

Establishing an effective link between Lesotho Highlands Water Project Phase II and the achievement of UN sustainable development goals in Lesotho

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Abstract

Lesotho's development is significantly aided by the (Lesotho Highlands Water Project) LHWP-I, a project that offers a vast water supply from Lesotho to South Africa. In exchange for giving Lesotho money, energy, and large-scale development projects, South Africa profited from the enriched water resources of Lesotho. Owing to the initial success of LHWP-I, both nations decided to move forward with LHWP-II, the second phase of the project, which is scheduled for completion in 2027. This article aims to establish the impact of LHWP-II towards Lesotho's sustainable development process as per United Nations (UN) Sustainable Development Goals (SDGs) framework. To comprehend these consequences, secondary sources of data such as academic journals, government publications, non-governmental documentations, etc., were examined. In consideration for the prospective outcomes of LHWP-II, the project plans of execution were analysed. Thus, it was determined that the implementation of LHWP-II has the potential to enhance Lesotho to achieve a number of SDGs. These include SDGs 1, 2, 3, 4, 5, 8, 9, 10, 15, and 16 that are related to no poverty, zero hunger, good health and well-being, quality education, gender equality, decent work and economic growth, industry innovation and infrastructure, reduced inequalities, life on land and peace, justice and strong institutions, respectively. However, the study established that the project encounters a difficult factor in the compensation process for local resettlers, even though the study found favourable results in improving Lesotho's stagnated level of performance towards reaching the SDGs. The study can lead to the development of more trustworthy frameworks and techniques for measuring the long-term effects of efforts on social, economic, and environmental dimensions.

Lesotho; South Africa; Lesotho highlands water project; sustainable development goals;

1. Introduction

Lesotho is a tiny, mountainous landlocked country bordered by South Africa, a considerably larger neighbor. It has a population of roughly two million people and a per capita GDP of \$999.7 in 2022. Lesotho is classed as a country with a lower middle-income (World Bank, 2023). Several developmental projects in the recent past have been the key drivers of development in Lesotho among which the LHWP (Phase-I) holds a special place (Hitchcock, 2015). Nestled amidst the majestic Drakensberg mountains, Lesotho is a country rich in culture that faces both unique problems and wonderful opportunities as it works toward development. Like any other emerging country, the region's ability to attract mega-projects is essential to its ability to expand sustainably of development. The term development refers to an improved state of growth or advancement in a certain category. Putting a country's development into the equation, the term seems to hold a much broader value and importance due to the social capacity, health, education, political and economic developments being an integral part of a country. Deficiently, developing countries often hold higher degree of poverty which typically results in a lack of education, access to proper healthcare, discrimination, and a lack of adequate housing ultimately leading to a downfall of the social and economic practices of the country. Furthermore, the increase in population is leading to global emergencies due to rapid consumption of available resources and a fear of possible scarcity of these resources in the near future. Rapid increase in the population has struck the developing countries even deeper with unregulated urbanization (Davis, 2015), destitution, crime, pollution, and political upheaval (Kimengsi and Ndam, 2017). In addition, the advances in food production have been outpaced with a misuse and degradation of arable land due to the population pressure (Holechek et al., 2017). Therefore, the Rapidly growing population has also impeded economic development and resulted in widespread unemployment.

As mankind faces various sustainability challenges (Yan et al., 2018) i.e., the earth is being impacted by climate change, land use change, natural resource depletion, and biodiversity loss. Poverty, starvation, and a lack of health-care services demonstrate that many individuals are subject to fundamental societal expectations. All of these situations provided barriers to the process of development on local, national and global scale. Under the necessitation of supportive policy making decisions, the United Nations (UN) developed the 2030 Sustainable Development Agenda to guide the global transition to a more sustainable, inclusive economy (Elum et al., 2017). The basic function of the financial system is to distribute cash to the most productive use. Sustainable Finance investigates the connection between finance (investment and lending) and fiscal, social, and environmental issues. Finance and sustainability, at their heart, are concerned with the future, thus there is room for a new alignment (Schoenmaker, 2017).

The Lesotho Highlands Water Project (LHWP) is one of the largest hydropower projects in Africa. The LHWP Phase I project, which began in 1986 and was completed in 2009, involved the construction of several large dams as well as other infrastructure such as roads, bridges, and power lines, the relocation or resettlement of approximately 400 Basotho households, and the provision of compensation and development programs to local communities affected by the inundation of villages, fields, and grazing lands. This project also provided remuneration to the wasted/destroyed natural resources in Lesotho's population (Devitt and Hitchcock, 2010). The excellent water infrastructure programme of LHWP-I (Phase-I) is a key pillar in Lesotho's growth and development for decades to come. Following in the footsteps of this project, Phase-II of LHWP being approved in October, 2022 also involves several landmark constructions throughout Lesotho. The project is one of the main water infrastructure projects of the Southern African Development Community (SADC) for strengthening regional integration. Effectiveness of the project will be based on the development of future prospects and timely delivery of the projects' aims. Creation of jobs, generation of raw energy and

economic revenue generation for Lesotho are the main goals associated with the project. It's important to remember that the LHWP Phase II is a complex project with far-reaching consequences. The importance of Phase-II leads to the development of current research which focused on the overall performance of the project in attaining SDG's both in Lesotho and South Africa. Understanding the ideas and frameworks that govern the implemented measures of LHWP project is necessary for this study. Sustainable development frameworks are essential for evaluating the long-term viability of LHWP compensation. The succession and progress of LHWP-I, the plan of action of LHWP-II and the effect of plan of action of LHWP-II on the attainment of sustainable development goals are the three major points which are elaborated and explained in this section of the paper.

1.1. Rationale of the Study

Due to the negative effects of LHWP-I, there exists a number of uncertainties for the next phase of the project (LHWP-II). Considering the ground realities, current plan of action only serves as a map for the future constructions and developments associated with the project. Which is why, this study will not only provide a decent overview on the suspected reaction to the project but will also serves as the first of many researches to come which will keep a closer look on the developmental process of the project and attainment of SDGs in Lesotho. From a practical point of view, this study has a holistic approach in the terms of the following attributes which may in turn be the possible outcomes in practice. Firstly, it may aid to determine the most successful approaches and best practices by researching how initiatives support Lesotho's sustainable development objectives. Secondly, by optimizing project planning procedures which can be achieved by comprehending the connection between projects and national sustainable development goals. Thirdly, this kind of study can help improve interactions amongst range of stakeholders, such as local communities, government agencies and the business sector. Thus, emphasizing on the importance cooperation and partnerships for more successful project execution and positive impact. Lastly, through this study we can help improve project outcomes evaluation and monitoring, as well as project alignment with sustainable development goals. Moreover, from a theoretical Perspective, our study has potential of significant value thereof. Firstly, it can contribute to the corpus of knowledge already in existence by providing insights into the ways in which initiatives might assist the accomplishment of sustainable development goals. Secondly, it can aid in the understanding of the interdependence of different stakeholders and elements in sustainable development initiatives by scholars and practitioners. Thirdly, by researching the link of the projects and the SDGs might improve conceptual models used to evaluate how projects affect sustainable development. It may result in the creation of more reliable frameworks and procedures for assessing the long-term impacts of initiatives on social, economic, and environmental fronts. Thus, we can project improved and evolved sustainable development theory by contribute to conversations on practical methods of attaining sustainable development in various settings.

2. Methods

The study involves a secondary mode of research based on empirical evidences located in government/public sector documents, scientific papers and global reports. Document analysis involved reviewing institutional records, journal articles, study reports, policies, and newspapers. Clark et al.,2021 defined document analysis as a secondary data gathering strategy that analyses data from other researchers, institutional policies, and reports. This strategy helps researchers understand the historical context of the phenomenon under study. This method is useful for verifying data from numerous sources and evaluating progress and improvement. The LHWP's historical planning, initiatives, and reports were obtained through document analysis.

2.1. Data collection and evaluation

Different online data bases including Google Scholar, Science Direct, Elsevier, Jstor etc., were used as founding sources for identifying important documents related to current research. Data obtained through these sources was subjected to scientific analysis conducted through Microsoft excel. Due to the nature of study, data analysis was limited to the construction of figures and results were purely based on available literature.

3. The Progression of LHWP-I

Large dam construction is a common strategy for fostering development both locally and worldwide. The existing rivers have undergone extensive development, including the construction of different dams to harness water resources (Shi et al., 2019). LHWP-I which was initiated in the year 1980 with the aim to harnessing the waters of the Senqu/Orange River in the Lesotho highlands by building a series of dams for the mutual benefit of both South Africa and Lesotho. The completion of Katse Dam and a transfer tunnel in the Katse region (Phase 1A) followed by Phase 1B consisting mostly of the Mohale Dam, located at the confluence of the Senqunyane and Likalaneng rivers. The Mohale Tunnel, measuring 32 km, connects this dam to the Katse Dam. The tunnel aims to carry water from Mohale Dam to Katse Reservoir, increasing its storage capacity. The project also includes building of the Matsoku weir and diversion tunnel. These are built to redirect flood waters from the Matsoku River into the Katse Dam. The progress achieved in the LHWP (Phase I) is presented in figure 1. While dam building promotes growth, it raises concerns about the impact on local residents. Dams can have significant socioeconomic implications for communities, including displacement and relocation (Ranasinghe, 2012). In specific reference to LHWP, Gwimbi and Rakuoane, 2019 reported alterations in the flow patterns of downstream rivers and the general status of riparian habitats due to LHWP (Phase I). Excessive cattle grazing has resulted in widespread riparian zone deterioration and soil erosion, endangering people's livelihoods. The riparian zone was characterized by the loss of shrubs and grass, as well as the incursion of woody vegetation into channel sloughs. Community residents downstream of LHWP dams reported decreased fish populations in rivers, grass for thatching and crafts, wild fruits, cattle grazing pastures, food supplies, medicinal plants, and timber. Interestingly, long before the establishment of the LHWP, livestock overgrazing was noted as a major contributor to the deterioration of riparian habitats. In addition, Skefu, 2018 found a positive effect of LHWP with convincing evidence on the improvement of livelihood among communities of Katse and Lejone yet there existed several negative effects of LHWP. The project possessed a variety of hazards, including landlessness for crop production, burial sites, food insecurity, poverty, inaccessibility to common goods such as forests and indigenous plants that support their livelihoods, grazing areas for animals, movement restrictions to neighboring villages, and isolation from relatives on the other side of the dam. Further, D'antoine, 2021 also found greater negative impacts of the project due to destabilization and de-localization of local communities. On top of food insecurity and poverty, the findings revealed an incompetency of LHDA for their restoration policy of the migrants resulting in worsening of their livelihood conditions. Several other studies have also reported the negative outcomes associated with LHWP-I (Mwangi, 2021, Braun, 2020). However, one of the most recent research by Wendt, 2023 reported that many of the faults of the LHWP stem from the reparations themselves, rather than the initiative's motivations. The LHWP has been criticized for failing to compensate affected communities for financial and ecological expenses associated with dams, tunnels, and power plants. This is not due to the severity of their design, but rather a lack of a planned social welfare strategy. Neglect, as well as unaccounted-for unfavorable civic externalities, hampered restoration attempts for local populations. These researches thrived to expose the differences between documented outcomes and ground realities. Regardless of these negative effects, the

LHWP-I was considered important enough by the policy makers which expanded the project into a second phase.

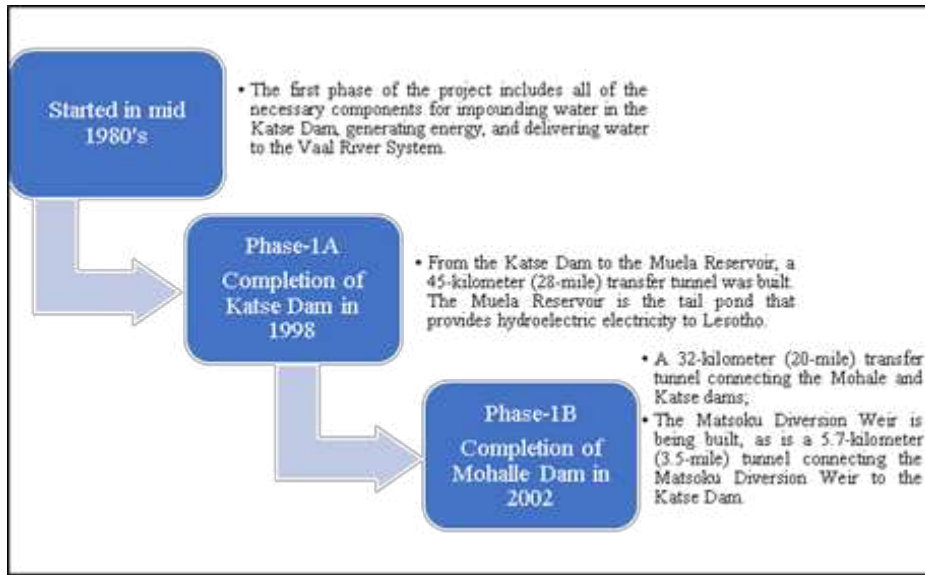


Fig. 1. History of LHWP (author's illustration)

4. Initiation and Suspected Course of Action

The successful accomplishment of LHWP-I provided a way point to future mega projects in the region. Following its predecessor, LHWP-II aims to provide water security in South Africa's Gauteng region and to boost Lesotho's socioeconomic growth through increased infrastructure and hydropower generating capacity (African Development Bank, 2021). Land acquisition from local communities is required to conduct Phase II. The Polihali Dam and reservoir will flood approximately 5,000 hectares of land in the Senqu and Khubelu River basins and tributaries. This will have a severe influence on the local population's livelihoods and socioeconomic standing, since homesteads, agriculture land, trees, grazing area, and other natural resources will be flooded, limiting access to resources and amenities (Lesotho Highland Development Authority, 2023). Although, these effects seem massive on the local population, there exists a treaty for consolidating these problems with the providence of alternate grounds, homes and additional development for the suffering populations between Lesotho and South Africa (Vinti, 2022). The second phase of the projects involves several measures including construction and upgradation in targeted areas (see Fig. 2). LHWP-II will provide additional annual water transfer capacity of 1260 cubic meter million from Lesotho to South Africa. Variety of construction schemes involving 2 major bridges at Khubelu and Senqu, 2 schools, 96 permanent housing amenities, community development center, health care center and 350 households for the re-settlers from Mokhotlong and surrounding regions. As, the construction of the Polihali Dam and reservoir, as well as the related access roads, bridges, lodging, and telecommunications infrastructure, will have an influence on these communities. Considering the geography and resources of Lesotho, the LHWP-II will provide with suitable solutions for the required development of the country. The water provided and transported to the Vaal River System would assure water supply for home use, irrigation, industry, and mining, with typical clients being

Rand Water, Midvaal Water, Sedibeng Water, ESKOM, and SASOL. Rand Water provides water to over 12 million people, including Greater Johannesburg, Tshwane Metro, Ekurhuleni Metro, Emfuleni Metro, and others, with an average daily usage of 4,460 million liters. The total socioeconomic effect in South Africa comprises the creation of 120,000 employment opportunities and more than 420,000 indirect jobs during the project's operation period (African Development Bank, 2024). In addition, the project will provide with optical ground wire to the targeted population enabling effective telecommunication in the area. Considering these reports, the initial problems of the re-settlers might be great but the promise provided by the project will give a huge boost to the development of Lesotho in general.

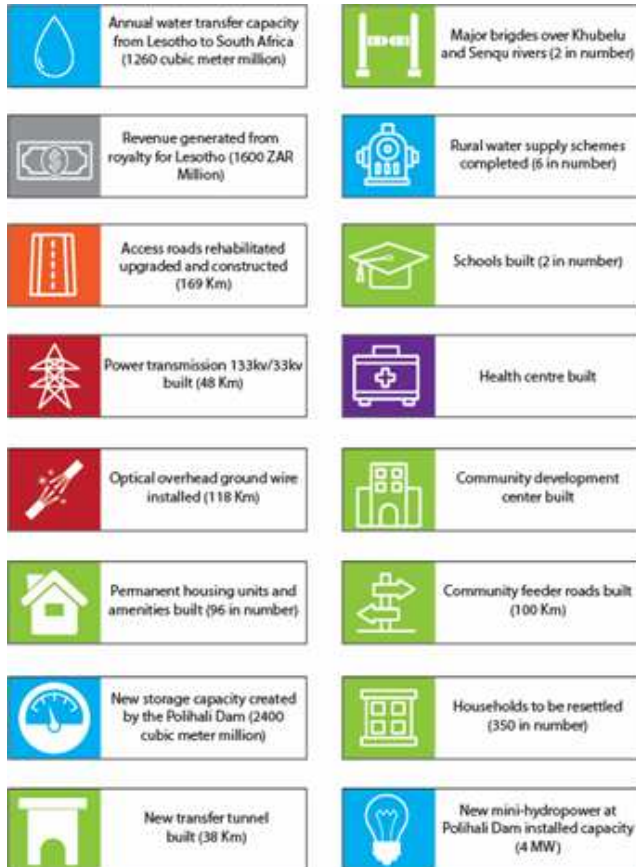


Fig. 2. LHWP-II expected outcomes (African Development Bank Portal, 2021)

5. Results and Discussion

5.1. Status of SDGs in Lesotho

Sustainable Development Goals being the set targets for development of a country is not just a lofty aspiration, but an essential pathway to a brighter future. Lesotho, like many countries worldwide, faces

challenges in achieving the SDGs due to political and economic situations of the country (Leshoele, 2021). Ideas such as environmental sustainability, good health and well-being, and human rights are particularly effectively handled, demonstrating a high level of national commitment to acquiring information, skills, and attitudes relevant to SDG attainment. However, economic sustainability, gender equality, and promoting peace and non-violence are often overlooked. Despite advances, access to WASH infrastructure in schools is limited, and internet connectivity and computers are only offered in a few private primary and lower secondary schools (Nko, 2021). According to a report from the United Nations, 2023, Lesotho had available resources with a total worth of 17.8 million Dollars with a major chunk (48.5%) being targeted towards achieving zero hunger in the region. The same report showed 14.2% investment in peace and strong institutions, 8.2% in climate action, 6.1% in poverty eradication, 5.7% on partnerships for SDG goals achievement, 3.3% on good health, 3.3% on decent jobs and economic growth and 3.1% on gender equality. The research of Kali, 2020 demonstrated that the Lesotho government has narrowed the gender gap in terms of educational achievement, health, and survival. It has also established a strong social protection system to alleviate poverty among the elderly, persons with disabilities, children, and women in the country. Lesotho is a country that is still considered impoverished, ranking 26 among the poorest countries in the world (Ventura, 2024). These factors of social disability and developmental concerns has a direct impact on the food security of Lesotho. Considering zero hunger to be the primary target of Lesotho's revenue, Zereyesus et al., 2022 estimated Lesotho to make the most progress towards poverty eradication by the year 2032. Each of the individual SDG has been under consideration by the government of Lesotho and projects like LHWP provides the basic entities for achieving these SDGs.

5.2. The role of LHWP-II in achieving SDGs

Sustainable development is of paramount importance for the well-being of the planet and its inhabitants. It is a holistic approach that aims to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development is essential for preserving the planet and ensuring a better future for generations to come which is why, the global agenda adopted by all the members of UN provided a total of 17 SDG goals (Nations, 2015). It offers a framework that integrates environmental, social, and economic dimensions, fostering a harmonious relationship between people and the planet. Similar to LHWP-I, LHWP-II is of great importance for meeting SDGs among the partnered countries (South Africa and Lesotho). Various aspects of this project would help in attaining a variety of SDG's both separately and collectively (Table 1).

Table 1: Link of LHWP-II with SDGs in Lesotho (author's illustration)

Attributes	Linked SDGs
Water transfer and supply schemes	1, 2, 6, 8, 9, 10, 11, 15
Housing schemes and resettlement	1, 3, 8, 9, 10, 11, 16
Construction of roads, bridges and tunnels	1, 3, 4, 5, 8, 9, 10, 11, 16
Direct revenue generation	1, 2, 3, 4, 8, 10, 17
Upgraded storage capacity and power transmission	1, 3, 4, 7, 8, 9, 10, 11, 12, 16
Hydropower energy	7, 8, 12, 13
Health center and school	1, 2, 3, 4, 5, 8, 9, 10, 15, 16
Optical overhead ground wire	4, 8, 9, 11, 16

- The water transfer and supply schemes associated with the project will help in achieving various SDG's including 1 (no poverty), 2 (zero hunger), 6 (clean water and sanitation), 8 (decent work and economic growth), 9 (industry innovation and infrastructure), 10 (reduced inequalities), 11 (sustainable cities and communities) and 15 (life on land). Although, most the water will be supplied to South Africa's Vaal River system, the project will still help in achieving the discussed SDGs in Lesotho due to the development of rural water supply schemes.
- Housing schemes and resettlement will provide assistance for achieving SDGs associated with 1 poverty alleviation (1), good health and wellbeing (3), decent work and economic growth (8), industry innovation and infrastructure (9), reduced inequalities (10), sustainable cities and communities (11) and peace, justice and strong institutions (16). These housing schemes will not only help in the resettlement of the communities being affected by the construction of dam but also provide development to the surrounding areas (Gupta, 2022). Housing and resettlement programs will be implemented as part of the social and environmental impact mitigation measures associated with large infrastructure involved in LHWP-II.
- Construction of roads, bridges and tunnels with in the LHWP-II will help in achieving SDG 1 (no poverty), 3 (good health and wellbeing), 4 (quality education), 5 (gender equality), 8 (decent work and economic growth), 9 (industry innovation and infrastructure), 10 (reduced inequalities), 11 (sustainable cities and communities) and 16 (peace, justice and strong institutions). Due to the mountain based territorial structure (Letsie, 2018), the construction of new roads/bridges and the upgradation of the already available roads will be a huge booster to the economic stability of Lesotho. These roads will increase connectivity between areas surrounding the project ultimately helping in the attainment of said SDG's.
- Direct revenue generation for the people of Lesotho will help achieve SDGs including 1 (no poverty), 2 (zero hunger), 3 (good health and wellbeing), 4 (quality education), 8 (decent work and economic growth), 10 (reduced inequalities) and 17 (partnerships for goals). Lesotho can benefit from revenue generation through LHWP-II which require various utilization strategies to turn it into economic opportunities. In other words, by adopting a holistic approach that combines economic diversification, effective governance, and strategic investments, Lesotho can maximize the benefits of revenue utilization for the attainment of discussed SDGs.
- Upgraded storage capacity and power transmission to the people of Lesotho will enable in achieving SDGs associated with no poverty (1), good health and well-being (3), quality education (4), affordable and clean energy (7), decent work and economic growth (8), industry innovation and infrastructure (9), reduced inequalities (10), sustainable cities and communities (11), responsible consumption and production (12) and 16 (peace, justice and strong institutions). LHWP-II will provide with improved power quality and modernization in the energy infrastructure enabling greater regional energy trade for the people of Lesotho. Upgrading power transmission infrastructure in Lesotho can lead to improved energy access, economic development, environmental sustainability, and overall resilience in the face of evolving energy needs and challenges.
- Further, Hydropower energy will help in achieving SDGs for affordable and clean energy (7), decent work and economic growth (8), responsible consumption and production (12) and climate action (13). Hydropower will prove to be a source of clean and renewable energy that generates electricity by harnessing the energy of flowing water. The hydropower generated as part of LHWP-II can

contribute to regional energy cooperation. Surplus electricity can be supplied to neighbouring regions, fostering collaboration in energy distribution and enhancing energy security.

- The construction of health centre and schools within the LHWP-II project will help achieve SDG's 1, 2, 3, 4, 5, 8, 9, 10, 15, 16 associated with no poverty, zero hunger, good health and wellbeing, quality education, gender equality, decent work and economic growth, industry innovation and infrastructure, reduced inequalities, life on land and peace, justice and strong institutions, respectively. The construction of a health centre and schools in LHWP-II are fundamental components of a thriving and healthy society. They will contribute to individual well-being, community development, and the overall progress of the nation. The provision of accessible and quality healthcare and education is critical for fostering a prosperous and sustainable future in Lesotho which will enable the achievement of the discussed SDGs in the region.
- Optical overhead ground wire installed during the project will help in quality education (4), decent work and economic growth (8), industry innovation and infrastructure (9), sustainable cities and communities (11) and peace, justice and strong institutions (16). Optical overhead wires, often associated with fibre-optic cables, can significantly enhance telecommunications infrastructure by providing lightning-fast internet connectivity. These wires can enhance connectivity in remote and underserved areas. Optical overhead wires installed in the LHWP-II will support the implementation of e-learning platforms and digital educational resources. Regardless of the providence of these wires to the region, the specific application and impact of optical overhead wires in Lesotho would depend on needs and the extent of the technological infrastructure deployed.

6. Conclusion

Sustainable development goals provide ways of development for every developing nation which makes them a necessity for a lower income country like Lesotho. Lesotho's involvement in mega projects like LHWP is of paramount importance for the nation's sustainable development and economic growth. LHWP Phase-II stands as a transformative project for Lesotho, addressing critical issues such as water security, economic development, infrastructure improvement, energy generation, regional cooperation, and drought mitigation. In return for this partnership, South Africa will gain sufficient water reservoir and safe water supply to nourish the livelihood and industry of the nation. Collectively, Lesotho will gain a lot more from this partnership with enough positive impacts to meet almost each of the SDG goal in the region. LHWP-II builds on the progress established in the first phase of the project, but because of the difficult consequences that the LHWP-I resettling communities had to deal with, there is some uncertainty associated with it. LHWP-II may be in a challenging situation as a result of these uncertainties, which could have a negative impact on the project's results. Given that LHWP-I had some detrimental effects on the re-settlers, LHWP-II must put up more robust procedures to protect the rights of those impacted by the endeavor. Visits with those impacted by LHWP-I should be made, and data-driven studies on their opinions and expectations on the inclusion of local communities in LHWP-II should be undertaken. Such projects are highly valuable to Lesotho economically and socially, hence the LHDA and other authorities should keep an eye on the established frameworks and adjust them as needed. In order to improve phase II's acceptability, the authorities should investigate and attempt to rectify the issues related to LHWP-I prior to the start of the heavy working schedule. To give a quick overview to the general public, several focused campaigns emphasizing the significance of large-scale initiatives in the area should be created and executed in public spaces and government buildings. It cannot be ignored that projects of this nature have a significant role in the improvement of local communities hence the need to establish a continuous research and development with a view to sustain an effective link between

development goals and such projects. Thus, we conclude by acknowledging the need for more researches and evaluation on the similar subject henceforth.

6.1. Limitations

This study used a novel approach to study the outcomes associated with LHWP-II as well as its effect on achieving SDG's. However, there are certain limitations associated with this study.

- Data plays a primary role in the assessment of a project's trajectory and success while until this point, the only available data on LHWP-I provided a great majority of challenges to the project due to the environmental and social after effects.
- This research focused on a stand point of ideal situation where most the projects plan will be executed successfully without considering any political, social and environmental changes that might take place in the near future and effect the outcomes of LHWP-II entirely.
- This study was limited to only one particular project that may have an effective contribution to the country's performance to achieve the SDGs but not focusing on the national initiatives performed by the government and other entities to achieve the SDGs as a country.

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