

Stakeholders' perceptions of the socio-economic and environmental challenges at Lake Victoria

Karlijn L. van den Broek^{1,2} 

¹Research Centre for Environmental Economics, University of Heidelberg, Heidelberg, Germany

²Department of Psychology, University of Heidelberg, Heidelberg, Germany

Correspondence

Karlijn van den Broek, Research Centre for Environmental Economics, University of Heidelberg, Heidelberg, Germany.
Email: karlijn.vandenbroek@awi.uni-heidelberg.de

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Abstract

Developing policy that is both relevant and supported requires an understanding of stakeholders' account of the key challenges in society. Such insights allow policy-makers to better align their policy and collaborate with stakeholders to successfully manage the challenges. To this end, the present study reports on a problem analysis conducted with Lake Victoria stakeholders. A thorough stakeholder mapping procedure was followed by semistructured interviews with businesses, NGOs, governmental organizations and communities. In these interviews, stakeholders discussed what they perceived to be the most pressing challenges in the region, as well as their causes and possible mitigation strategies. The analysis resulted in 12 key challenges raised by the stakeholders that cover socio-economic, environmental, health and institutional issues. Stakeholder analysis revealed that the type of challenges discussed varied across countries and stakeholder institutions. Based on these analyses, the present study concludes that these diverse perceptions must be taken into consideration in future policy formulation and that a strong partnership between policy-makers and stakeholders is crucial to mitigate these challenges.

KEYWORDS

lake victoria, participatory research, perceptions, problem analysis, stakeholder engagement

1 | INTRODUCTION

Knowing the perceptions of local stakeholders regarding the most significant challenges in a particular region allows policymakers to align their policy or adapt information provisions accordingly. This not only ensures a policy is widely supported, but also opens the door for policymaker–stakeholder collaborations to more effectively address the challenges.

Lake Victoria, the world's second largest lake by surface area, would particularly benefit from mapping stakeholder perceptions because of the diverse types of stakeholders spanning a large geographical area across three riparian countries. Indeed, local scientists have called for stakeholder involvement to address challenges

at Lake Victoria (Njiru, Kazungu, Ngugi, Gichuki, & Muhozi, 2008; Odada, Olago, Kulindwa, Ntiba, & Wandiga, 2004). A first step for collaborations between policymakers and stakeholders to address local issues is to understand the views of the stakeholders regarding the challenges in the region.

Ample research effort has been dedicated to understanding the social and environmental challenges at Lake Victoria, including sanitation and health issues (Muyodi, Hecky, Kitamirike, & Odong, 2009), hazards and disasters around the lake such as floods, droughts (Awange & Ong'ang'a, 2006), the growth of the water hyacinth (Njiru et al., 2008), continued poverty (Onyango & Jentoft, 2010), governance issues (Awange & Ong'ang'a, 2006), effective fisheries management (Njiru et al., 2008; Van den Broek, 2018), corruption (Njiru

et al., 2008), soil erosion (Meyer, Deckers, Poesen, & Isabiryre, 2009) food security (Geheb et al., 2008), gender equality (Fröcklin, De La Torre-Castro, Lindström, & Jiddawi, 2013) water pollution and eutrophication (Odada et al., 2004), climate change (Johnson, 2010) and the prevalence of HIV/AIDS (Nagata et al., 2012).

However, little research has focused on analysing Lake Victoria's stakeholder *perceptions* on the challenges in the area. An exception is a study exploring Ugandan fishers perspectives on the most important problems in the fishery (Kyangwa, Resources, & Box, 2000). In the present study, the key challenge reported by the fishers was the use of illegal fishing methods, followed by corruption and gear theft. Nevertheless, no research has mapped out the perspectives of different types of stakeholders regarding Lake Victoria or compared the different stakeholder views.

The present study discusses a problem analysis conducted with diverse stakeholders at Lake Victoria. It aims included (a) laying out the perceptions of the most pressing challenges in the Lake Victoria region and (b) comparing the views of different stakeholder groups. Such insights will be a valuable first step in building bridges between stakeholders and policymakers to co-develop policy effectively addressing key challenges in the region.

2 | METHODS

Lake Victoria stakeholders were first identified through a comprehensive stakeholder mapping procedure (Van den Broek, 2019). They were selected on the basis of the following criteria: (a) they represented individuals or institutions directly or indirectly affected by developments in and around Lake Victoria; (b) they represented the range of types of relevant individuals and institutions, including businesses, NGOs, communities and government institutions; and (c) they represented different geographical regions around the lake (Figure 1).

The stakeholder mapping process consisted of three steps, including (a) identification of stakeholders; (b) categorizing stakeholders; and (c) understanding (relations between) stakeholders (Durham, Baker, Smith, Moore, & Morgan, 2014; Prell, Hubacek, & Reed, 2009). A 'snow-ball sampling' technique was used to identify stakeholders through current contacts, who then identified further contacts until sufficient stakeholders were selected, or no further stakeholders were identified. The stakeholders were categorized in terms of priority and role (e.g., businesses, NGO's, communities, government) to facilitate selection of a diverse set of stakeholders, thereby ensuring different views were obtained.

Stakeholders from 44 institutions were contacted and invited for an interview, with 25 institutions agreeing to participate (Table 1), representing a response rate of 56.82%, with a total of 67 participants. Of the stakeholder institutions, 13 were located in Uganda, three were in Kenya, and nine were in Tanzania (Table 1 displays the jurisdiction of these institutions, rather than their locations). They include ten governmental organizations, nine NGOs, three business organizations and three community groups, collectively being

a diverse set of stakeholders representing different interests and nationalities. It is noted that not all stakeholders responded to the interview, however, meaning some stakeholder views were not represented in the current study (e.g., all relevant government Ministries).

Structured interviews were conducted to learn about the perceived challenges in the region according to each stakeholder institution. One interview was conducted for each institution, including one to eight participants. Stakeholders were interviewed about the key benefits, challenges and their drivers, and mitigation of the challenges. Follow-up questions were asked to facilitate the stakeholders discussing the underlying causal process of the particular issue(s) and how different factors affected it (them).

The stakeholders identified the issues autonomously in the interviews. Further, they were not given any examples nor were they prompted to discuss known issues when the stakeholders did not spontaneously discuss them. This meant the participants did not give their opinion on issues they did not raise, with the results of the present study thereby only reflecting the perspectives of participants who raised a particular issue. This approach was taken to avoid social desirability bias, which would result in a tendency for the participants to agree with the interviewer. This bias was expected to be particularly likely in this setting because the interviewer was a foreign researcher and East Africa cultures tends to be hierarchical (Hofstede, 2013).

Participatory tools were used to aid the discussions and to visualize complex processes. Where appropriate, a fishbone diagram or force field analysis was conducted to facilitate mapping out the key challenges in the region, as well as the process causing these issues. Notes were taken during the interview which were subsequently used for the data analysis.

A coding scheme was developed to identify recurrent issues in the interview discussions. For each challenge identified by a participant, a code was created, with subsequent data coded accordingly. The analysis resulted in a matrix of challenges across stakeholders,

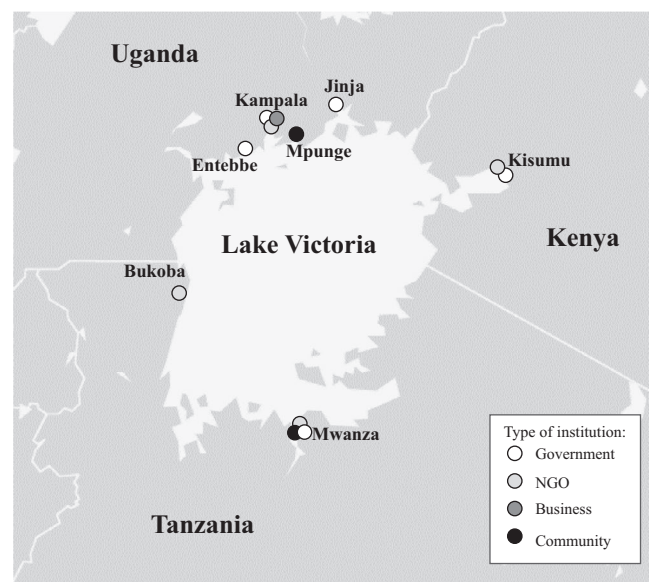


FIGURE 1 Geographical distribution of interviewed stakeholders around Lake Victoria

TABLE 1 Overview of participating stakeholder institutions

| | Uganda | Kenya | Tanzania | Regional |
|-------------|---|---|---|---|
| Government | <ul style="list-style-type: none"> • Fisheries Training Institute • Ministry of Agriculture, Animal Industry & Fisheries • National Fisheries Resources Research Institute | <ul style="list-style-type: none"> • Kenya Marine and Fisheries Research Institute | <ul style="list-style-type: none"> • Lake Victoria Environmental Management Programme • National Environment Management Council • Tanzania Fisheries Research Institute | <ul style="list-style-type: none"> • Lake Victoria Regional Authorities and Counties Cooperation • Lake Victoria Basin Commission • Lake Victoria Fisheries Organization |
| NGO | <ul style="list-style-type: none"> • Katosi • WWF • Association of Fishers and Lake Users of Uganda • Ugandan Fisheries & Fish Conservation Association | <ul style="list-style-type: none"> • Osiendela | <ul style="list-style-type: none"> • Environmental Management and Economic Development Organisation • Fishers Union Organisation • Kagera Development And Credit Revolving Fund • Naturland | |
| Business | <ul style="list-style-type: none"> • Ugandan Fish Processors & Export Association | | | <ul style="list-style-type: none"> • East African Industrial Fishing & fish processors Association • East African Tourism Platform |
| Communities | <ul style="list-style-type: none"> • Community members of Mpunge | | <ul style="list-style-type: none"> • Mishikamano women's group • Beach Management Unit Kigoto | |

within which the specific discussions per stakeholder group for each challenge were detailed. Once all the data were entered in the matrix, the data were revisited to ensure all the data were consistently coded with the coding scheme.

Interviews can provide a rich description of participant perspectives regarding specific challenges and the drivers of these challenges (Van den Broek & Walker, 2019). Nevertheless, analysis of interview data is inevitably strongly determined by a researcher's interpretations. Thus, follow-up sessions were conducted with a selected group of stakeholders in which the findings from the present study were presented. The participants confirmed the discussions were correctly interpreted in these sessions and accurately reflected their perceptions of the key challenges in the region.

3 | RESULTS

Through the analysis a list of 12 challenges discussed by the stakeholders was identified. The challenges are not necessarily independent and may overlap or influence each other. They were categorized into socio-economic, environmental, institutional and health challenges. These types of challenges are discussed below in the order of the number of stakeholder institutions that addressed the challenge category (starting with the most frequently raised challenge category). At the same time, it is acknowledged that this order of challenges does not necessarily reflect their overall relative importance.

3.1 | Socio-economic challenges (33)

Participants most frequently discussed socio-economic challenges, including reduced fish catches (20 stakeholder institutions); lack of alternative livelihoods (6); poverty (5); gender inequality (1); and food security (1). Each of these challenges is discussed below, providing stakeholder accounts of the challenges.

3.1.1 | Reduced fish catch

Based on identification by 20 stakeholder institutions, the most frequently discussed challenge was a declining fish catch and stock, perceived as one of the most pressing issues in the Lake Victoria region, mainly referring to the Nile perch fishery. Stakeholders reported that too much immature Nile perch is being caught, causing a declining stock. They also identified a lack of monitoring as a driver for non-compliance with fishing regulations on the use of destructive fishing gear. The stakeholders discussed how a high demand for Nile perch on the one hand, and a lack of alternative livelihoods on the other hand, means the fishery continues to attract people in the region. Other causes of the declining fish catch were also discussed, including climate change, poor water quality and corruption.

A range of mitigation strategies was discussed by stakeholders, including the fishing regulations previously established by the government, and the current approaches of monitoring and

enforcement. Stakeholders also proposed alternative regulations and compliance frameworks. Many proposed more efforts should be devoted to raising awareness as a means of mitigating the challenge. Finally, stakeholders also discussed how a change in attitudes (i.e., increasing the sense of ownership; promoting a long-term orientation) among fishers could help mitigate this issue.

3.1.2 | Alternative livelihoods

Stakeholder organizations indicated there are few alternative livelihood options for people living in the Lake Victoria region, other than fishing. The stakeholders discussed how people experience a large barrier to move away from fishing and into other professions because of a lack of capital, skills or knowledge, or because of a strong fishers identity.

Stakeholders suggested adaptation of alternative livelihoods could be stimulated by setting examples and ensuring ownership of the new livelihoods. They also proposed the development of government programs to provide support to help them re-integrate in society when they adopted a new livelihood.

3.1.3 | Poverty

The discussion on poverty in the Lake Victoria region tended to focus on the lack of a savings culture among the fishing community, thought to be a key factor for the continued poverty in the region. Participants reported the government is currently not sufficiently addressing this issue. Further, a lack of education opportunities was proposed to exacerbate the poverty in the region.

Participants suggested fishers should be given more opportunities to save money. As an example, they proposed a scheme should be introduced that allows fishers to save money, noting that few banks are present near the lake.

3.1.4 | Gender inequality

A lack of gender equality was discussed, noting women do not enjoy equal opportunities and rights for Lake Victoria. Specifically, increased scale and regulations have driven many women out of the fishing industry who previously tended to dry the fish for a living. Accordingly, the stakeholders proposed that women especially should be assisted in a transition into alternative livelihoods. They further proposed that successful women should function as examples as a means of defying stereotypes.

3.1.5 | Food security

One stakeholder institution identified food security as an increasing challenge in the region, mainly because climate change is affecting the weather which, in turn, affects the harvest. No solutions to this problem were offered by the participant.

3.2 | Environmental challenges (32)

After identifying socio-economic challenges as the major concern, environmental challenges were the second most frequently discussed including water pollution (17), soil erosion (9) and water hyacinth (6).

3.2.1 | Water pollution

The second most discussed challenge was Lake Victoria water pollution, with 17 stakeholder institutions discussing this issue. Many stakeholders described how the pollution was caused by industry discharging waste waters into the lake, with the government not exercising sufficient control over this problem. Mining practices around Lake Victoria were also identified as contributing significantly to Lake Victoria water pollution, as well as an increased use of agricultural fertilizers. The stakeholders also discussed how a growing population, deforestation, poor sanitation practices, use of poison by fishers and unsustainable waste disposal by local communities continue to exacerbate the water pollution issue.

Mitigation strategies discussed ranged from introducing tourism around the lake and building more sanitation facilities to stricter monitoring and enforcement. Similar to the issue of the decreasing fish catch, socio-psychological factors also were discussed, including promoting ownership, long-term orientations and environmental education to create awareness and knowledge.

3.2.2 | Soil erosion

Most of the discussions on soil erosion and deforestation focused on local communities cutting trees to use for fuel and building houses, and clearing land for cultivation. Stakeholders explained that a consequence of the soil erosion was the removal of a buffer zone that functioned to filter water prior to its entering Lake Victoria, meaning deforestation contributes to the issue of water pollution.

Participants proposed solutions for soil erosion, including planting trees, stimulating the use of renewable energy and environmental education to increase public awareness of the consequences of deforestation.

3.2.3 | Water hyacinths

The water hyacinth growing in Lake Victoria was identified as a significant challenge. Some stakeholders expressed their opinion that the growth of this plant is a result of poor sanitation practices, industrial wastes and the use of pesticides in the region (although the latter does not contain nutrients that promote the growth of water hyacinth). Fishers often discussed how the growth of water hyacinth can prevent access to the lake. Many stakeholders also discussed that many mitigation strategies have been successful, and therefore this challenge has been alleviated.

Participants provided few solutions for the existence of the water hyacinth other than the existing approaches (i.e., introduction

of weevils that consume water hyacinth; relocation of a bridge in Kenya that was preventing the water from mixing). Interestingly, participants did not propose addressing the sanitation and pollution issues at the lake as a means of addressing the issue of water hyacinth, despite reporting this causes the plant to grow.

3.3 | Institutional challenges (12)

The institutional challenges identified by the stakeholders included governance issues (8) and land ownership challenges (4).

3.3.1 | Governing Lake Victoria

Stakeholders indicated they did not feel they were sufficiently involved in the mitigation of Lake Victoria issues and wanted to see more partnership with the government. Participants also discussed how, although regulations among the three riparian countries were harmonized on paper, this was not yet the case in practice. The stakeholders argued that corruption prevented an effective approach to tackle the challenges in the region. A lack of an effective institutional framework and unclear water borders further complicate successful governance in the region, according to stakeholders.

Participants proposed the need for developing policy in closer collaboration with stakeholders. Moreover, they suggested more effort should be invested in aligning the policies across the three riparian countries to ensure a unity in the approaches for tackling the lake challenges.

3.3.2 | Land ownership

According to the stakeholders, many citizens do not legally own the land on which they live. They discussed how the government owns a large share of the riparian land and is selling this land to foreign investors, meaning the occupants are evicted or are uncertain about their future. The stakeholders, however, did not discuss any solutions for this issue.

3.4 | Health challenges (10)

Stakeholders discussed the prevalence of HIV/AIDS in the region (6), well as the spread of other diseases (4).

3.4.1 | HIV/AIDS

According to the stakeholders, the prevalence of HIV/AIDS is particularly high around Lake Victoria, much higher than the national average of the riparian countries. The stakeholders discussed how poverty and a lack of employment forces women into the sex industry. They also discussed how the nature of the payout (daily wages) causes many fishers to spend their wages on alcohol and prostitution, increasing the chances of contracting HIV/AIDS. Stakeholders

also mentioned that polygamy further increases the spread of HIV/AIDS.

The stakeholders proposed that women should have more opportunities for alternative income generation (e.g., aquaculture). They further emphasized that women should be given more education on safe sex practices and the prevention of HIV. Interestingly, no solutions were suggested that would require any behavioural change from men in regard to this issue.

3.4.2 | Spread of diseases

Stakeholders also discussed how poor sanitation practices in the region result in a high prevalence of such diseases as malaria, cholera, diarrhoea and typhoid. Particular attention was paid in these discussions regarding lack of access to clean drinking water, and how many riparian communities drink untreated water from the lake. Stakeholders discussed how the mitigation of this issue required improved sanitation practices around the lake.

3.5 | Stakeholder analysis

The challenges identified in the stakeholder discussions were further analysed to investigate the distribution of the reported challenges across geographical locations (Figure 2) and the types of institutions (Figure 3).

The country-level stakeholder analysis indicated that the type of challenges discussed by the stakeholders tended to differ across countries. Kenyan stakeholders did not discuss any health or institutional challenges, possibly attributable to the small sample of Kenyan stakeholders. In fact, all stakeholders discussed socio-economic challenges, but Ugandan stakeholders particularly focused on these types of challenges.

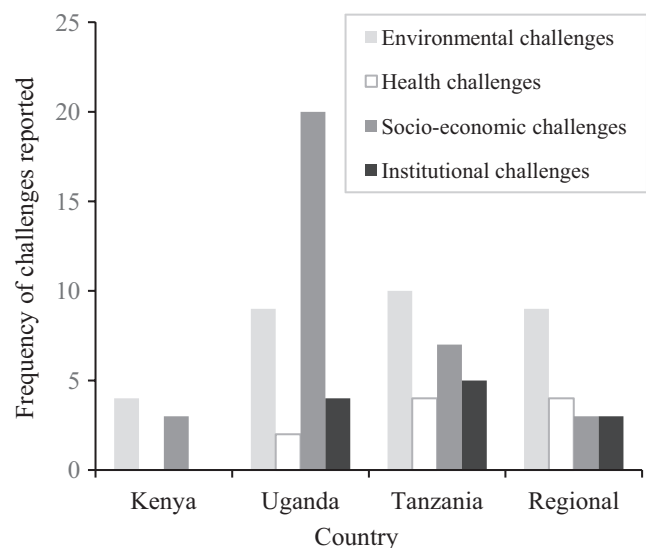


FIGURE 2 Frequency of challenges discussed per region. N.B. the frequency consists of the number of institutions per individual challenges multiplied with the number of challenges per category

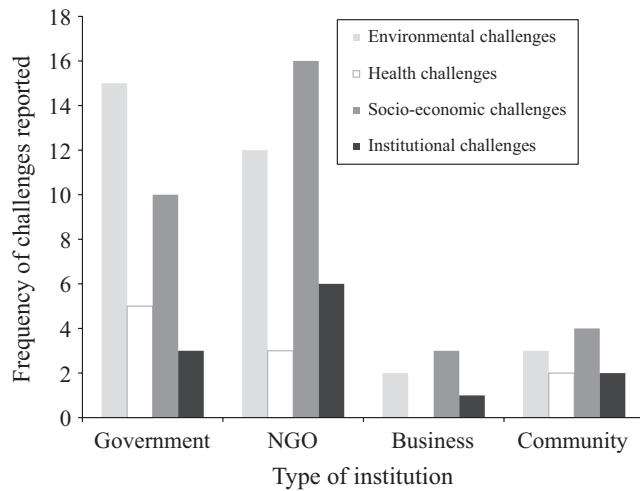


FIGURE 3 Frequency of challenges discussed per region. N.B. the frequency consists of the number of institutions per individual challenges multiplied with the number of challenges per category

The institution-level stakeholder analysis revealed that government institutions and NGO's mainly tended to report on environmental and socio-economic challenges in the region, while focusing less on health and institutional challenges. The businesses and communities tended to discuss the smallest range of challenges, also possibly attributable to the smaller sample of these institutions. Since government and NGO institutions were particularly represented in Uganda, these findings suggest the strong focus of Ugandan stakeholders on socio-economic challenges may be due to the type of stakeholders that were interviewed in Uganda.

4 | DISCUSSION AND CONCLUSIONS

The present study intended to map out the most important challenges in the riparian zone of Lake Victoria as reported by local stakeholders. The study findings indicate Lake Victoria stakeholders believe the region suffers from many serious issues, comprising a diverse mixture that includes socio-economic, environmental, health and institutional challenges. Stakeholders particularly reported socio-economic challenges, such as a reduced fish catches, and environmental challenges, such as water pollution. Nevertheless, stakeholder analysis revealed that the type of discussed challenges tended to vary across countries and stakeholder institutions, with Ugandan stakeholders tending to focus most on socio-economic challenges and government institutions, while NGOs focused mostly on both environmental and socio-economic challenges.

These differences in identified challenges between stakeholder institutions and countries may be underpinned by structurally different perceptions of the urgency of the various challenges in the region. Such a heterogeneity of perceptions may form barriers for collaborations and effective management of the challenges in this region (Van den Broek, 2018). Accordingly, future research should

further investigate the differences in these perceptions and the underlying causes for such diverging perspectives.

The list of challenges affecting Lake Victoria corresponds well with the socio-economic and environmental challenges identified in the literature, with the exception of land ownership issues around Lake Victoria. Thus, it is important that this issue receives more attention in the future to explore the relevance and nature of this issue.

Interestingly, some of the challenges already receiving significant research attention were not discussed by the participants. These issues include hazards such as droughts and floods in the lake region, suggesting these natural disasters are not salient in stakeholder minds, possibly because of their infrequent occurrence. As a related item, climate change was not identified as a major challenge in the region, only being incidentally discussed in relation to other issues (e.g., declining fish catches). This observation suggests stakeholders may not perceive climate change itself to be a major challenge in the Lake Victoria region.

In fact, other research has demonstrated climate change poses a very significant challenge to the Lake Victoria region. It is expected to threaten the Nile perch fisheries, the health of the ecosystem of the lake, increase the influx of refugees, threaten food security, increase waterborne diseases and exacerbate eutrophication (Johnson, 2010). Such issues will greatly impact this region, which is already confronted with many challenges, as previously outlined. Thus, it would be highly counterproductive if climate change is not recognized to be a key challenge by stakeholders, as suggested by the findings of the present study. Importantly, if climate change does not receive the attention required to adapt and mitigate to a changing environment, the consequences of this global challenge can be catastrophic for this region. Thus, future research should also further investigate the perceived urgency of climate change and its potential impacts in the Lake Victoria region.

The findings of the present study not only indicated which challenges stakeholders perceive to be important in regard to the Lake Victoria region, but also how they think about these challenges. Their discussion show their perspectives on the drivers of the issues and particularly what possible mitigation strategies could be taken to address them. It is clear that addressing these issues is a challenging task and that one solution alone cannot mitigate such a variety of challenges to the lake. Nevertheless, the most common mitigation measure proposed by the participants was to increase awareness on the issues and alternative practices that could be used to address the challenges. Moreover, stakeholders emphasized that ownership of the local resources should be promoted among riparian communities in order to stimulate conservation. Not only was individual behaviour change proposed as a mitigation effort, but changes in the governance of the lake were also imperative according to the stakeholders.

It is clear that these stakeholders are aware, knowledgeable and engaged in the social and environmental challenges in the riparian zone of Lake Victoria. To this end, many stakeholders reported they feel insufficiently consulted by policymakers, even though

they demonstrated keen interest in being part of the solutions to address these challenges. Thus, a key recommendation arising from the present study is that a stronger partnership between stakeholders and policymakers should be established. This partnership will be mutually beneficial since it will give stakeholders an opportunity to voice their concerns and needs, thereby aid policymakers to develop relevant policy that is supported by society.

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ORCID

Karlijn L. van den Broek  <https://orcid.org/0000-0002-0933-1194>

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