European Journal of Social Sciences Studies
ISSN: 2501-8590
ISSN-L: 2501-8590
Available on-line at: www.oapub.org/soc

doi: 10.5281/zenodo.1410616 Volume 3 | Issue 2 | 2018

THE SOCIO-ECONOMIC IMPACTS OF DAM CONSTRUCTION: CASE OF TOKWE MUKOSI IN MASVINGO PROVINCE, ZIMBABWE

Evans Chazireni,
Tanyaradzwa Chigonda
Department of Physics, Geography and Environmental Science,
Great Zimbabwe University, Masvingo, Zimbabwe

Abstract:
Dam construction projects can cause significant socio-economic impacts on the surrounding communities. The impacts can be both positive and negative. The current study sought to examine the socio-economic impacts of the construction of Tokwe Mukosi Dam to the surrounding communities. Research methods included key informant interviews and a questionnaire survey. The results from the study showed that Tokwe Mukosi Dam has both positive and negative impacts on communities around the dam. It emerged from the study that the positive socio-economic impacts of the construction of Tokwe Mukosi Dam included: increased availability of fish; water provision for livestock production, irrigation and domestic purposes; and tourism development and associated income enhancement. On the other end, there were also negative impacts of dam construction revealed by the current study including: drowning of people; attack of people and livestock by crocodiles; displacement of people; and increased incidences of water-borne and vector-borne diseases. Various recommendations are suggested to minimise the negative impacts of Tokwe Mukosi Dam to local communities and enhance the positive impacts including: awareness programmes to minimise dangers of drowning of people and attacks by crocodiles; health care interventions by the government and other stakeholders to prevent or minimize water-borne diseases and vectors; development of tourist facilities by locals in partnership with other entities to enhance benefits from tourism; training of locals in aquaculture so as to increase benefits from fish resources; and the setting up of an Integrated Environmental Management Plan to enhance the long term conservation and sustainable utilisation of the dam and its resources.

Keywords: dam construction, socio-economic impacts, water-borne diseases, dietary protein, irrigation

1. Introduction

The consequences of large dam constructions are varied and numerous. These include direct and indirect impacts on the socio-economic, chemical and bio-physical environments. Dam constructions are normally large-scale investments meant to fulfill numerous socio-economic benefits. While there are benefits associated with dam construction, such projects often pose serious problems with far reaching implications. Numerous scholars (Canter, 1985; Mudzengi, 2012; Bond and Manyanya, 2002) concur that dam construction can cause severe socio-economic negative impacts. The construction of Kariba Dam caused devastating disease and loss of livelihoods among the Tonga people (Bond and Manyanya, 2002). With growing worldwide environmental awareness, there is increasing attention on the impacts of dams on communities. This implies that there is need for a better understanding of the socio-economic impacts of dam construction. The main objective of the current study is to assess the positive and negative socio-economic impacts of the construction of Tokwe Mukosi Dam in Masvingo Province of Zimbabwe. The study will also recommend remedial measures that can be used to minimize identified adverse socio-economic impacts of Tokwe Mukosi Dam and enhance the beneficial impacts. In pursuing the study objective, the research was guided by the following research questions:

- What are the positive socio-economic impacts of Tokwe Mukosi Dam to surrounding communities?
- What are the negative socio-economic impacts of Tokwe Mukosi Dam to surrounding communities?
- What measures can be taken so as to mitigate the negative socio-economic impacts and enhance the positive impacts?

Since it is a recently completed dam construction project, the socio-economic impacts of Tokwe Mukosi have not been studied by many researchers, hence the significance of the current study in filling an important research gap. The findings of the study could also feed into ongoing monitoring and auditing activities by the project developers. Project monitoring provides the basis for fine-tuning mitigation measures, while auditing involves checking on environmental management practices to see whether they comply with what should be done.

2. Area of Study

Tokwe Mukosi dam is located in Masvingo Province (See Figure 1). The Dam is built on the point where two rivers namely, Tokwe and Mukosi converge, giving rise to the use of the name Tokwe Mukosi Dam. Tokwe Mukosi area lies in Zimbabwe's agro-ecological Region IV. This is a semi-intensive agricultural region experiencing a mean annual precipitation averaging between 300-600mm with a 40-45 percent coefficient of variation. It is subject to periodic seasonal droughts and prolonged dry spells during

the rainy season. Mean annual temperature is between 25-27.5 degrees Celsius (Chenje *et al*., 1998).

Construction on the dam began in June 1998 but stalled in 2008 due to lack of funding. Construction was resumed again in 2011 and stalled again in 2014 due to lack of funding. Finally, construction was resumed in 2016 and eventually completed in December 2016. The commissioning of the dam was done in May 2017. Tokwe Mukosi is the largest inland dam in Zimbabwe with a 90-metre dam wall, a back throw of over 35 kilometres and capacity to hold more than 1.8 billion cubic metres of water. Tokwe Mukosi is Zimbabwe`s biggest development of the 21st century (Tapfumaneyi, 2014).

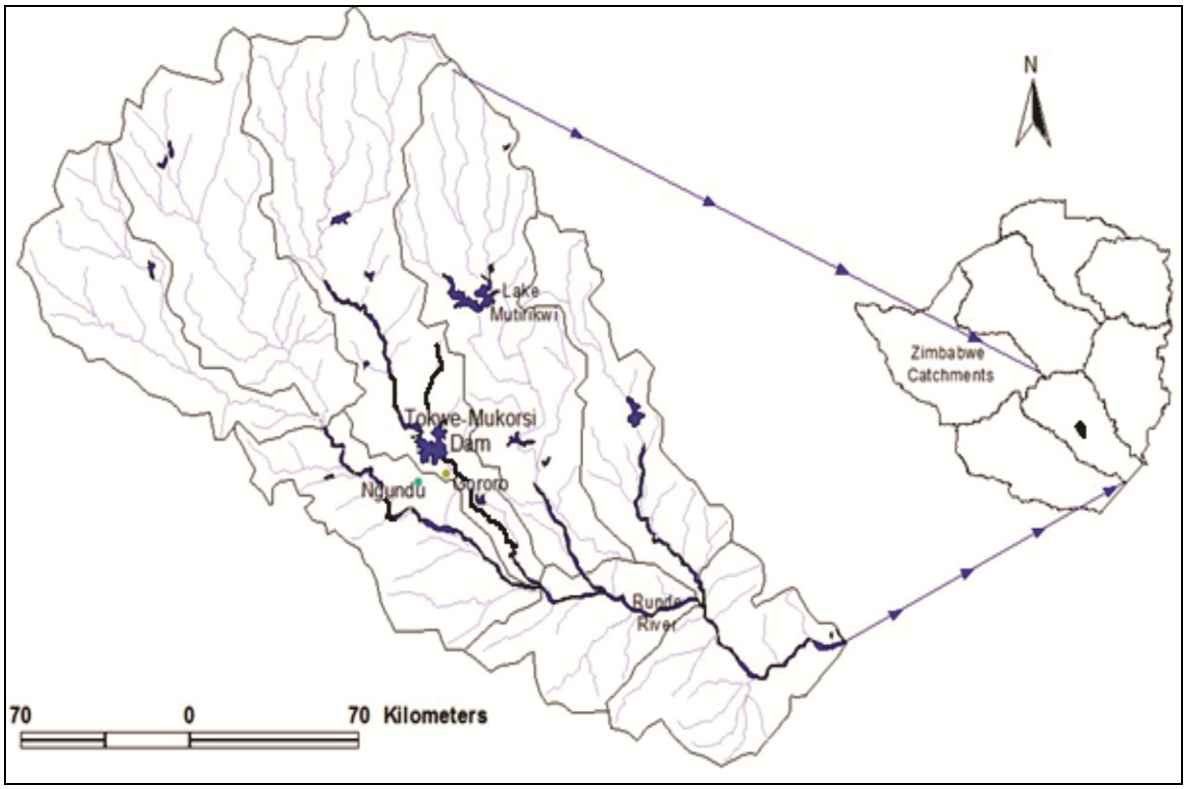

Figure 1: The Location of Tokwe Mukosi Dam in Masvingo Province, Zimbabwe

According to Payne (2014) Tokwe Mukosi Dam was a planned project whose impact had the outcome of displacing families from the flood basin to the designated relocation sites. The plan span was four years and the first group of 600 households was relocated in 2013 (Bote, 2014). Dam construction resulted in the disruption of livelihood activities as people were made to relocate at short notices, some with the involvement of the police and the army.

3. Research Methodology

Research techniques for this study included key informant interviews and a questionnaire survey. Key informant interviews were carried out with the Zimbabwe National Water authority (ZINWA) officer at Tokwe Mukosi, Zimbabwe Parks and Wildlife Management Authority (ZPWMA) officer based in Masvingo City and an

Agricultural Research and Extension Officer around Tokwe Mukosi area to obtain data on the socio-economic impacts of Tokwe Mukosi Dam construction to the surrounding communities. The key informants were selected using purposive sampling. A total of 60 questionnaires were administered in the villages in the area around Tokwe Mukosi to obtain data on how their livelihoods are being impacted upon by the construction of Tokwe Mukosi Dam. The survey questionnaires were targeted at household heads. The stratified random sampling method was used to select households to take part in the questionnaire survey. The households were first stratified according to village boundaries in the study area. Random sampling was then used in each stratum, using proportional representation, to select the households for questionnaires interviews. Names of all the household heads in each village were written on small pieces of paper and then put in a container. Names were then randomly picked from the container for questionnaire interviews.

A mixed methods design was therefore adopted as the strategy of inquiry. This design uses both quantitative and qualitative approaches. The choice of the mixed methods approach was due to numerous reasons. These include, inter-alia, the viewing of a problem from multiple perspectives to enhance and enrich the meaning of a singular perspective and triangulation of results to provide more meaningful illustrations of context and trends. Descriptive statistics were used in analysing quantitative data from the questionnaire, while qualitative data gathered through interviews were analysed using thematic and content analysis.

4. Results and Discussions

4.1 Positive Socio-Economic Impacts of the Construction of Tokwe Mukosi Dam

Figure 2 illustrates the positive socio-economic impacts of Tokwe Mukosi Dam to surrounding communities. The construction of Tokwe Mukosi Dam has increased access to fish by the local communities. From the questionnaire respondents, sixty seven percent (67%) of the respondents felt that increased provision of fish to the local community was of great importance. In addition to fishing by individual households, the Zimbabwe Parks and Wildlife Management Authority has also launched aquaculture at Tokwe Mukosi. Fish boosts the diets of the local residents, particularly the protein nutrients in the diets.

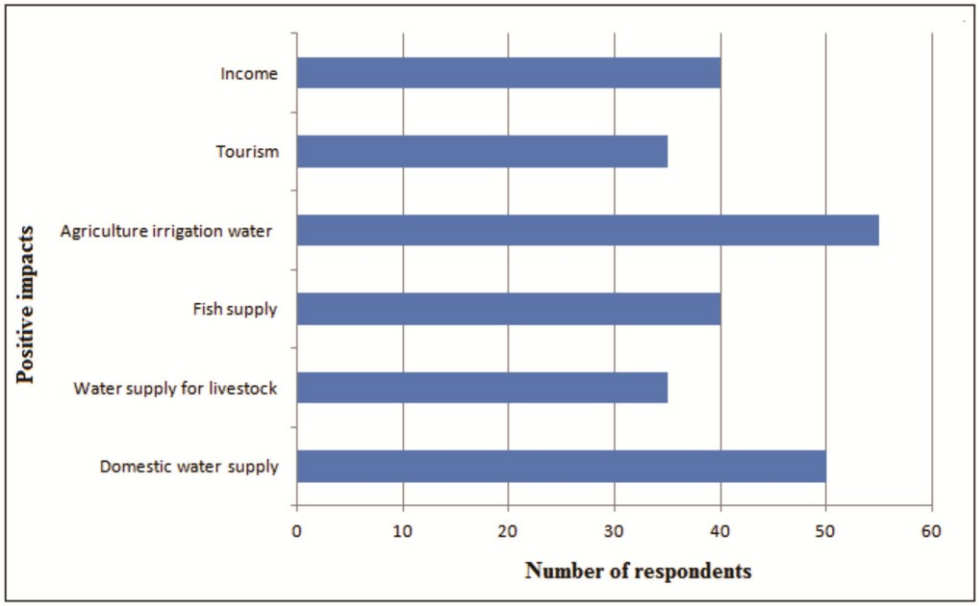

Figure 2: The positive impacts of dam construction in Masvingo Province
Source: Field survey

Tokwe Mukosi Dam is also essential in that the livestock in the area does not suffer from water shortages. The percentage of questionnaire respondents who owned livestock was ninety five percent (95%). Fifty eight percent (58%) of the questionnaire respondents from the villages around Tokwe Mukosi indicated that constant supply of water for livestock by the dam is of great importance. Tokwe Mukosi dam also provides water for domestic uses that include laundry, bathing, and cooking. Eighty three percent (83%) of questionnaire respondents indicated that the dam is of benefit in providing domestic water. Unfortunately, some residents were using the water from the dam for drinking purposes. This highlights the inadequacy of clean and safe potable water in the rural areas of Zimbabwe (Chigonda and Chazireni, 2018). Mazvimavi (2010) further notes that forty percent (40%) of the population in Southern Africa has no access to clean potable water. Tokwe Mukosi also supplies water for irrigation particularly in the farms in Hippo valley, Triangle and Chiredzi. A large percentage (92%), of the questionnaire respondents indicated that the construction of Tokwe Mukosi is very important in supplying irrigation water in the south-east lowveld region of Zimbabwe. This finding is in line with Auret (1990) who states that the need for irrigation development in Zimbabwe is critically necessary to supplement dryland cropping and to provide food security in the country. Irrigation development is of great importance in the face of climate change and the associated increased frequencies of extreme climatic events, particularly El Nino and related droughts. Fifty eight percent (58%) of the questionnaire respondents indicated that tourism activities in the area had been boosted by the construction of Tokwe Mukosi Dam. In addition to the above, sixty seven percent (67%) of the questionnaire respondents indicated that people in the surrounding communities have increased incomes due to Tokwe Mukosi dam, mainly through the selling of fish and also the selling of various crafts to tourists.

The above questionnaire responses were generally in agreement with responses from interviewed key informants. The key informant from ZINWA succinctly summarised the positive impacts of Tokwe Mukosi in Masvingo province by stating that: *"The major positive impacts of Tokwe Mukosi Dam are that the dam provides fish to the surrounding communities and there is also a constant supply of water for livestock as well as for domestic use. The dam is also now a major source of water for irrigation particularly in the south-eastern lowveld area of Zimbabwe."*

It also emerged during the interview with the Agricultural Research and Extension Officer around Tokwe Mukosi that the dam supplies water to the plantations in Chiredzi, Hippo Valley and Triangle.

4.2 Negative Socio-Economic Impacts of the Construction of Tokwe Mukosi Dam

Figure 3 summarises the negative socio-economic impacts of Tokwe Mukosi Dam to surrounding communities. Forty five percent (45%) of the questionnaire respondents indicated that the construction of Tokwe Mukosi Dam has resulted in increased incidences of water-borne and vector-borne diseases such as malaria and schistosomiasis in the area around Tokwe Mukosi. These water-borne and vector-borne diseases have resulted in increased incidences of absenteeism from school by affected students, thereby negatively affecting their learning. Four percent (4%) of the questionnaire respondents also felt that financial costs of hospitalization due to increased water-borne and vector-borne diseases as a result of the construction of the dam was also a major concern. The increased illnesses are also resulting in reduced labour productivity for affected households. The findings of the current study are in agreement with the findings of many other scholars (Newson, 1997; Bond and Manyanya, 2002; Adams, 1992; Clarke, 1991) who concur that devastating water-borne and vector-borne diseases are introduced by reservoirs such as dam constructions and their associated irrigation works.

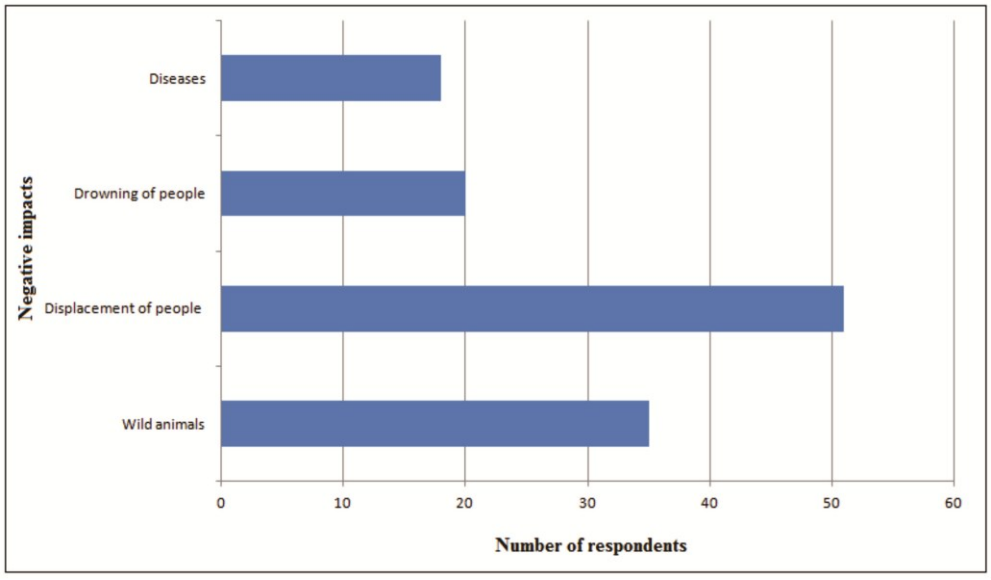

Figure 3: The negative impacts of dam construction in Masvingo Province
Source: Field survey

Drowning of people has also been mentioned by communities around Tokwe Mukosi Dam. Thirty three percent (33%) of the questionnaire respondents indicated that drowning of people is a negative impact of the construction of Tokwe Mukosi Dam. Such drownings mainly occur during fishing or swimming. Closely related to the above was the problem of wild animals attacking people and livestock around Tokwe Mukosi Dam, with crocodiles indicated as the major threat. The problem of wild animals attacking people and livestock as a negative impact of dam construction was mentioned by thirty four percent (34%) of the questionnaire respondents.

Many people have also been displaced to make way for the construction of Tokwe Mukosi Dam. The displacement of locals due to the construction of the dam was acknowledged by 87% of the questionnaire respondents. Displacement of people as a problem associated with dam construction has been echoed by other scholars (Adams, 1992; Scudder, 2005; Brokensha and Scudder, 1968) who generally concur that dam construction leads to resettlement of people to other areas. Such resettlement of people disrupts their usual ways of living.

There were numerous similarities between the responses from questionnaires and those from the interviews. The key informant from Zimbabwe National Water Authority at Tokwe Mukosi summarised the negative impacts of Tokwe Mukosi Dam construction in Masvingo Province by indicating that: *"There are numerous problems that have been experienced since the dam was constructed in the area. One of the problems has been the drowning of people in the dam and the attack of people by wild animals such as crocodiles. These problems have particularly been experienced by people during fishing, when fetching water or when swimming."*

The key informant from ZPWMA basically concurred with the Zimbabwe National Water Authority officer but he further reiterated that the displacement of people prior to the construction of the dam disrupted the normal lives of the people.

5. Conclusion and Recommendations

The study has revealed that the construction of Tokwe Mukosi Dam has brought about both positive and negative socio-economic impacts to the surrounding communities. Among the positive impacts of the dam emerging from the study included: increased availability of fish; supply of water for livestock, irrigation and domestic purposes especially in drought years; and increased tourism activities which have enhanced the incomes of local people through, *inter alia*, traditional crafts making and selling. The negative socio-economic impacts of dam construction emerging from the study included: drowning of people; attack of people by wild animals, particularly crocodiles; displacement of people; and increased incidences of water-borne and vector-borne diseases. Although there were both positive and negative impacts of dam construction manifesting in the study area, on average, more questionnaire respondents tended to highlight the positive impacts compared to the negative ones as evidenced by Figures 2 and 3. It can therefore, be concluded that, according to the current study, the

construction of Tokwe Mukosi Dam has brought more positive impacts than negative ones.

The study ends by suggesting some recommendations to enhance the beneficial impacts of Tokwe Mukosi and minimize the adverse impacts. The recommendations include:

- The need to encourage local people around Tokwe Mukosi Dam to form some partnerships with external entities towards the construction of lodges and the setting up of boat cruising services. This will enhance local benefits from the booming tourism in the area, and prevent such benefits from being captured by outsiders.
- The need to train local people in aquaculture so that they enhance incomes derived from fish.
- Awareness programmes should be put in place to minimise dangers of people drowning, as well as attacks by crocodiles.
- Health care interventions need to be put in place particularly on infectious diseases closely linked with water. Health officials should also ensure that incidences of malaria and schistosomiasis in the Tokwe Mukosi area are kept at a minimum or, if possible, completely eradicated. As much as possible, aquatic vegetation should be cleared to limit the shelter of snails which are vectors for the transmission of schistosomiasis. There should also be some government interventions to reduce the dangers of malaria in the Tokwe Mukosi area. Such interventions could include encouraging people to apply mosquito repelling ointments to their body, supplying of mosquito nets to communities, prophylaxis treatment of the people with chloroquine, and spraying of houses and water bodies with anti-mosquito pesticides. Other preventive measures such as the growing of plant species that act as mosquito repellents around the dam area and frequent burning of cattle dung are comparatively much cheaper.
- Closely related to the above, those people getting their drinking water from the dam should pre-treat it either through boiling or through water tablets. In addition, more boreholes should be drilled in the areas around the dam so as to improve the supply of clean potable water.
- It is also critical that an Integrated Environmental Management Plan be put in place to ensure the long term conservation and sustainable utilisation of the dam and its surrounding environments. For this to be effective, local communities must be empowered so that they can actively participate in the local environmental management plan.

References

1. Adams, W.M. (1992) *Wasting the rain: Rivers, people and planning in Africa*, Earthscan Publications, London.

2. Auret, D. (1990) *A Decade of Development: Zimbabwe 1980-1990*, Mambo Press, Gweru.
3. Bond, P. & Manyanya, M. (2002) *Zimbabwe's Plunge: Exhausted Nationalism, Neoliberalism and the search for Social Justice*, Weaver Press Limited, Harare.
4. Brokensha, D. & Scudder, T. (1968) 'Resettlement', In Rubin, N. and Warren, W.M. (Eds.) *Dams in Africa: An Inter-disciplinary Study of Man-made Lakes in Africa*, pp. 20-62, Frank Cass and Company Limited, London.
5. Canter, L. (1985) *Environmental Impact of Water Resources Projects*, Lewis Publishers, Michigan.
6. Chenje, M., Sola, L. and Paleczny, D. (1998) *The State of Zimbabwe's Environment 1998*, Ministry of Mines, Environment and Tourism, Harare.
7. Chigonda, T. and Chazireni, E. (2018) Water Supply and Sanitation in Zimbabwe's Resettlement Areas: A Case Study Approach. *European Journal of Social Sciences Studies 2(11): 139-151.*
8. Clarke, R. (1991) *Water: The International Crisis*, Earthscan Publications Limited, London.
9. Mazvimavi, D. (2010). 'Climate Change, Water Availability and Supply', In Kotecha, P. (Ed.) Climate Change, Adaptation and Higher Education: Securing our Future: SARUA Leadership Dialogue Series Volume 2 Number 4, pp. 81-100, SARUA, Wits.
10. Mudzengi, B.K. (2012). An Assessment of the Socio-Economic Impacts of the Construction of Tokwe Mukosi Dam in the Mazungunye Area: Bikita District of Zimbabwe, *Journal of Sustainable Development in Africa*, Vol. 14, No. 4, pp. 1-17.
11. Newson, M. (1997) *Land, Water and development: Sustainable Management of river basin systems*, Frank Cass and Company, London.
12. Payne, A. (2014) *Corruption in Tokwe- Mukosi dam in Zimbabwe*. Available at, http://www.digitaljournal.com/new. Accessed on 27 January 2018.
13. Scudder, T. (2005) *The Future of Large Dams: dealing with Social, Environmental, Institutional and Political Costs*, Earthscan, London.
14. Tapfumaneyi, R. (2014) *Tokwe Mukosi: The untold positive side*, Available at http://www.newzimbabwe.com. Accessed on 27 January 2018.