



## Research article

# Mainstreaming health impact assessments in environmental impact statements into planning obligations in post dam construction in Metolong, Lesotho: A qualitative investigation

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## ABSTRACT

Health impact assessment (HIA) is internationally identified as a mechanism for ensuring that potential health impacts of project proposals are considered before project implementation. This study examined the inclusion of HIAs in environmental impact statement (EIS) and their translation into planning obligations of a dam project in Lesotho. A framework premised on the general systems theory, and integrating EIS contents, environmental management plans and monitoring obligations in post dam construction was used as the analytic lens. A review of the EIS was conducted to assess HIAs covered during the environmental impact assessment (EIA) of the dam. Data drawn from selected household questionnaire interviews and analysis of related documents was used to assess the extent of HIA mainstreaming into planning and monitoring obligations in post dam construction. Results showed inclusion of HIAs in EIS, including endemic diseases such as sexually transmitted infections (STIs) and HIV/AIDS, acute respiratory infections, pharyngitis, hypertension, influenza and diarrhea. Social, economic and environmental conditions were identified as major determinants of health; while mental and nutritional determinants of health were less discussed. The results also showed that some HIAs included in EIS influenced decision-making in relation to raising awareness of health issues in the community. Deficiencies were however reported by respondents in relation to mainstreaming of several HIA recommendations. HIAs can be useful in promoting community health and mitigating adverse impacts of decisions made by project proponents.

## 1. Introduction

Factoring in health impact assessments (HIAs) of local communities in environmental impact statements (EISs) can have a substantial impact on public health (Richter et al., 2010; Veronez et al., 2018). However, a review of literature demonstrates that, while HIA is a tool to help planners and other decision-makers better recognize the health consequences of the decisions they make, it is not covered adequately in EISs and the extent to which HIA's recommendations are translated into planning obligations remain questioned (Davenport et al., 2006; Dannenberg, 2016). In context, there is growing disquiet over the impact of large dams on health and well-being of nearby communities whose livelihoods degrade in post dam construction (World Commission on Dams WCD, 2000; Hanna, 2016). Often, local communities consistently complain that they do not benefit from dam water transfer and electricity generation projects, beneficiaries are hundreds of kilometers away at their expense, they are often consulted after projects have been authorized (Ison, 2009;

Harris and Spickett, 2011; Hanna, 2016), and developers perceive HIAs as a mere formality; while perceiving them as holding back economic development (Nakamura, 2008; Cooke et al., 2017).

The rationale for health impact assessment (HIA) is that many risk factors for community chronic diseases are influenced by development projects. HIA is a tool used to incorporate health considerations into the decision-making process of plans, projects, programmes and policies of such projects (Watterson et al., 2008). Its aim is to estimate the health effects of projects, programmes and policies in order to minimize potential negative impacts and maximize potential positive impacts (Dannenberg, 2016; Pereira et al., 2017). Because of this potential, the World Health Organization (WHO) and multilateral development banks have been strong and persistent voices calling for the recognition of the role of HIA in development, and, reciprocally, the impact of development on community health (Ison, 2009; Winkler and Utzinger, 2014). The WHO Gothenburg consensus paper of 1999 calls for the mainstreaming of HIAs into development planning to enhance community acceptance of such

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projects as well as improve their livelihoods (Ison, 2009; Winkler and Utzinger, 2014). However, despite the increasing use of HIA, its effectiveness is being questioned. Calls for more research to focus on the effectiveness of HIA are increasing especially in developing countries where several reports have called for its evaluation to determine its impacts and usefulness (Fischer and Cave, 2018).

In Lesotho, dams have been targeted as major sources of economic development and revenue by the Government of Lesotho since the establishment of the Lesotho Highlands Water Project in 1986 (Tilt et al., 2009; Hitchcock, 2015). The Lesotho Highlands Water Project is one of Africa's largest projects aimed at supplying water to South Africa and electricity to Lesotho (Tilt et al., 2009). The project includes five dams constructed in four phases over a period of 30 years. To date, three dams (Katse, Muela and Mohale) are completed while two others are still in the planning phases (Tilt et al., 2009). However, these dam projects also pose enormous risks to community health and wellbeing; including declining rural livelihoods, respiratory illness and mental health; as well as indirectly through the transmission of communicable diseases such as HIV and AIDS (Tilt et al., 2009; Hitchcock, 2015).

The Government of Lesotho through its EIA policy and legal frameworks now identify HIA as a means of ensuring that community health and wellbeing associated with dam projects are addressed. Metolong Dam, the focus of this study, was subjected to an EIA in 2008 (Rossouw and Walker, 2014). However, despite its potential contributions to sustainable development, communities are increasingly concerned about increased dam development project activities on their health and wellbeing. Given that HIA explicitly seeks to influence decision making, there have been no known attempt to evaluate its mainstreaming into planning obligations in post dam construction.

This study examined the inclusion of HIAs in EIS and their translation into planning obligations for Metolong Dam in Lesotho. A conceptual framework used to assess HIA effectiveness is explained first.

## 2. Conceptual framework for understanding HIA effectiveness

The conceptual framework proposed for understanding the effectiveness of HIA in this study emphasizes the integration of three domains, through a systems thinking approach: EIS contents for informing decision-makers, environmental management plans for confirming the translation of paper promises into practice and EIA follow-up for monitoring effectiveness of implemented decisions (Figure 1). The framework considers both input, process and outcome in its approach.

The WHO defines HIA as a set of tools and procedures to judge health policies, plans, or programs by systematically evaluating the potential effects of development projects on public health (WHO, 1999). This

definition incorporates the WHO broad definition of health that covers aspects of physical, mental, and social well-being, considering both positive and negative aspects of health (Kemmer and Parry, 2004). According to the World Health Organization, health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, 1948).

Sadler (1996: 37) defines effectiveness as “how well something works or whether it works as intended and meets the purpose it is designed”. In context, Wismar et al. (2007) define effectiveness as the ability of HIAs to influence decision-making and be taken into account by decision-makers. Bekker et al. (2005) argue that evaluating HIA effectiveness should focus on documenting its influence on decisions and examining its adherence to its underlying values. There is general and increasing recognition within the broader field of EIA that when assessing HIA effectiveness, it is important to take into account a holistic perspective of all those components influencing it because viewing effectiveness in narrow terms overlooks and misrepresents how it works in reality (Haigh et al., 2015). Literature highlights common shortfalls in current HIA effectiveness evaluations. The shortfalls include insufficient inclusion of HIAs in EIS rendering the document of little influence in decision making (Ross et al., 2006), failure to translate those HIAs included in EISs into planning obligations and conducting effective monitoring (Tinker et al., 2005; Morrison-Saunders et al., 2007; Haigh et al., 2015). Therefore, defining HIA “effectiveness” in relation to input, process and outcomes is important because of the contested definition of the term by different scholars. Accordingly, this wider perspective suggests that all factors related to the HIA effectiveness be explored.

The EIS is the most important and tangible output to emerge from an EIA process (Pinho et al., 2007) and the only source of scientific knowledge generated and brought to the attention of decision-makers to protect the environment and human health from development activities. On this premise, its quality and credibility are deemed critical in the outcome of its implementation (Morrison-Saunders et al., 2001). But is it implemented in reality regardless of its quality? A plethora of scholarly studies that have evaluated EIA effectiveness based on EIS quality alone have concluded otherwise (Morrison-Saunders et al., 2001; Baker and McLelland, 2003; Pinho et al., 2007). The argument in literature is that the quality is only one of the factors that determine whether the conclusion will be accepted by decision makers (Bekker et al., 2005). When evaluating effectiveness in terms of EIS contents, HIA may not be free from the criticism that it is poorly conceptualised in EIA of most development projects (Dannenberg, 2016; Nour et al., 2016). Consequently, HIA recommendations in EISs are usually ignored when implementing EIA decisions. This has been attributed to several reasons, including limited HIA knowledge and the mindset of project developers

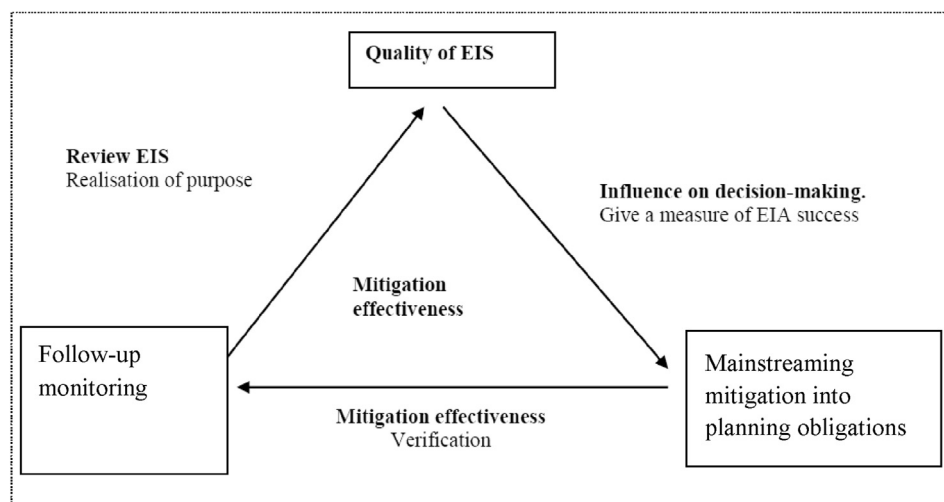


Figure 1. HIA effectiveness framework based on EIS contents, environmental management plans and EIA follow-up. Source: Gwimbi (2014).

to avoid unnecessary expenses (Chang et al., 2017). Ideally, other researchers have argued that HIA effectiveness evaluations should be based on subsequent outcomes of its implementation and monitoring, not merely inclusion in EIS (Morrison-Saunders et al., 2007; Kabir and Momtaz, 2011).

A strong view emerging from literature (Tinker et al., 2005; Kabir and Momtaz, 2011; Gallardo et al., 2016) is that the actual implementation of mitigation measures identified in EIS through planning obligations should be evaluated. Tinker et al. (2005) and Sánchez and Gallardo (2005) concluded that failure by developers to mainstream mitigation measures discussed in EISs is the real reason for EIA ineffectiveness. Kabir and Momtaz (2011) argue that poor adherence of EIS to planning obligations is often the reason for EIA ineffectiveness. According to Dannenberg (2016), outcome evaluations comparing health outcomes after implementation with those predicted by the HIA, is big.

Yet other researchers have argued that the lack of EIA follow-up is the weakest link in EIA effectiveness (Ahmed and Nixon, 2005). EIA follow-up is aimed at checking if mitigation measures were effectively implemented and are meeting the desired outcomes (Gallardo et al., 2016).

This study proposes a framework premised on the integration of EIS contents, planning and monitoring components of EIA in conceptualizing the effectiveness of HIA (Figure 1). This framework has strong face validity in recognizing that a HIA may have more than one type of effectiveness.

### 3. Methods

#### 3.1. Research design

The research followed an in depth qualitative case study design following Yin (2014), focusing on the inclusion of HIA in the dam case study EIS and translation of recommended HIAs into planning obligations in post dam construction. According to Jones et al. (2014), a qualitative study is useful when working with communities as it describes their experiences without theorizing the findings or adding additional meaning. Three types of techniques for data collection were used, reviewing documents, conducting a household questionnaire survey and field observations. The strength of this approach was in its ability to provide valuable insights into the effectiveness of HIA in their natural environment settings (Linkov et al., 2009; Yin, 2014).

A two phased approach was adopted in collecting the data. The first phase reviewed documents. The reviewed documents included the Metolong Dam EIS for HIA inclusion and other literature on the mainstreaming of HIA recommendations in post dam construction. The second phase was a questionnaire survey on households' views and perceptions on mainstreaming of HIA recommendations into planning obligations in post dam construction. In addition field observations provided further data on mainstreaming of HIA recommendations into planning obligations.

#### 3.2. Data collection

##### 3.2.1. Document analysis

A review was conducted of the Metolong Dam EIS to identify HIAs covered during EIA. A comprehensive, health-focused checklist form was adapted from previous published literature (Harris et al., 2009; Hresc et al., 2018; Riley et al., 2018). The form was used in capturing key concepts of health and wellbeing included in the EIS. Some of the terms considered in the checklist form included 'health', 'health impact assessment', 'wellbeing' 'health facilities', 'health policies', 'health effects', 'health services', 'health policy', 'social impact', 'community health', 'environmental determinants of health', 'malnutrition', mental health and any other terms related to health were captured from chapters and sections of the EIS.

Apart from EIS review, other relevant documents were examined, capturing any evidence regarding mainstreaming of HIA recommendations into planning obligations.

##### 3.2.2. Household questionnaire survey

The study focused on people affected by the construction of the Metolong Dam. The study covered the population living in the upstream, adjacent and downstream of the dam site. The research used purposeful sampling to ensure representation from each of the three village communities listed located upstream, adjacent or downstream of the dam.

From each selected community approximately 33 households were randomly selected for the study. A total of 100 households were interviewed using an open ended questionnaire interview technique. For each selected household the head of house or anyone senior available at the time of the survey was given the chance to answer the questions. A minimum stay of at least five years before the dam was constructed was defined to ensure that respondents had sufficient knowledge about the pre-dam construction livelihood activities.

The questions explored respondents' opinions on access to resources, livelihood changes, health-care and wellbeing issues, compensation, local development issues, perceived health and wellbeing issues before and after the construction of Metolong Dam. Field observations regarding the implementation of HIA recommendations were also made.

#### 3.3. Data analysis

The collected data was analyzed according to thematic areas based on the objectives of the study. Text data in the form of field notes and transcripts were explored using content analysis. In addition, certain respondent quotes from the questionnaire interviews were extracted to provide a more personal account of research findings.

#### 3.4. Ethical considerations

The study was granted ethics approval by the National University of Lesotho, Faculty of Health Sciences Ethics Review Board under the Ministry of Health in Lesotho. All the data collected was provided with voluntary consent of participants. Confidentiality was also assured by not using names and keeping questionnaires anonymous.

### 4. Results

#### 4.1. Coverage of health impact assessments in EIS

Table 1 provides a comprehensive overview of HIA themes covered in EIS. The terms of reference formed the base of information shown in Table 1. A public health expert was involved in conducting the HIAs. The investigators followed the steps for conducting HIAs that included screening, scoping, assessment of the direction and magnitude of the health impacts, communication of results and recommendations to decision-makers. Methods used to gather HIA data ranged from documents review to consultation with stakeholders.

Health was conceptualized holistically to include biomedical, social, economic, and environmental determinants. Community involvement was a component of HIA and stakeholders assisted in identifying and assessing the health impacts of the dam. Topics examined ranged from policies about health, land tenure and compensation, community health profile, living wages to determinants of health.

The baseline health data profiles were used to create a profile of existing health conditions and evaluate the potential health impacts of the decision being considered. This baseline profile included data about the demographics and health determinants and outcomes. The demographics baseline health data highlighted sexually transmitted infections (STIs) including HIV/AIDS, acute respiratory infections, sore throat, influenza, high blood pressure, arthritis and diarrhoea as common diseases in the area (Table 1). Majority of these health problems were

**Table 1.** HIA inclusion in different EIA steps of Metolong Dam.

HIA step	Elements of HIA included in EIS
Terms of reference	<ul style="list-style-type: none"> <li>• Urged public consultation with affected stakeholders.</li> <li>• Insisted on adherence to environmental, health and safety regulations</li> <li>• Environmental and Social Management Plan with appropriate mitigation measures for adverse impacts was insisted on.</li> </ul>
Screening	<ul style="list-style-type: none"> <li>• Screening recommended full HIA to determine appropriateness of the dam project.</li> </ul>
Policy and legal Framework	<ul style="list-style-type: none"> <li>• EIA policy and legal frameworks to be complied with was highlighted.</li> <li>• Land Act, 1979 as it related to land tenure system and the determination of compensation in Lesotho was emphasized.</li> <li>• Policy Framework on compensation was outlined.</li> <li>• Public Health Order 1970 as it related to prevention of public health hazards at project construction sites was highlighted.</li> </ul>
Scoping	<ul style="list-style-type: none"> <li>• A broad model of health that integrated social, genetic, and environmental factors was used in identifying impacts.</li> <li>• Stakeholder engagement was identified as a key component of the HIA</li> <li>• Range of health issues to be examined in the HIA were defined.</li> </ul>
Baseline HIA study	<ul style="list-style-type: none"> <li>• Broad health issues and their determinants were highlighted.</li> <li>• Demographic and health data of study population was provided.</li> <li>• Sexually transmitted infections (STIs) including HIV/AIDs, acute pharyngitis (sore throat), hypertension (high blood pressure), influenza tuberculosis were identified as main diseases.</li> <li>• Health facilities and services were described.</li> <li>• Social, economic, environmental and nutritional determinants of health were covered.</li> </ul>
Impact Identification and Analysis	<ul style="list-style-type: none"> <li>• HIA projections indicated: <ul style="list-style-type: none"> <li>◦ increased spread of HIV/AIDS and other sexually transmitted infections (STIs) in the local population and among the workers,</li> <li>◦ Increased water and air pollution</li> <li>◦ Increased waste generation</li> <li>◦ Reduced livestock access to riverine vegetation.</li> <li>◦ Improved access to safe drinking-water is essential to health,</li> <li>◦ Diversification of local livelihood strategies (e.g. through the implementation of preferential employment strategies) and contribute to an increase in household incomes.</li> </ul> </li> </ul>
Mitigation measures	<ul style="list-style-type: none"> <li>• Mitigation recommendations included: <ul style="list-style-type: none"> <li>• Health education awareness interventions: e.g. HIV/AIDS awareness education among the local population.</li> <li>• Access to workplace health services as well as to voluntary counseling and testing.</li> <li>• Upgrade all the local health clinics serving the local population.</li> <li>• Community access to safe drinking-water and improved sanitary facilities to improve quality of life in the community.</li> <li>• Employ local people during the construction phase of the project</li> <li>• Provide fair compensation</li> <li>• Resettle displaced households within existing villages</li> <li>• Improving infrastructure in the area e.g. construct footbridges at key crossing points agreed in consultation with affected communities.</li> <li>• Provide capacity building, alternative livelihoods</li> <li>• Dust control through regular watering of access roads, use of respiratory protective equipment by workers closely involved in excavation, blasting and crushing activities.</li> </ul> </li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>• Periodic surveys around the dam site to check HIA effectiveness;</li> </ul>

invariably linked to determinants of health in the community. For example, diarrhoea was heavily linked to poor sanitation, with 53% of the households practicing open defecation because they could not afford costs of constructing sanitary facilities.

By evaluating the biomedical health conditions among community members, the HIA baseline study helped identify potential future health impacts that could be avoided with certain alternatives. The general projection was that of population influx related to the dam project resulting in pressure on health facilities and services. The baseline HIA findings raised concerns about possible gentrification in the area from future development, and highlighted the need to upgrade the health facilities and services in the area as part of the mitigation measures.

The methods used to make predictive judgments on health outcomes were qualitative. While the HIA was able to obtain some data for use in their analyses, there were instances where certain data were not available and investigators made generalized estimates based on other studies. The investigators acknowledged these data gaps.

#### 4.2. Determinants of health included in EIS

Community engagement played an important role in identifying major determinants of health in the community. In addition, HIAs empowered the community members and let their broad health concerns related to the dam projects be heard. The HIA team held public consultations that drew a cross section of the public, to hear their viewpoints. The public consultation revealed that the public voiced significant

amount of concern on socioeconomic and environmental impacts of the dam on their livelihoods.

The Metolong community is highly rural and dependent on subsistence agriculture and gathering of natural resource for its livelihood. On average, households derived wide range of riparian resources along the Phuthiatsana River for their livelihoods. Thatching grass and river sand are used for building purposes. Women harvested these natural resources to supplement household diets and supplies. Local herbalists and traditional healers also made use of riparian resources such as medicinal plants. Wood and shrubs were harvested for building and firewood. The proposed Metolong Dam could revitalize the community through economic growth and community projects, but could also lead to environmental interference with subsistence activities, and disruption to community livelihoods.

The dam was projected to provide many positive socioeconomic benefits to the affected communities. Positive impacts such as new opportunities from employment generation, improved water supply and sanitation and upgrading of health facilities were heightened in EIS. In general, the majority of the HIA impacts focused on anticipated benefits the dam would bring to the community. Approximately, 42.9% of the impacts were projected positively.

The practice of open defecation was significantly high, with baseline data showing that 53% of the households practiced open defecation, threatening drinking water sources. As a result, diarrhoea disease attributed to poor sanitation, solid waste management and hygiene practices was highlighted as significantly high. As the population was projected to increase, so were the levels of environmental contamination.

It is for this reason mitigation measures in the form of improving sanitation in the area were strongly recommended as part of the HIA recommendations.

The psychological dynamics of health, including emotional, attitudinal, and behavioural that could affect community health were however inadequately covered in EIS. Issues related to potential substance abuse, stress, anxiety and depression in response to the dam impact were rarely discussed. Health risk behaviors such as smoking, poor diet and substance abuse, while partially discussed, were closely tied to poor economic activities in the area. Lower social status was also linked to prevalence of diseases such as HIV/AIDS and other respiratory related diseases. Causal association of economic determinants and health outcomes were however insufficiently discussed. Nutrition impacts were the least studied livelihood impacts within the EIS.

Most of the HIA mitigation recommendations focused on fair compensation for those impacted by the dam. The investigators recommended on 30% of the jobs being reserved for members of the local community and suggested that this could gradually be increased with capacity building during the course of the project. Other recommendations included generation of tourism and fishery opportunities, improved water supply and sanitation in the communities and upgrading health care facilities among others.

Results from the EIS review showed that the HIAs helped identify the broader scope of determinants of health concerns in the Metolong community that needed community engagement. The inclusion of these concerns in EIS allowed the members of Metolong community to proactively address issues affecting them and identified issues that would be problematic if not included in the planning process of the dam when most of the major decisions were being made. A trend that characterized the HIAs was however the lack of quantification of impacts. There was no quantitative analysis in the characterization of impacts.

#### 4.3. Demographic characteristics and social information of the surveyed population

Of the 100 respondents, 60 (60%) were men and the remainder women. The gender discrepancy can be attributed to the males being the head of the households in the community setting. The average age was 48 years old, with the youngest study participant aged 30 and the oldest aged 75 years. The majority of respondents had primary school education (69%).

Approximately 52% of the respondents had lived in the study area their entire lives, while 32% indicated that their families had lived in the study area for more than 25 years. The remaining 16% had lived in the study area for less than 15 years. Respondents who had lived in the study area for less than 15 years were all females who had moved to the study area after marriage.

The majority of the respondents lived on subsistence agriculture. The main crops grown in the area are maize, beans and sorghum. Seventy nine respondents (79%) reported they owned fields from which they cultivated various crops including maize, beans, wheat, and sorghum, while 55 study participants (55%) mentioned animals as an important livelihood strategy. Other livelihood strategies reported by local residents included fruit trees, sewing and selling clothes, brick making, growing food in gardens, gathering and selling wood.

#### 4.4. Mainstreaming of HIA recommendations in Metolong in post dam construction

The EIS detailed HIA mitigation measures for mainstreaming in post dam construction. These included health awareness programmes, livelihood income generating projects, financial compensation for loss of assets and resources, job creation, construction of health and communication infrastructure (SMEC, 2008). Reviewed documents showed that Metolong Dam project led to development of social amenities such as foot bridges and a tarred access road of 32km road to the

site were constructed across Phuthiatsana River linking communities either side of the dam, making movement of goods and people to and from the communities easier (King and Coin, 2014).

The biomedical model of health focusing on diseases, dominated the decision makers' thinking regarding translation of HIA recommendations into planning obligations. Several HIV/AIDS related programmes including awareness campaigns and income generating projects were implemented. The World Bank Report (2015) suggest that the Metolong Dam project benefitted 75 villages through the provision of healthcare including HIV/AIDS community support programmes in the post dam construction. Mitigation measures for potential infectious disease transmission between dam construction workers and villagers were limited to provision of support services for HIV/AIDS control programmes. Documents reviewed suggest that 15 000 community members were supported through education and awareness programmes in Metolong under the Environmental and Social Management component of the project.

The World Bank (2019) also indicate that a livelihood restoration programme was implemented in two affected communities of Ratau and Motanasela focusing on livelihood options such as such as poultry, pigery and establishment of trust fund companies to manage the programme.

One respondent summed up the general feeling of most respondents: *How do they expect us to feel when our fields were destroyed for this project and we are denied the water? We have a drought that has made the water situation in this area extremely desperate so we will do anything to save our families and livestock because we have the right to this water.*

Prior to Metolong dam construction, 53% of the households practiced open defecation, threatening drinking water sources. In the post dam construction survey, majority of the respondents (60%, n = 100) indicated that they had no sanitary latrines in their homes and all their family members were using open defecation.

The HIA follow-up step was not documented. This reduced the evaluations of the effectiveness of those recommendations that were implemented. The acceptability of the implemented HIA recommendations by respondents however showed that HIA was enhanced the lives of those who were assisted with resources to start income generating projects and those benefitting from antiretroviral treatment therapy.

It should however be noted that the measures of HIA effectiveness are subjective and may not reflect the true effect of the HIA on the decisions that were considered.

#### 4.5. Respondent opinions and perceptions on HIA effectiveness

Beyond influencing the decision-making outcome, the other measure of HIA effectiveness was based on the perception of respondents. Using the respondent value of satisfaction, the HIA was able to provide an valuation of the the effectiveness mainstreamed mitigation measures. The respondent perceptions revealed several trends in implementation of HIAs within the community.

Respondent views regarding employment and implementation of income generating projects was largely negative. The HIA recommendation in EIS was for the proponent to reserve 30% of the jobs to locals. The general view among respondents was that employment opportunities were rare, and most workers were brought from outside the community. Approximately 78% (n = 100) of the respondents indicated that their standard of living had not changed with the construction of the dam. Approximately 20% indicated that their incomes were worse off than before the dam. The local chief aptly summarized this view:

*There is a lot of unemployment in this area, and many expected the dam project to employ them. Most of the 400 jobs that we were promised were given to people from outside the community.*

Respondents frequently complained of promised income-generating projects such as fisheries and tourism that never took off. If these gaps are to be overcome, it is essential to acknowledge the existence of this rhetoric-reality gap and to address the resource needs of community members.

The loss of riparian grazing resources was the most mentioned negative effect of the dam. The natural pastures are the main source of feed for livestock for the local communities for most part of the year. Most of the respondents (54%, n = 100) reported a reduction in grazing areas compared to the situation before the dam. As a result the quality of livestock pastures had declined. The main impacts on livestock pastures had been in terms of reduced livestock fertility and milk production. Responses from more than 60% of the respondents indicated that livestock in the area had been adversely affected by the construction of the dam. One respondent aptly summarized:

*I used to grow wheat and peas on my taken field. Now my life has been made difficult for generations because of the dam.*

A common source of dissatisfaction among respondents was the cash compensation offered for the loss of pastures, which was perceived inadequate. More than 65% of the respondents were not satisfied with the compensation they received for the loss of their grazing pastures. The Metolong Authority offered one United States Dollar (USD) per square metre of arable land lost to the dam (IPS, 2009). More than 65 % (n = 100) of the respondents were not satisfied with this amount. Some respondents (35%, n = 100) indicated that they expected lifetime supply of fodder for the loss of their grazing lands. The Metolong Dam Committee chairperson summed up the respondents' sentiments:

*The \$1 per square metre compensation means nothing to us. Most of the people here survive on land. In any case, we do not even know when we will get it.*

Most of the respondents (91%) indicated that there is serious range land degradation in the area. The one-time cash compensation was not considered sustainable as one respondent further remarked:

*The authorities did not recognise the importance our fruit trees made to our livelihoods. How can you compensate me for the loss of my fruit trees that I harvest every season by giving me only one season compensation?*

While cash compensation was preferred, it proved problematic because beneficiaries used all their money within a short period of time and became impoverished.

## 5. Discussion

This study investigated the inclusion of HIAs in EIS and their mainstreaming into planning obligations of a dam project in Lesotho based on a framework integrating domains of EIS contents, environmental management plans and EIA follow-up for its effectiveness. A review of the dam EIS indicated that HIA was covered as part of the EIA approval process for the dam project. Some challenges to the implementation of HIA were however experienced, based on the community respondents' views and perceptions.

The assessment of community health and wellbeing was integral to the EIA of the dam project. The EIS made specific references to human health in its table of contents and sections dealing with human health. There were specific sections directly relevant to the assessment of impacts on human health. Health was conceptualized to include biomedical, social, economic, and environmental determinants of health. On the basis of the baseline data derived from EIS, biomedical conditions focused on illnesses, diseases and their causalities and medical care facilities; while the socio-economic and environmental models focused on the causes of illnesses with the aim of preventing them from occurring. Thus, despite the lack of rigour and absence review guidelines HIA offered the opportunity for health promotion and disease prevention in Metolong community associated with the dam project. HIA helped increase project proponent awareness of the health issues and accountability. Nevertheless, in terms of the mainstreaming of recommended HIAs into planning obligations in post dam construction, majority of local community members were not satisfied.

Birley (2003) states that the effectiveness of HIA should be based on the extent to which it influences decision making and contributes to human health enhancement in local communities. Due to the dissemination and capacity building efforts on HIAs recommended in the dam

EIS, a growing number of health education programmes in the form of HIV/AIDS health awareness, provision of antiretroviral drugs to those infected and livelihood development projects for those affected by the disease were acknowledged in the study. While there was no comparison group to document what would have happened in the absence of the implementation of such HIA recommendations, results from literature highlight substantial evidence of benefits associated with such interventions (Dannenberg, 2016).

Nonetheless, evidence of the effectiveness of the mainstreamed HIAs was limited. The experience of community respondents in this study suggests that the community enthusiasm changed to disillusionment in post dam construction because of unfulfilled expectations. The key finding was that households felt that their access to economic opportunities in the post dam construction was negligible. The results of this research support the argument in the literature that the public approval of development project is usually combined with conditions, which the project proponent is supposed to meet (Obour et al., 2016; Wiejaczka et al., 2018). Obour et al. (2016), for example found similar experiences in the post Bui Dam construction in Ghana, with respondents arguing that the dam had led to increased poverty, food insecurity, health problems and property loss amongst people living in the catchment area. Wiejaczka et al. (2018) similarly found that in the Teesta River Basin in India, majority of respondents did not see the dam project as having a positive effect on their livelihoods. These findings must be understood and investigated to the concerns of local communities.

One frequently mentioned reason for local communities' opposition to dam projects is insufficient compensation (Wiejaczka et al., 2018). In this study, those who received cash compensation considered the once off cash payments inadequate to make up for loss of their livelihood resources such as grazing pastures. Cash compensation for such resources has been criticized for failing to sustain the wellbeing of communities removed from their lands and loss of livelihood resources (Obour et al., 2016). This problem is particularly acute for poor communities, who are not always able to efficiently negotiate satisfactory cash compensation (Wiejaczka et al., 2018). The chief executive officer of the Lesotho Highlands Water Project in an earlier study regarding challenges experienced in the Lesotho Highlands Water Project Phase I post dams construction summed up this view, arguing that:

*The big problem is that our policy replaces their livestock and land with hard cash, and these farmers are not used to living off money. We've introduced these people to a completely different way of life (The New Humanitarian, 2011).* Linking the Lesotho Highlands Water project experience to this study finding suggest that improving quality of the remaining grazing pastures could have been a better option than cash compensation. Randell (2017) argues that financial compensation alone, by definition, is never sufficient for reestablishing sustainable communities.

There is a need to heighten public health policy-maker awareness of the linkages between HIA recommended in EISs and those mainstreamed into planning obligations in order to strengthen the influence of EIS on decision making. The overall conclusion from this study is that though HIA are considered in EIS, their influence on decision making was limited. There are gaps regarding the mainstreaming major community based HIA recommendations in post dam construction. Future works should promote the incorporation of health aspects into project development policies.

## 6. Conclusion

Lesotho has experienced the construction of several dams in recent years, but the mainstreaming of community health and wellbeing in post dam construction to safeguard their health and wellbeing has not always been accompanied the benefits of such projects. This study evaluated the inclusion of HIAs in EIS of a dam project and their mainstreaming into planning obligations in post dam construction. The coverage of HIAs in the EIS was confirmed. However, there was broad consensus among local community members that the mainstreaming of HIA recommended in EIS

was low. The perceived little HIA mainstreaming in post dam construction was reflected in the low perceptions of the locals regarding benefitting from dam project. This, combined with lack of monitoring evidence could be limiting the overall effectiveness of HIA. The engagement of local communities in mainstreaming HIA included in EISs is crucial for the sustainability of development projects like dams.

## Declarations

### Author contribution statement

Patrick Gwimbi: Conceived and designed the experiments; Analyzed and interpreted the data; Wrote the paper.

Palesa Lebeso, Kamohelo Kanono: Performed the experiments.

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The authors declare no conflict of interest.

### Additional information

No additional information is available for this paper.

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