health. The developer to contribute towards public education on accidents and fire hazards.
Population increase	The project will oversee the implementation of the environmental and social management plans that will contribute to mitigations on its part.
Influence of new culture	The project in collaboration with the Bariadi district council and Nkololo village government requires a plan to accommodate the situation by proposing the place to contain the challenges of growth of urbanism and cultural change.
The spread of HIV/AIDS	The project requires the adoption of periodic health checkups to her workers to provide the status of their health. In collaboration with Nkololo village government and Bariadi District council (BDC) it is also important to adopt periodic educational and sensitization programmes to workers and the public on HIV/AIDS at the level of the community.
Project workers Health Risk	The project requires the provision of workers' education and proper working gears and tools to facilitate a good working environment that is safe for them.
Occurrence of Accidents	The project requires a training programme for workers to handle the operation of the project. Workers need protective gears in the of course working at the site. Workers also need registration to the Health Insurance Fund Schemes including Community health fund

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	and National Health Insurance Fund. However, the project holds firefighting systems for the onsite vulnerability and concurrency of accidents.
Influence on Youth and Adolescents on Behavior Change	The project in collaboration with the village community to undergo awareness creation to youth regarding youths from time to time to protect good behavior for them. Workers should be made aware as well on the need to observe the local culture of the community in the project area.
Immigration	The village government in cooperation with the Bariadi district council must be prepared for the changes promoted by the project so that the community to continue living in harmony. Issues about security and social changes will be accommodated through legal and working regulations of the project.
Fire Outbreaks	The developer has installed fire protection and fighting systems that comply with the requirement of petroleum stations. Smoking and carrying of fire substances like matches need to be strictly prohibited in the project site.
Traffic Accidents	The developer to contribute to his part in the provision of education related to road safety to workers and drivers.
Oil Waste from Project Storage and Sales Pumps	The project requires the construction of an oil waste storage basin that will be impermeable for collection purposes before disposal. This requires the construction of waste oils drainage system that is separate from the storm water system.
Harmon by Nkololo Village and Developer	Project to use BDC human resources in addressing community issues related to the management of the project.
Agglomeration of Economic Activities	The project to expand its services to accommodate the raw materials produced in the area.
Rural Electrification	The government should encourage community members' use of their farming income in the construction of modern housing.
Improved Transport	Project to collaborate with village and BDC for improving feeder roads that are nearby its location.

Note: EV Stands for environmental, E for economic, S-E for socio-economic, S for social and H for health impacts of the development

3.3.1 Short Term Impacts

1. Change in Land use at the site: The project had occupied the current site for petrol station development purposes. The land-use change happened from bare land and village land to petrol station development. This comprises office and petrol station installed pumps. This is the positive beneficial impact that the petroleum product services have contributed. The land was formerly

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unutilised. The development now is generating services for the promoter and the public benefits. However, this can sustain up to the decommissioning phase of the project that depends on the policy, legal, economic, social, political and environmental factors. The impact possesses a high level of influence in terms of significance. This is due to the investment upon the site that contributes to the socio-economic aspect of the locality and beyond. However, it must comply to the Village Land Act number 5 of Tanzania when it comes to decommissioning phase, (URT, 1999) regarding handling of land matters.

2. Air Pollution: The project construction might have caused air pollution due to construction activities at the site. The operational phase involves the transportation of petroleum products to and from the site through road mode. Given the aridity, and nature of soils of the site, air pollution is indispensable, particularly during the dry season. This is the negative impact associated with development that requires project observation of the Employment policy of Tanzania (URT, 1997). It occurred during construction and in this period of operation. It will also occur in the case of the decommissioning of the project. Air pollution is also a long term negative impact because of the operation phase of the project that sells petroleum products to users of means of transport who produce pollution in the feeder roads in the locality and beyond. In terms of the level of influence, air pollution has a low adverse effect and therefore its significance is low due to the micro-level of the project.

3 Creation of employment: The project employs permanently 2 people. It also employs about 1 to 2 people on a seasonal basis as labourers. Indirectly, the project employs the majority of commuter motorcycles, cars and lorries in the village community and outside indirectly. This impact has a positive contribution to the socio-economic wellbeing of the locality. Indirect employment was observed through the existence of means of transport that use petroleum products serviced by the project. Drivers do carry various people for the search of life necessities from one area to the other. In such a way, they promote quick mobility for the public through the existence of the project indirectly. Employment was short term during project establishment and it is now a long term impact in its operation phase until the decommissioning period. Employment has a high level of influence in terms of its ability to promote socio-economic livelihoods of the public; therefore the development has high significance on employment creation at the micro-level or locality, hence to contribute to the Employment and Labour Relations Act of Tanzania (URT, 2004).

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3.3.2 Long Term Impacts

4. Population Increase: The project acts as a stimulant on population increase at Nkololo village and Bariadi district in general. This contributes to the creation of opportunities for economic and social development such as the adoption of new skills, technological transfer and increased monetary and income flow among people in the community. The increase in population essentially is sourced from the enhanced status of living among the public that leads to greater social stability contributing to greater reproduction and transfer to the locality. Generally, population increase has a positive contribution to the socio-economic, political, technological and cultural spheres of life provided that enhancement techniques on how to regulate and promote the population are considered appropriately. This impact has a high level of significance due to it being one of the main factors for development that contributes to the National population policy objectives of Tanzania (URT, 2006).

5. Influence of New Culture: The existence of the project attracts many groups of people including business entrepreneurs, job seekers, and suppliers. This causes a change in the ways of life to the Nkololo village community to the semi-urban and mixed culture of peri-urban characteristics. This influence can be positive in that the introduction of a new urbanite style of living among members of the community can enhance well-being. This can be linked to the modernisation theoretical perspective that entails the change of traditional culture to modern cultural sentiments of a village or rural areas to peri-urban modern ways of living among community members. On the other hand, a new culture can have a negative influence in that some of the bad elements of urbanity can be adopted by community members such as alcoholism if effective mitigation measures are not in place to regulate the behavior of the public. This again entails a high level of influence as it captures the whole aspect of the life of the community in the locality.

6. Spread of HIV/AIDS: The project is situated in the rural business centre of the village. The project is likely to accelerate the spread of HIV/AIDS by attracting newcomers into Nkololo village that will cause high social interaction. These include the immigration of workers, job seekers, suppliers, and business entrepreneurs. The spread of HIV and AIDS is a negative impact as it is evident in limiting the human capacity to promote socio-economic livelihoods effectively. Much as it is the negative impact, it has a high level of influence regarding the significance of its adverse. The developer must comply to the national health policy objectives of protecting public health (URT, 2007).

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7. Project workers' Health Risk: The project is in its operation phase. It employs human resource in running the petroleum station. The production of dust though observed to be minimal and the risky condition to the outbreak of fire may cause health risks to workers. The risk as such is due to the nature of occupation that is concerned with the provision of petroleum products services. Therefore, it has a negative and high level of significance once disasters such as fires occur at the workplace.

8. The occurrence of Accidents: The project is in the operation phase. The project is essentially a petroleum product service provider for various means of transports. There may be possible accidents by vehicles, cars, and motorcycles getting its services. The development is the source of petroleum products in Nkololo locality and other users who pass by and access the services. Therefore, various means of transport do get the services and community in the locality and other places. These contribute to the likely occurrence of accidents which imply negative consequences for the public health and properties. These results imply that there are problems caused by the state of advancement or development that are more in the developed world than in developing countries. However, given the modernization theory, the problems of poverty such as lack or limited means of transport and energy services are now replaced by modern technologies in the name of modern means of transport that consume petroleum products. While enjoying their benefits in promoting livelihoods, they are on the other hand producing the problems of development such as accidents that require effective attention due to its possession of high influence one occurs. However, the project must comply with the Tanzania Road Safety Policy in practice (URT, 2009).

9. Influence on Youth and Adolescents on Behavior Change: Nkololo village receives different visitors as the rural business centre. These may influence youths including students due to accelerated easy access to the village. This is a negative impact in terms of influencing youth behavior. The increase in social interaction caused by the development will gradually influence youth due to changing roles from rural to peri-urban and urbanism. This is connected to the modernisation practice of development. Hence gradually, the traditional youths' roles in society will gradually and steadily be influenced changeably. This has a high level of significance if mitigation measures are not on board to moderate behaviour in the locality. The influence may also be of a beneficial positive impact if it adheres to modernisation as progress among youths. This will stimulate social development at a high level due to youths being a rapid source of change in society.

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10. Immigration: The current Nkololo village community is sparsely populated such that there might be higher immigration to this economically promising village. The project attracts employment in the farming opportunities that makes Nkololo village to be the recipient area of individuals. Immigration is a positive impact due to its contribution to promoting livelihoods among actors. This is the other source of change in the locality. Local dwellers of the locality will be influenced positively by new ways of life that will transform the locality. Modernisation theory attempts to address development through the role of external factors. In such a way immigration will contribute to the modernising practices of development in the locality by eliminating traditional practices that are no longer desired by the community.

11. Fire Outbreaks: The project uses electricity in the provision of petroleum services. There might be an incidence of fire outbreak if preparedness measures are not in place. This is the negative impact that can be caused by the project to the development of society. The products offered at the project are fire-sensitive, hence require keen management that incorporates preparedness, onset and the after fire disaster measures as established in the national and international operational standards and practices

12. Increase in Traffic Accidents: The project is located in the rural business centre of Nkololo division and Ward. The operational process serves several means of transport including trucks, motorcycles, cars which all use some limited rural feeder roads. The project continuously adds to increased trafficking because many people will have the motivation to buy various means of transport because of the certainty and close availability of petroleum products to feed and fuel. These will contribute to road accidents. This is a negative impact that marks a high level of influence in terms of significance once it occurs. The project must implement the Road Act No.13 and the Road Traffic and Transportation Regulations 2001 (URT, 2007 and URT, 2001).

13. Oil Waste contamination from Project Storage and Sales Pumps: The project sells petroleum products. The storage and disposal of oil may contaminate soils and microorganisms. This is a negative impact that has incremental or cumulative results on the environment. Thus it produces high-level adverse results in its occurrence.

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3.3.3 Long Term Indirect Impacts

14. Enhanced Cooperation between Bariadi District Council, Nkololo Village, and Project: The project has good cooperation with the local authorities and the community. The expansion of it will call for strengthened relations between these institutions. This is a positive impact with a high level of significance in its occurrence. The cooperation is very important because of the economic and social benefits that this micro-level development is contributing to the village and Bariadi district council at large.

15. Agglomeration of Economic Activities: The project has attracted several income-generating activities including food vendors and kiosks. Therefore, the project adds to the current economic state of the village community and government in general. This is a positive impact with a high level of significance because of the ability to stimulate the micro-level development of the rural communities at Nkololo and the surrounding areas. The economic activities of the area are moderated by the availability of fuels as inputs in the transport sub-sector of the area. Therefore, the project stimulates the enhanced operation of these activities through enabling transactions, mobility, sales and distribution of various products and services. The project also is there to facilitate the close social interactions in the locality and beyond. This is typical, the practice of modernisation perspective of development that focuses on transforming or changing the traditional economic activities into modern ones. The development adds to the small and medium enterprise development policy direction of promoting enterprises at local, rural areas in Tanzania (URT, 2003).

16. Extended Rural Electrification: The project has been connected to the national grid system of electricity in its operation. The project, therefore, has and influenced the availability of electricity to the village community. It will continually, influence the availability of electricity to the other villages and households not connected to electricity. The project contributes to this as a positive sustainable impact. This impact has a high level of significance in terms of contribution to the socio-economic and cultural aspects of peoples' lives in the locality. This will change the use of traditional energy that is not desired in the socio-economic, environmental and health aspects. Hence it is linked to the modernisation theory of development. The impact will gradually redress the bulk use of forest resources in the locality as charcoal and firewood for lighting and cooking at households. Electricity will also add value to the quickening rural transformation process of modernisation as an agent.

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17. Improved Transport Infrastructure: The site is located about 30 km from Bariadi town. The existence of the project influences improvement of the feeder road network from Bariadi and site to the other farmlands and villages. In such a way, it enables the permanent accessibility of villagers to Nkololo village because of the availability of petroleum products. The development will contribute to this as a positive impact intended to promote the socio-economic aspects of the locality. The project existence is a factor for the availability of various means of transport and improvement of feeder roads in the locality. Such improvement is connected to a move from traditional modes and means of transport to modern ones as per modernisation thinking in practice.

4.0 Conclusion

The paper concluded that the development has influential environmental and socio-economic impacts on development in the locality and beyond. Some impacts are negative and harmful such as air pollution and the spread of HIV/AIDS. However, these are less important given the prescribed mitigation measures provided that they are effectively implemented. The positive impacts will contribute much to the realisation of project objectives as well as public socio-economic benefits. These involve job creation in the locality, agglomeration of economic activities and improved transport infrastructure. The enhancement measures proposed are sufficient for making the project obtain its intended results. These are such as the adoption of periodical HIV check-up of community members in the locality, continued provision of education on the pandemic, adherence to standards of driving. Tanzania is undertaking struggles to attain major policy goals of attaining middle-income status by 2025. Therefore the study found more positive and beneficial impacts than it is for the negative and harmful impacts. These impacts add to the national strategies by benefitting the needy population of the rural areas. Therefore, the positive impacts of the development outweigh the negative impacts. It contributes towards rural poverty reduction and reduced environmental degradation which is among others the main source linked to poverty like conditions of rural areas.

5.0 Recommendations

The study recommended for implementation of the Environmental and Social Management and monitoring plan by actors. The developer shall take all practical measures to ensure the implementation of the environmental management plan by carrying out self-monitoring through the facilitation of the plan by human and financial resources. It was recommended that the expert should

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be hired to undertake external environmental monitoring and environmental auditing in the course of project implementation by the developer. The developer had been examined and found that the management does not have the units to promote the management of environmental mitigation measures. It was therefore recommended that the following units were key to be formed, followed by the recruitment of the relevant personnel. There is a need to implement the Environmental, Health and Safety Subsection for the development by the developer. This will enable the overseeing of all operations involving workers, project physical environment and surrounding Nkololo community. The relevant personnel here will be the Environmental Officers who will be responsible for community relations and education, wastes management and monitoring of environmental and social parameters of the Environmental Management Plan (ESMP). The developer was required to get clear familiarization with the impacts, mitigation and enhancement measures and the way the ESMP and Monitoring Plan will be implemented. Therefore, it recommended that the workers, surrounding community at village authority, project management, and contractors in all project phases was important that be empowered on the EMP implementation.

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