

Incorporating community perspectives in health impact assessment: A toolbox

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ARTICLE INFO

Keywords:

Community-based research
Equity
Extractive industries
Health impact assessment
Participation
Social determinants of health

ABSTRACT

Large infrastructure projects, such as mining and renewable energy projects, can affect the health of surrounding communities by changing the natural, physical and social environment. While there is limited understanding of potential health impacts of such projects on local populations in general, there is a particular need for community-driven and equity-oriented approaches to predict and manage such impacts.

To assess health impacts as perceived by vulnerable communities affected by large infrastructure projects in sub-Saharan Africa, we present here a suite of qualitative data collection tools, which are complementary to the existing health impact assessment (HIA) tools. At the core of the toolbox are guides to conduct (i) transect walks to qualitatively map and systematically select study communities and (ii) participatory focus group discussions to explore perceived impacts on the wider determinant of health and related health implications from the perspective of the affected communities. This methodology was developed as part of a qualitative study evaluating perceived health impacts in local communities in industrial mining settings in East and West Africa.

These flexible and intuitive tools produced reliable and comparable findings across different countries and contexts, suggesting that the tools can be applied in a broad range of large infrastructure project settings. The methodology, with its particular potential for translating qualitative research rapidly into visual outputs, is a promising addition to the existing, mainly quantitative HIA toolbox. Strengthening HIA driven by local communities can ultimately contribute to achieving the health-related targets of the Sustainable Development Goals (SDGs).

1. Introduction

Large-scale infrastructure projects cause many physical and environmental changes, which can affect the health of surrounding communities (Schrecker et al., 2018; Von der Goltz and Barnwal, 2019). Less well understood is how these projects can affect the wider determinants of health, such as social services or food security. For example, large infrastructure projects can cause in-migration, which may lead to a perceived increase in teenage pregnancies, or loss of land for subsistence farming, which may impede traditional income-generating activities

(Leuenberger et al., 2021a). Understanding these changes is key in preventing adverse impacts on environmental, social, institutional and individual determinants of health and, thus, promoting the health and well-being of local communities (Green et al., 2019; Winkler et al., 2013). In order to identify and address the needs of local populations, their perception and knowledge must be included in decision-making processes, such as health impact assessment (HIA) (Baldwin et al., 2019; Den Broeder et al., 2017; Harris-Roxas et al., 2012). Despite the fact that participation and democracy are core values of HIA, public participation often remains limited (Den Broeder et al., 2017; Winkler

Abbreviations: EIA, environmental impact assessment; FGD, focus group discussion; HEIA, health equity impact assessment; HIA, health impact assessment; HIA4SD, Health Impact Assessment for Sustainable Development (<https://hia4sd.net/>); NGO, non-governmental organization; SIA, social impact assessment.

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<https://doi.org/10.1016/j.eiar.2022.106788>

Received 10 August 2021; Received in revised form 30 March 2022; Accepted 30 March 2022

Available online 21 April 2022

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et al., 2021). Especially in low- and middle-income countries, where the potential for inequities in communities affected by large-scale infrastructure projects are particularly high, there is a pressing need for strengthening HIA practice (Carvalho, 2017; Gamu et al., 2015; Thondoo et al., 2019; Winkler et al., 2020a).

In countries and regions where HIA is well-established, the HIA methodology has been advanced toward health equity impact assessment (HEIA) (Povall et al., 2014; Snyder et al., 2012; Sohn et al., 2018). Several guidelines to promote and monitor equity aspects in HIA are available emphasizing differential health impacts among subpopulation groups or potential unintended health impact of project, policies (Abrams et al., 2020; Heller et al., 2014; Mahoney et al., 2004; Ontario Ministry of Health and Long-Term Care, 2012; SOPHIA Equity Working Group, 2016). Furthermore, community-based HIA frameworks in the context of health systems have been proposed by researchers from Canada, India as well as Ghana (Aboagye et al., 2019; Cameron et al., 2011). Yet, in terms of community engagement, recent research demonstrated that there is a gap between theory and practice (Den Broeder et al., 2017; Leuenberger et al., 2019). Indeed, (lack of) community engagement was noted as a major limitation of environmental impact assessment (EIA) (Bawole, 2013), while social impact assessment (SIA) tends to be more community-oriented by design (Esteves et al., 2012; Leuenberger et al., 2019; Vanclay, 2003). At the same time, evidence from community-based HIA remains scarce and few case studies including the communities' perspective have been conducted in sub-Saharan Africa. For instance, one study evaluated the use of rapid appraisal tools in EIA (Sandham et al., 2019). Sinclair and colleagues emphasize the synergies of community-based research in impact assessment in order to create equitable partnerships with communities (Sinclair et al., 2009). Taken together, community participation and empowering local communities within the frame of impact assessment are considered key to reduce the inequitable distribution of positive and negative environmental, social and health impacts (Bawole, 2013; Den Broeder et al., 2017; Leuenberger et al., 2021b). Achieving community participation, health equity, and non-discrimination as part of HIA, beyond being important for population health, has tremendous added value in terms of promoting human rights (MacNaughton and Forman, 2014).

Integrating indigenous perceptions and knowledge is important for both HIA practitioners and researchers. Moreover, these kinds of community-based approaches are a necessity to achieve participatory and equity-oriented HIA. For example, engaging with local communities as part of feasibility studies or to develop effective development programs is important to help involved stakeholders (e.g. private sector, government) to better understand how the proposed large infrastructure projects being planned will affect community needs (Chilaka and Nwaneke, 2015; Haigh et al., 2020). As part of research, voices of affected communities tend to be underrepresented in the current

literature (Karakaya and Nuur, 2018; Leuenberger et al., 2019). Thus, understanding is lacking about how cultural contexts intersect with these projects to affect health equity in general. While consultation with local communities and specific subpopulations by using e.g. focus groups is often recommended in international guidelines for HIA, methodological guidance remains vague (ADB, 2018; IFC, 2009).

In order to address this gap, the existing quantitative and semi-quantitative HIA toolset would benefit from complementary qualitative research methods that directly incorporate the perspectives of local and vulnerable populations (Leuenberger et al., 2019; Winkler et al., 2010, 2011, 2012). The development of community-centered impact assessment approaches emphasizes the importance of including local communities in order to identify their needs and the needs of the most vulnerable population groups that may not have a voice in local leadership (Haigh et al., 2020; Sandham et al., 2019). In the best case, this kind of engagement or community-based research further enhances communities' development capacities and leads to long-term empowerment (Wallerstein and Duran, 2006).

To address the need for comparable, community-based data from different infrastructure development settings in different countries, we developed and validated a suite of qualitative research tools. Here, we present two tools to explore the communities' perception about impacts on the wider determinants of health and implications for their health that have been developed and validated in the field. Based on a qualitative multicenter study conducted to evaluate health impacts as perceived by affected communities (Farnham et al., 2020), we propose a methodology to explore health impacts on the wider determinants of health, including environmental, economic and social factors. The motivation behind this paper is to share a standardized and highly flexible qualitative tool set to the wider impact assessment community.

1.1. Study setup

The current work has been embedded in the "Health Impact Assessment for Sustainable Development" (HIA4SD) research initiative (hia4sd.net), which aims to strengthen HIA in sub-Saharan Africa (Farnham et al., 2020; Winkler et al., 2020b). To generate a sound evidence base about health impacts induced by large natural resource extraction projects on local communities the initiative has been launched in 2017 in four African countries, namely, Burkina Faso, Ghana, Mozambique and Tanzania (Fig. 1) (Farnham et al., 2020; Winkler et al., 2020b). Within this framework, we present here a series of qualitative data collection tools designed to specifically include the voices of affected communities (Leuenberger et al., 2021a, 2021b, 2021c). We aimed to develop methods that could be adapted to be contextually appropriate in each country while enabling a standardized implementation, which ultimately allowed for cross-country comparisons of different settings.

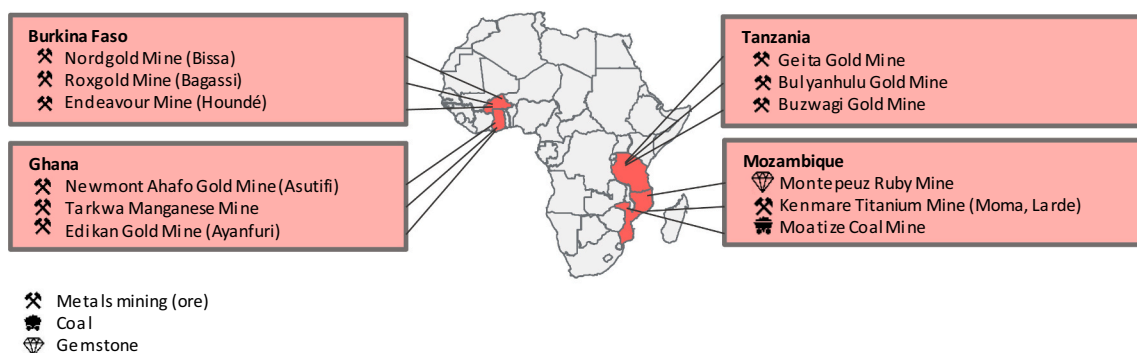


Fig. 1. Map indicating partner countries and case study sites of the HIA4SD project.

2. The toolbox

While qualitative research includes many other useful tools (e.g. in-depth interviews or surveys), to quickly and systemically select study villages and collect comparable data from the different study sites, a transect walk and participatory FGDs are at the core of the toolbox (Fig. 2). The transect walk enables the researcher to quickly understand the physical and social landscape of the local community and proceed with recruitment for the FGDs appropriately, making these two methods particularly complementary. The following section describes the proposed methodology for the different components of the development, implementation and output of the respective research tools.

2.1. Preparatory steps

As a first step, ethical clearance must be obtained from the relevant national and regional institutions. To navigate these processes, we highly recommend close collaboration with local research institutions, which are knowledgeable about local requirements and standards. In order to collect valid results, data collection structure and analysis needs to take into account local context while maintaining high quality standards across different collectors. We propose that such projects develop a project specific data collection manual to facilitate a standardized implementation of the study tools. The main purpose of the data collection manual is to have one guiding document for the early stages of the study implementation, including the training of the moderators. The example of the data collection manual developed under the HIA4SD project is available as supplementary file (Annex A1). To contextualize the data collection tools at the local level, a cognitive debriefing with

fieldworkers and study coordinators should be held to translate the tools adequately into official and/or local languages of the countries and settings, ensuring consistent implementation.

For successful implementation, a close collaboration with local stakeholders early on is essential. Local partners (e.g. non-governmental organizations (NGOs), government officials or representatives from the health sector) should guide the selection of the study communities and pre-inform the local governments and official authorities. In the study sites, a gatekeeper (e.g. representative from the health sector), who is familiar with public health aspects in the study area can liaise the researchers with relevant stakeholders. Field teams should be officially introduced into the study sites, which further allows the establishment of a rapport with key informants for the study implementation.

2.2. Transect walk: Qualitative mapping of communities, impacts and interventions

A transect walk is a tour through the study sites guided by local informants, allowing researchers to observe, ask, listen and discuss (DPI & QNRDP, 2007). Transect walks have been described by other researchers as a simple, efficient and easy-to-adopt approach – especially to guide decisions or sampling on the local level (Pérez-Foguet and Giné-Garriga, 2018).

As a first entry point into each study site, the transect walk is used to obtain a geographical and social overview of the study areas, comprising the project site and surrounding communities. Maps, either hand drawn or digital (e.g. MAPS.ME), can be used to document the information obtained. For practical reasons, “raw maps” can be printed from Google Maps or OpenStreetMaps, while landmarks and points of interest can be

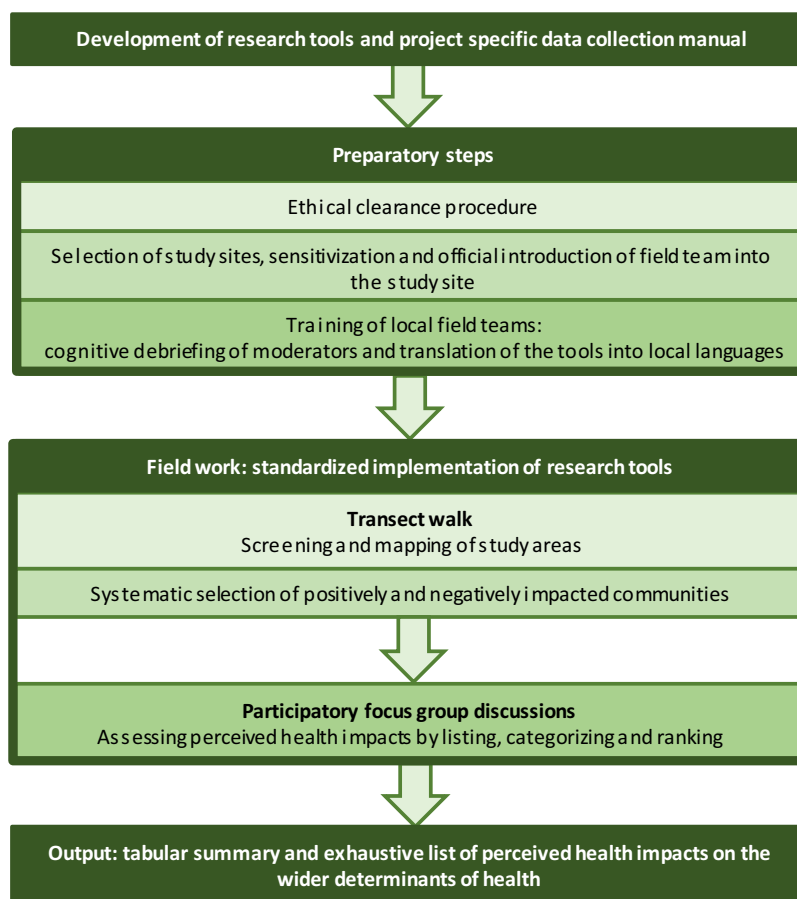


Fig. 2. Flowchart of proposed qualitative study to incorporate the communities’ perspective in health impact assessment (HIA) by evaluating their perception on impacts on the wider determinants of health.

marked by hand. Field notes about specific observations or discussions as well as pictures of specific locations or interventions are an integral part of site documentation and infuse a social dimension to the geographical data, producing a “qualitative map.” Beyond the initial mapping based on the transect walk, we recommend updating the maps throughout the entire field visit. The tool guide (Annex A2), a PowerPoint template for documentation (Annex A3) and a fictive example of an output (Annex A4) are given as supplementary files.

Based on the transect walk, villages, impacts and interventions are documented in qualitative maps by the field team using a structured approach. Two examples of the original outputs are provided as supplementary file (Annex A5, A6). Besides the mapping, visiting the study areas prior to data collection with community members creates an opportunity to be introduced in the communities and to meet stakeholders or future respondents for the study. The guided tour at the beginning of each site visit enables the field teams to systematically select communities for the upcoming data collection. Moreover, having seen the study areas prepares moderators to guide informed discussions and probe accordingly about impacts or interventions.

2.3. Participatory focus group discussions: Collecting, categorizing and ranking perceived health impacts on the wider determinants of health

FGDs are a qualitative data collection method to discuss a specific topic with a small group of people and have been used in health research to better understand social, cultural, economic, ecological and political health context (Kitzinger, 1994; van Eeuwijk and Angehrn, 2017). As an interactive data collection tool, FGDs are facilitated by a trained, external moderator. Participatory approaches build on the richness and

validity of local people’s knowledge, allowing respondents to actively engage with and jointly reflect about the research topic of concern (Chambers, 1994).

In the toolbox presented, the main objective of the FGDs is to explore the diversity of impacts on the wider determinants of health as perceived by communities impacted by the project activities. The entire tool guide is given as supplementary file (Annex A7). In addition to purely qualitative discussions, our FGD tool draws on rapid rural appraisal methods to incorporate a semi-quantitative approach where participants describe, categorize, and rank perceived impacts. As a result, these participatory FGDs can be documented not only by audio records but also in a tabular summary (Annex A8). The tabular summary is particularly powerful to quickly summarize a comprehensive overview of the perceived impacts as well as synthesize and compare the data from the different discussions, settings and countries.

The FGD tool can create an exhaustive list of perceived health impacts related to the different categories of the health determinants. Moreover, the approach allows the prioritization of the most important potential impacts, identification of important concerns or sources of misinformation, as well as an assessment of the distribution of the impacts among subpopulation groups. The tool highlights site and/or country specific findings related to the current stage of the project development or cultural practices. An overview of the semi-quantitative visualizations of the main findings from these tools in the context of the HIA4SD study, in which they were originally implemented, are compiled in Fig. 3. For the final analysis of community perspectives on the perceived impacts of the proposed infrastructure project, close collaboration and constant exchanges across participants, gatekeepers and researchers are key aspects to ensure the quality of the synthesis as well

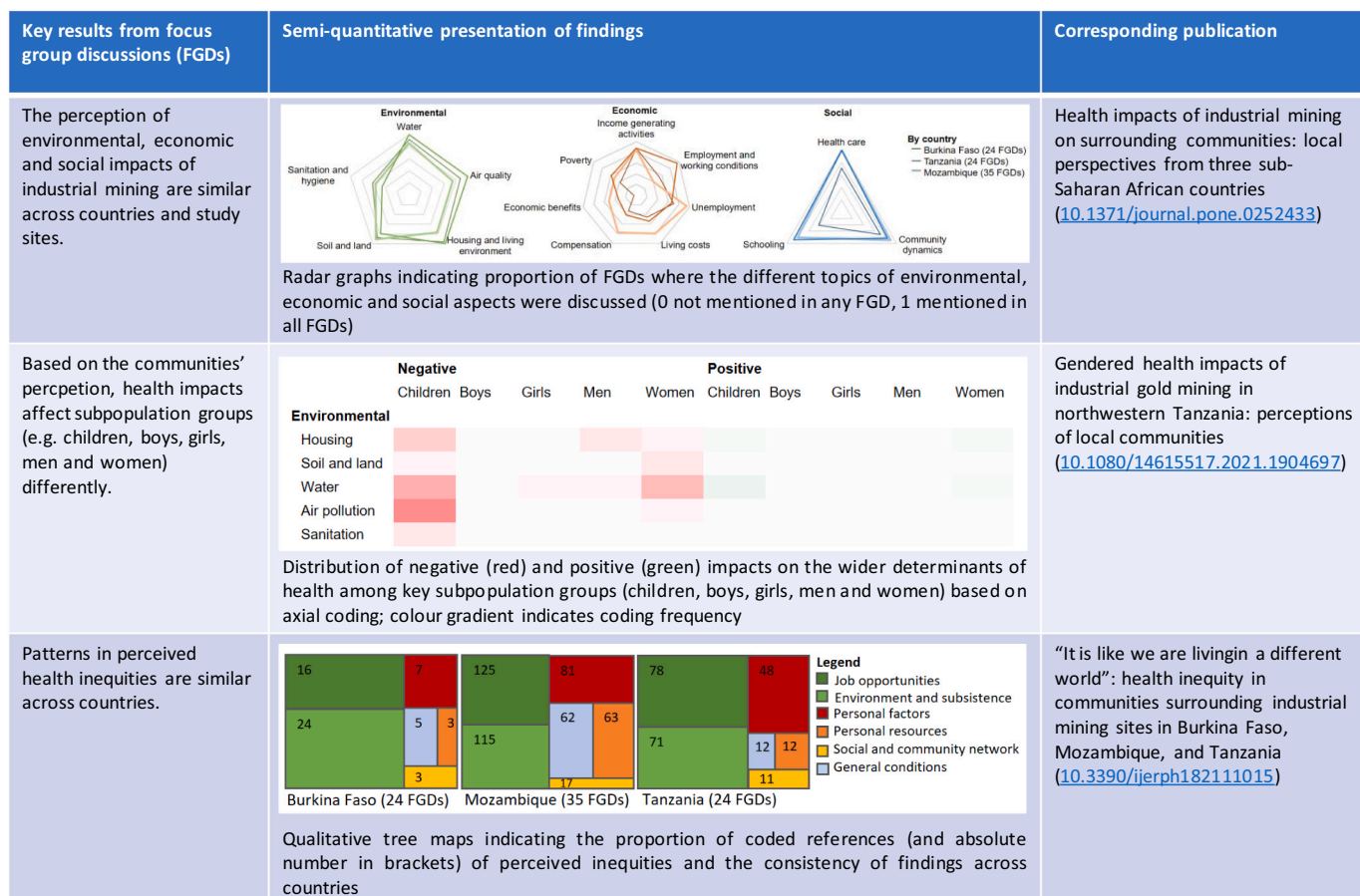


Fig. 3. Overview of semi-quantitative visualization of key findings deriving from qualitative data collection tools as part of the Health Impact Assessment for Sustainable Development (HIA4SD) study (FGD: focus group discussion).

as to verify the interpretation.

3. Discussion

3.1. Lessons learned from the field implementation of the tools

During the field implementation of the tools as part of the HIA4SD study (Farnham et al., 2020), we were able to evaluate how well these tools functioned in various industrial mining settings across four Sub-Saharan African countries. The development of the data collection manual allowed the collection of reliable and comparable data across different settings and countries. The clear instructions of the tool guides and translation into local languages by field researchers increased their understanding of the study purpose overall and thus, contributed to the consistent implementation. The data collection manual enabled the independent, simultaneous and targeted data collection by different study teams. Ultimately, this enabled the researchers to conduct a rigorous qualitative analysis and publish the findings (Leuenberger et al., 2021a, 2021b, 2021c) (see also Fig. 3).

The transect walk conducted at the beginning of each site visit provided researchers with a sound spatial overview of impacts and interventions, alongside contextual and social insights into the study areas, enabling communities to be sampled in a systematic manner. Compared to pure purposive sampling, this approach can reduce researcher bias, which is often discussed as a key issue in qualitative research (Johnson et al., 2020; Morse, 2015). Mapping negative impacts during the transect walks was difficult. The location or source of negative impacts, such as air or soil pollution, was often not clearly identifiable, since they represent systemic effects in the study areas. Hence, general remarks on the maps were used to report negative impacts in a comprehensive manner. Our hands-on mapping methodology could be further elaborated toward a more sophisticated participatory GIS approach, as for example suggested by Douglas and colleagues (2020). Including a scientific analysis of the spatial data would allow the transect walk to become a more scientifically rigorous data collection tool in addition to the explorative purpose.

The participatory FGD tool turned out to be intuitive to administer in a systematic manner in different countries and languages. Based on our experience employing the tool in 12 settings in four countries, the FGDs generated a comprehensive semi-quantitative list of perceived impacts on the wider determinants of health and related health implications. We identified groups most at risk of negative consequences. For instance, we found that women tend to be affected disproportionately by negative impacts, while men are more likely to benefit (Leuenberger et al., 2021c). In light of these findings, FGDs could be held with specific sub-population groups, characterized by different gender, age, power or occupational background. Hence, besides separated sessions with men and women, separate FGDs could be held with village leaders, elderly people, adolescent girls and former or current employees of the mines. Considering the distribution of potential positive and negative impacts among population and population subgroups is particularly important to minimize inequities in sustainable development (Harris-Roxas et al., 2004; Leuenberger et al., 2019; Thondoo and Gupta, 2020).

3.2. Added value of participatory methods in HIA practice

Our participatory methods hold promise to promote community-based, equity-oriented and evidence-based HIA. In our experience as part of the HIA4SD study, the close interaction with a local gatekeeper during the transect walk allowed the infusion of social aspects into the geographical screening of the study areas. Interactive discussions with community members revealed key concerns of affected populations and specific population subgroups. The tabular summary of the FGDs was a powerful tool to moderate the discussions in a structured manner as well as for rapid synthesis of findings. Immediate comparisons and summaries were possible without reading the full transcripts, which were

often up to 40 pages. Such a rapid qualitative data analysis was particularly helpful for preliminary synthesis and subsequent collaborative data analysis. The participatory and community-driven approach used during the FGDs is complementary to previous HIA studies, which were mostly based on quantitative household surveys where the researcher dominated the direction of the research (Knoblauch et al., 2018; Winkler et al., 2012; Winkler et al., 2014). The methodology at hand could also be used to inform or partially replace health surveys, which are often time-, resource- and cost-intensive. With these advantages, the proposed methodology can contribute to overcoming barriers of HIA practice in low- and middle-income countries (Winkler et al., 2020b).

While our toolset is framed in a multi-country research initiative, it is also applicable to every day HIA practice in the field. HIA are often conducted by external people or institutions who are not familiar with the context and thus depend on the knowledge of local people. The HIA process, be it research-driven or for administrative purposes, must include different perspectives as promulgated by one of its guiding principles: participation (Winkler et al., 2021). The inclusion of and active engagement with local stakeholders would implicitly increase the transparency of HIA, a recently reported limitation of HIA (Dietler et al., 2020b). The proposed methodology allows to include community voices on the local level, which are often lacking in HIA (Den Broeder et al., 2017). As a powerful tool, the rapid appraisal can serve researchers or policy makers to raise the community voices also on a regional, national or even international level in an efficient manner. Notably, the tools hold promise to identify the needs of the most vulnerable population groups, and thus strengthen the core value of equity in HIA (Leuenberger et al., 2019). Taken together, the participatory methods developed can address several shortcomings of HIA practice and transform HIA into a more participatory, equitable and transparent process.

3.3. Potential application in the health impact assessment process

While our intention was to strengthen specifically HIA or health in integrated impact assessment for large-scale infrastructure projects, it is worth mentioning that a similar procedure might be applicable in impact assessment in general (i.e. including environmental, social or integrated impact assessment). Based on the proposed methodology, including reflections about lessons learned from the field implementation of the tools, the following section relates the HIA toolbox at hand for the different phases of the HIA process (i.e. screening, scoping, impact assessment, reporting, implementation and monitoring) (enHealth, 2017; IFC, 2009; Quigley et al., 2006; Winkler et al., 2021).

Systematic transect walks, as described here, have potential to become an integral part of the scoping phase of HIA, which mainly aims to identify potentially affected communities, potential health effects and key stakeholders. Transect walks have been used in other impact assessment related studies (Dilay et al., 2019; Pradyumna et al., 2020) and offer several advantages. We highly recommend to conduct a transect walk as an “entry tool” and to systematically select study sites.

Depending on the design of the HIA, FGDs can be administered during the scoping or impact assessment phase. FGDs can complement the quantitative research by drawing on mixed methods research approaches (Pluye and Hong, 2014). As an exploratory tool, FGDs can be conducted prior to a baseline health survey and inform the development of household surveys. As an explanatory tool, FGDs can be used to understand the perception of health impacts more in depth.

Indeed, the outputs of the tools (i.e. qualitative maps and tabular summaries of FGDs) allow the rapid synthesis of information for report writing in a comprehensive and efficient manner. We were pleasantly surprised how much insight can be gained by only looking at the tabular summaries of the discussions. The tabular summary holds promise to potentially complement the time intensive qualitative analysis based on transcription and coding (Brown et al., 2006). Compared to research driven impact assessments, this semi-quantitative method is particularly interesting for administrative impact assessments, which are often

restricted in time and financial resources (Winkler et al., 2021).

Both transect walks and FGDs can be used as a tool to monitor health impacts. Given their systematic and rapid approach, the tools are suitable for repetition over time in combination with a quantitative component. Moreover, including the voices of the communities in monitoring the health impacts would facilitate a continuous communication, which could ultimately aid in avoiding misunderstandings or conflicts among involved stakeholders.

As summarized in Fig. 3, the implementation of the tools as described above were used to evaluate the perceived health impacts of long-lasting industrial mining projects (Leuenberger et al., 2021a, 2021b, 2021c the two tools were analyzed independent). Beyond the evaluation of perceived impacts, the tool can be applied as a starting point of developing interventions. Similar to participatory rural appraisal methods, the tool could inform community development initiatives, ensure need-directed interventions and ultimately maximize benefits for communities and the most marginalized population groups (Schoonmaker Freudenberg, 1999). This is also in line with community-based impact assessment and participatory health impact assessment approaches that have recently gained momentum (Sandham et al., 2019; Thondoo et al., 2020).

4. Limitations

The implementation also demonstrated limitations of the study tools proposed. Firstly, the tools presented only include affected communities, who may be biased to overweigh the negative impacts of a project. Besides the communities' voices, it is also important to acknowledge and potentially include other stakeholders, such as local health care workers, local authorities and representatives from the project proponent. Indeed, the tools presented in the piece at hand (transect walk and participatory FGDs) were implemented as part of a larger qualitative study, comprising also key informant interviews with local stakeholders and leaders (Farnham et al., 2020). With the specific focus on the communities' perspectives, data from the two tools were analyzed independently (Leuenberger et al., 2021a, 2021b, 2021c). Secondly, it should also be mentioned that the tools were implemented in study sites where extractive projects had already been established for several years (see also Fig. 1). Thus, participants of our study were asked to report impacts retrospectively (Leuenberger et al., 2021a, 2021b, 2021c). It is therefore not clear, if and how potentially affected communities could anticipate impacts and related consequences for their health. Especially when used for HIA in the context of large infrastructure projects planned in remote rural areas, the ability of community members to anticipate health impacts has yet to be evaluated. Thirdly, the tools were administered only in mining areas and not in comparison sites (Leuenberger et al., 2021a, 2021b, 2021c). While qualitative research is context specific, some of the impacts mentioned could also be related to "natural" urbanization-related dynamics. The consistent findings from the FGDs indicate that the tool could be applied in a context other than industrial mining projects, such as renewable energy projects, large-scale agricultural projects or airports. Indeed, a mix of methods is necessary to obtain comprehensive evidence about impacts and respective health outcomes. Under the umbrella of the large research initiative of the current study, several quantitative and mixed methods research studies investigating health impacts of mining projects in sub-Saharan Africa have been published (Dietler et al., 2020a; Dietler et al., 2021a; Dietler et al., 2021b; Farnham et al., 2020; Leuenberger et al., 2021d; Lyatuu et al., 2021).

5. Conclusions

Large infrastructure projects change the physical, natural and social environment of local populations, which subsequently can influence the health status of affected individuals. How these changes and their consequences on health are perceived by affected communities is often not

comprehensively assessed. Including community voices in evaluating and researching health impacts is key to obtaining a comprehensive understanding of health, including socio-cultural aspects. In order to generate sound, community-based and comparable data from multiple countries, we developed a suite of qualitative data collection tools.

By presenting a toolset that was applied in several mining areas in East and West Africa, this paper shows how we collected comparative qualitative data in large infrastructure projects settings. The presented methodology, comprising a transect walk and participatory FGDs, is standardized, intuitive to implement and highly flexible to explore a wide range health impacts as perceived by local communities. The case study further revealed the complexity of health impacts as described by the community members. Compared to the existing HIA toolbox, which is mainly based on geographic stratification of affected communities and quantitative research methods, the suggested tools also enable social stratification, identification and inclusion of the most vulnerable and marginalized population groups. This bottom-up approach provided local knowledge, informing researchers of pressing community needs and enabling them to implement need-directed interventions.

Hence, we believe such participatory tools hold promise to fulfill the guiding principle of participation in HIA. Indeed, in order to integrate the knowledge and perceptions of local communities more prominently, the proposed participatory tools present an opportunity to integrate the voices of local population into the different phases of HIA. Notably, the visualizations and semi-quantitative output of the tools (i.e. qualitative maps and tabular summary of the FGDs) could enhance HIA and, thus, more readily assist decision makers. The easy administration and the flexibility of the toolset presented shall serve as solid foundation for further strengthening HIA practice.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.eiar.2022.106788>.

Funding

This work was supported by the Swiss Programme for Research on Global Issues for Development (r4d Programme, <http://www.r4d.ch/>), which is a joint funding initiative by the Swiss Agency for Development and Cooperation (SDC) and the Swiss National Science Foundation (SNSF) under grant (No. 194003). The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Author statement

Conceptualization: AL, MSW, AF; Methodology: AL, HC, IL, HZ, DD, MSW, AF; Funding acquisition: MSW; Supervision: MSW, AF; Writing - original draft: AL, MSW, AF; Writing - review & editing: HC, IL, HZ, DD, MSW, AF.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We are grateful for all the efforts of the study and field teams in the countries, including local gatekeepers, moderators, transcribers as well as drivers. Many thanks go to all study participants for sharing their time and insights with us. Sincerest thanks go to Dr. Constanze Pfeiffer and Dr. Sonja Merten for their inspiration and guidance to develop the data collection tools. We also acknowledge intellectual contributions of core project team members, other than the co-authors, who have contributed to the tool set and methodological approach employed for this study, namely Dr. Belinda Nimako. We express our gratitude to all the fruitful

collaboration with the many other project associates, which ensured a smooth implementation of the study and a successful data collection.

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