

# Assessing climate impacts on gender and socially inclusive WASH: lessons from a research-practice project

Jeremy Kohlitz, Tamara Megaw, Anna Gero,  
Silvia Landa, Angelo Ximenes, Caitlin Leahy,  
and Joanne Chong

**Abstract:** *This paper describes a research-practice project that produced guidance materials for, and built knowledge on, assessing climate impacts on gender and socially inclusive water, sanitation, and hygiene (WASH) services. Lessons about the relevance of gender and social inclusion for WASH climate resilience, and recommendations for programming and policy are provided. This paper outlines how a team of researchers and practitioners developed participatory community-based activities for assessing climate impacts on inclusive WASH in Indonesia and Timor-Leste. The team found differences in the type and magnitude of impacts that different people experience, burdens of responding to impacts, capacity to prepare for and respond to impacts, and influence on WASH decision-making. WASH programming and policy-making should seek to leverage tacit knowledge of local stakeholders and consult diverse people to inform climate interventions that provide equitable benefits. Partnerships between civil society organizations and research organizations can generate valuable and innovative learnings for WASH practice and policy.*

CLIMATE UNDOUBTEDLY INFLUENCES THE SERVICE levels and the sustainability of water and sanitation systems. There are a growing number of studies that demonstrate how extreme weather events and trends affect water and sanitation systems (Howard et al., 2016; Kohlitz et al., 2017). Due to climate change, extremes in temperatures, precipitation and sea-levels are predicted to increase for the foreseeable future (IPCC, 2014). Consequently, climate-related hazards will increasingly feature as a barrier to safe and equitable water and sanitation for decades to come.

Social structures and processes shape the ways that people experience the effects of climate change (Leichenko and Silva, 2014). While this is still not a widely researched area in relation to water, sanitation, and hygiene (WASH), Dickin et al. (2020) show that in one region of Burkina Faso, droughts caused ethnic Mossi women to experience greater burdens of water-related labour whereas ethnic Peul women lost access to safe drinking water. The differences were because ethnicity largely determines women's livelihoods and therefore how they use water. In another study, Kohlitz et al. (2020a) describe how wealthier households in a community in Vanuatu controlled private rainwater

---

Jeremy Kohlitz, [Jeremy.Kohlitz@uts.edu.au](mailto:Jeremy.Kohlitz@uts.edu.au), University of Technology Sydney, Institute for Sustainable Futures; Tamara Megaw, University of Technology Sydney, Institute for Sustainable Futures; Anna Gero, University of Technology Sydney, Institute for Sustainable Futures; Silvia Landa, Plan International Indonesia; Angelo Ximenes, WaterAid Timor-Leste; Caitlin Leahy, University of Technology Sydney, Institute for Sustainable Futures; Joanne Chong, University of Technology Sydney, Institute for Sustainable Futures  
© The authors, 2022. This open access article is published by Practical Action Publishing and distributed under a Creative Commons Attribution Non-commercial No-derivatives CC BY-NC-ND licence <http://creativecommons.org/licenses/by-nc-nd/4.0/>.  
[www.practicalactionpublishing.com](http://www.practicalactionpublishing.com), ISSN: 0262-8104/1756-3488

harvesting systems and set the rules for poorer households to access them when they were the only safe drinking water option on the island after flooding contaminated communal wells.

The development of practices that proactively account for the inextricably blended impacts of physical climate hazards and social inequality on WASH is critical for meeting the climate change challenge. The aim of this paper is to describe a research-practice project that produced guidance materials for exploring impacts of and responses to climate change on gender and socially inclusive water and sanitation. It describes the guidance materials for participatory community-based activities that a team of WASH researchers and practitioners developed for assessing the differential impacts of climate hazards on WASH, examples of what was learned from applying these activities, and explains the significance of this approach for the broader WASH sector.

### **Climate Change Response for Inclusive WASH: project overview**

The research-practice project titled 'Climate Change Response for Inclusive WASH' (CCRIW) was funded by the Australian Department of Foreign Affairs and Trade (DFAT) and GHD through the Water for Women (WfW) Fund. The overall research question that the CCRIW project answered was: How can civil society organizations (CSOs) assess climate change impacts to help improve the service and gender and social inclusion outcomes of rural WASH programmes? The project was implemented in partnership between the Institute for Sustainable Futures, University of Technology Sydney (ISF-UTS), WaterAid Australia, WaterAid Timor-Leste, Plan International Australia, and Plan International Indonesia. Ethical approval for the project was granted in principle by the University of Technology Sydney Human Research Ethics Committee (UTS HREC REF NO. ETH18-2599).

Indonesia and Timor-Leste were chosen as countries in which to implement this project because of their exposure to effects of climate change and documented norms of gender inequality in water management. All countries are exposed to climate change, but southern Indonesia and Timor-Leste are particularly exposed to a decrease in future rainfall (IPCC, 2021). Drying trends could have profound implications for gender equality in terms of rural water and sanitation in Indonesia where water fetching is typically delegated to women and girls in rural areas (Irianti and Prasetyoputra, 2019) and in Timor-Leste where women often have low levels of participation in decision-making about rural water supply projects (Tam, 2012).

ISF-UTS developed a conceptual framework (Figure 1) to guide the transdisciplinary research that informed the project design (Megaw et al., 2020b). The framework describes the multiple, interacting pathways through which people differentially experience impacts of climate change. The impact pathways include physical impacts of climate hazards on WASH infrastructure, water resources and ecosystems on which WASH services depend, and people's livelihoods. The pathways also include socially determined access to resources and decision-making, and psychological factors.

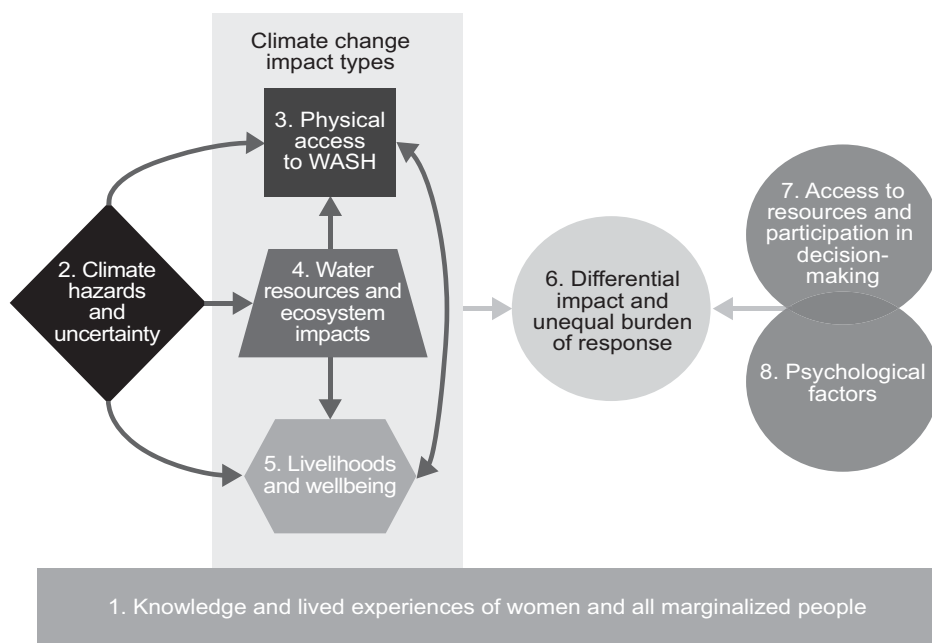


Figure 1 CCRIW conceptual framework

### Field-testing in partnership: a research-practice approach to developing ways to understand the climate, gender and social inclusion, and WASH nexus

The CCRIW guidance materials were developed through intensive one-month long engagements between ISF-UTS researchers and field staff at Plan International Indonesia (PII) and WaterAid Timor-Leste (WATL) (and WATL's implementing partners, Fundasaun Hafoun Timor-Lorosa'e and CARE Timor-Leste). ISF-UTS researchers were with PII staff in Indonesia from 7 July to 6 September 2019 and with WATL staff in Timor-Leste from 30 September to 25 October 2019.

First, ISF-UTS and the CSO field staff held a one-week workshop to collaboratively reflect on the relevance of climate impacts for gender and socially inclusive WASH, and to design pilot activities to assess these impacts. In the first stage of the workshop, participants shared their perspectives, knowledge, and experiences on how climate hazards (e.g. flooding, drought, landslides) affect local communities, discussed potential ethical risks of discussing harm from climate change with community members and how to mitigate those risks in small breakout groups. Select participants presented their CSO WASH programmes' theories of action, gender and social inclusion approaches, and what existing tools they used. Activities, such as collaborative systems mapping to explore the complex web of social and environmental factors that contribute to differential impacts of climate change on WASH, drew out the tacit knowledge of the CSO field staff and developed a shared understanding of the climate change problem.



**Photo1** Plan International Indonesia team practising a participatory community-based climate resilience activity

Next, ISF-UTS staff presented the CSO participants with a selection of participatory rural appraisal-style activities that were contextualized for learning about inclusive WASH and climate change in communities. These activities included various forms of community mapping, catchment mapping, transect walks, focus group discussions, Water Safety Plan risk assessments, participatory analyses of local resources and social norms, and futures visioning. The participants deliberated on each activity before voting which to pilot. The CSO participants then simulated the selected activities among themselves. For example, the PII team simulated a climate-sensitive sanitation accessibility audit by walking from a nearby neighbourhood to the workshop venue's toilet. This simulation helped to build the confidence of the CSO staff to pilot the activities and facilitate discussions on climate change with community members.

After the workshop, ISF-UTS and CSO staff trialled the activities in rural communities in the Manggarai regency, Indonesia and the Liquiçá municipality, Timor-Leste over periods of two to three weeks each. During the trials, women and men in each community had an equal opportunity to discuss and share how they experience climate impacts. Where appropriate, the team sought the participation of people with disabilities in the activities by explaining how the activities would be conducted and letting them choose the terms of their participation. Participants with disabilities comprised people with mobility and sensory disabilities, and were identified and recruited using information from local leaders in the villages. A transect walk activity was modified to suit some participants with disabilities



**Photo 2** Women's group in Timor-Leste participating in the impact diagram activity

who preferred to describe at home their experience accessing a toilet during climate hazards rather than go on a transect walk (this modification was then recorded as an optional step in the guidance materials). The team also held interviews and focus group discussions relating to climate impacts on WASH separately for women, men, and local government officials to complement the team's learning about issues confronting communities.

Reflexivity was an important feature of the trialling process. After trialling each activity, the ISF-UTS/CSO team convened to ask one another questions such as 'Did the community enjoy and respond to the activity?' and 'What you learnt from the community – is it a shared or different experience to your own?' A note-taker recorded each team member's reflections and these notes were referred to in subsequent design and planning meetings. These questions facilitated the team to adjust the design and implementation of the activities, and encouraged introspection and shared learning among the team.

### **The outputs: guidance for practitioners and ideas for all**

ISF-UTS and its CSO partners developed two guidance notes, one for PII and one for WATL, that describe the activities for assessing impacts of climate change on inclusive WASH (Kohlitz et al., 2020b, 2020c). The guidance notes provide

step-by-step instructions for implementing the activities, and are written to integrate directly into the WASH programmes of PII and WATL, also offering techniques and ideas that are transferrable to other contexts (the outputs are available at <https://waterforwomen.uts.edu.au/climate-change-response/>).

### ***Plan International Indonesia guidance note***

The ISF-UTS/PII team developed four activities for assessing and responding to climate change impacts on rural sanitation (Kohlitz et al., 2020c):

*Climate-sensitive community mapping.* Groups of women draw a map of their community and identify important livelihood and WASH features. They then identify where climate hazards affect WASH within the community and how the hazards differentially affect women, men, and people with disabilities.

*Climate impacts on sanitation accessibility.* People with disabilities, women, and men conduct a transect walk to identify how very wet or very hot and dry conditions create barriers for physically accessing and using public toilet facilities. They also discuss barriers to people with disabilities participating in community decision-making. Participants then propose local solutions to the identified issues that can be taken forward by families, the community or the local government.

*Considering climate impacts in the Gender and WASH Monitoring Tool (GWMT).* The GWMT is a process developed by Plan International to enable local project staff and government partners to explore and monitor gender relations with women and men in implementation of WASH-related initiatives. This activity extends the GWMT process to facilitate separate groups of younger and older women and men to consider how weather extremes change the amount of time they spend on WASH tasks, whether decision-making power changes when there is extreme weather, and their aspirations for changing these norms in their household and community.

*Five resources and future visioning.* Community members consider their own local resources and strengths and how they can be mobilized to address climate impacts on inclusive sanitation. Women and men then visualize their preferred future for sanitation in their community and describe steps they can take to achieve that future.

### ***WaterAid Timor-Leste guidance note***

The ISF-UTS/WATL team developed four activities for assessing and responding to climate change impacts on rural water (Kohlitz et al., 2020b):

*Impact diagram.* Groups of women and men draw arrows between the picture cards to develop a causal chain of direct and indirect impacts between climate hazards, local activities and objects, and WASH components. The participants also discuss how women, men, and people with disabilities are affected differently by the chain of impacts.

*Who does, who decides during climate change scenarios?* An extension of WaterAid's 'Who does, who decides' activity that identifies different ways women and men are engaged in WASH workloads and decision-making and encourages participants to think about how WASH responsibilities can be fairer and more effective. Similar to the extended GWMT process in the Plan Indonesia guidance note, implementers extend this activity to facilitate participants to think how wet and dry weather extremes affect WASH workloads and decision-making at the community and household levels.

*Feedback session for community.* Implementers share overall findings from the above two activities with community members. It is an opportunity for participants to validate the findings from the activities before they are used to develop community action plans, for community members to add additional details or identify inaccuracies, and for all involved to discuss the implications of the findings.

*Five resources.* Community members consider their own local resources and how these can be mobilized to address the identified climate impacts on inclusive WASH. The concepts of human, social, physical, environmental, and financial capitals from the Sustainable Livelihoods Framework (Scoones, 1998) are used to frame a discussion about what local resources are available to the community.

## **Examples of learnings about climate impacts on inclusive rural WASH**

Knowledge shared by community members while the team conducted the activities described in this paper, and in complementary interviews and focus group discussions, are documented in case studies (Leahy et al., 2020; Megaw et al., 2020a). This section summarizes examples of four key learnings.

*The severity and type of impact from climate hazards is differentiated across people.* In one community in Indonesia, heavy rainfall made a steep path to a waterpoint more slippery. Community members explained that although everyone accessing the waterpoint had to deal with the risk of slipping and falling on the path, the risk (and consequences) of falling while carrying heavy water were greater for elderly people and pregnant women who were more likely to get injured.

Groups from two communities in Indonesia also reported that many community members reverted to open defecation if water was unavailable for using toilets due to dry spells. Again, all community members were exposed to this, but women were said to be at higher risk of harassment or sexual violence while openly defecating.

When prioritizing climate risks to manage in a community, WASH planners should therefore consider that risk is not the same for everyone and make efforts to acknowledge and reduce risk for especially vulnerable groups.

*Social norms differentiate the burden of response.* In a community in Timor-Leste, women explained that it was their responsibility to collect water for the household, including in the dry season when primary water sources dried up and they were required to walk to sources that were more distant. Meanwhile, men in the

community explained they took responsibility to repair infrastructure damaged by storms or flooding.

WASH implementers should consider who stands to benefit most from a climate-related intervention. In the example above, providing support to construct more robust latrines would likely benefit men more, while improving the reliability of waterpoints would likely benefit women more. Interventions should provide equitable benefits that prioritize meeting the needs of more disadvantaged groups.

*Capacity to prepare for and respond to climate events is differentiated.* In Indonesia, tanks for storing water in the dry season were a common coping mechanism for helping meet WASH needs when water was scarce. However, poorer households were less likely to be able to afford storage tanks. Consequently, they tend to spend more time collecting water in the dry season and spend more money on bottled water than relatively wealthier households.

This example illustrates that climate vulnerability is not just an outcome of being geographically exposed to climate hazards, but also influenced by economic and social processes. Therefore, if WASH interventions are to reduce vulnerability, they should seek to redress economic and social inequalities and not just improve infrastructure.

*Women, men, and people with disabilities have unequal influence on community decision-making about WASH and climate impacts.* In both Timor-Leste and Indonesia, women and men agreed that women were less likely to attend community meetings on WASH than men, either because men were culturally prioritized to be invited as the household heads, women were too burdened with domestic responsibilities to attend, or if women had attended before they felt their voices were not valued. People with disabilities in Indonesia who were interviewed also stated they had not been invited to community meetings. As a result, women and people with disabilities had fewer opportunities to influence community decisions about WASH that might affect how they personally experience effects of climate change.

Climate change adaptation is inherently a socio-political act. WASH interventions should aim to gain the perspectives of diverse groups to ensure that actions taken by communities and government reflect the needs and concerns of all people.

## How the learnings improve WASH programming

The learnings this project produced had multiple benefits for the PII and WATL WASH programmes. First, they shed light on issues that may otherwise go unnoticed. For example, transect walks that are carried out in pleasant weather may not account for the challenges that people with disabilities face in accessing sanitation when it is raining heavily or very hot unless activity facilitators prompt community members to reflect on this. Considering the gendered dimensions of climate impacts on WASH can be eye-opening for community members, government officials, CSO staff members, and researchers alike.



The learnings also reinforce the need for existing WASH programme objectives. The PII team found that including a map of flooding during community mapping helped drive home messages about the effects of open defecation in the community. Meanwhile, the WATL team commented that supporting community members to reflect on local resources they have for responding to climate impacts strengthened their approach to community-led water management.

Finally, the learnings raise awareness on the need for inclusive climate resilience for WASH. The PII team noted that involving local government officials in the project activities led them to empathize with challenges that different social groups face, for example, difficulties for women and girls in accessing distant waterpoints during water shortages. The participatory nature and equality-focus of the activities enable decision-makers, like those in local government, to understand the need to mobilize resources for equitable and resilient WASH services. Similarly, the WATL team noted that communicating the discussions of these activities to government is critical for helping the government realize and prioritize the links between climate change resilience and equitable WASH.

## **Lessons learned and recommendations for WASH programming and policy**

In this section, we share three key lessons learned from the CCRIW project that are relevant for all WASH programming and policy that seeks to address impacts of climate change on WASH.

*Working in partnerships is valuable for developing effective and relevant tools.* Partnerships between researchers, practitioners, governments, and communities are particularly important for addressing climate change impacts on WASH because climate change is new territory for many in the WASH sector and its expansive impacts are best explored by drawing on diverse knowledge bases.

*Much can be learned about climate, gender and social inclusion, and WASH at the local level through tacit community knowledge.* Beginning an assessment of climate impacts on inclusive WASH with a thorough engagement of the tacit knowledge of community members is a logical starting point. Where local stakeholders do not have access to climate data, or find it confusing, participatory community-based activities, like the ones described in this paper, can facilitate people to draw on their own experiences to respond to climate impacts with locally designed solutions.

*Climate action within WASH programming and policy must account for the differentiated nature of climate impacts and the burden of response.* Marginalized groups are likely to suffer impacts of climate change to a greater degree than others (Sultana, 2018) and therefore should be prioritized when consulting with communities about WASH needs. Gaining insights from different people is not just about deciding who needs assistance the most, but also appreciating that gender, age, socioeconomic status, livelihoods, and more shape the way people experience climate impacts. A stronger appreciation of this will help inform interventions that provide equitable benefits for all.

## References

- Dickin, S., Segnestam, L. and Sou Dakouré, M. (2020) 'Women's vulnerability to climate-related risks to household water security in Centre-East, Burkina Faso', *Climate and Development* 13(5): 443–53 <<https://doi.org/10.1080/17565529.2020.1790335>>.
- Howard, G., Calow, R., Macdonald, A. and Bartram, J. (2016) 'Climate change and water and sanitation: likely impacts and emerging trends for action', *Annual Review of Environment and Resources* 41(1): 253–76 <<https://doi.org/10.1146/annurev-environ-110615-085856>>.
- IPCC (2014) 'Summary for policymakers', in C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, pp. 1–32, Cambridge University Press, Cambridge.
- IPCC (2021) 'Regional fact sheet – Asia', in V. Masson-Delmotte, P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge.
- Irianti, S., and Prasetyoputra, P. (2019) 'The struggle for water in Indonesia: The role of women and children as household water fetcher', *Journal of Water, Sanitation and Hygiene for Development* 9(3): 540–8 <<https://doi.org/10.2166/washdev.2019.005>>.
- Kohlitz, J.P., Chong, J. and Willetts, J. (2017) 'Climate change vulnerability and resilience of water, sanitation, and hygiene services: a theoretical perspective', *Journal of Water Sanitation and Hygiene for Development* 7(2): 181–95 <<https://doi.org/10.2166/washdev.2017.134>>.
- Kohlitz, J., Chong, J. and Willetts, J. (2020a) 'Rural drinking water safety under climate change: The importance of addressing physical, social, and environmental dimensions', *Resources* 9(6): 77 <<https://doi.org/10.3390/resources9060077>>.
- Kohlitz, J., Leahy, C., Chong, J., Soares, D., Ximenes, A., Neave, E., Guterres, T., Antoni, A., Pereira, M., Barbosa, P., Gomes, C., Mascarinhas, L., Reis Mangalae, A., Ximenes, S., do Carmo, D., Weking, E., da Costa, L., Amaral, J., Pereira, M., Sequeira, L., Alves, D., Moniz, N. and Gero, A. (2020b) *Climate Change Response for Inclusive WASH: A Guidance Note for WaterAid Timor-Leste*, ISF-UTS, Sydney.
- Kohlitz, J., Megaw, T., Chong, J., Sugi, F., Palaipeni, P., Emanuel, Y., Brikman, H., Joman, Y., Landa, S., Talan, J., Leong, L., Kelleher, J. and Gero, A. (2020c) *Climate Change Response for Inclusive WASH: A Guidance Note for Plan International Indonesia* ISF-UTS, Sydney.
- Leahy, C., Kohlitz, J. and Chong, J. (2020) *Socially-inclusive Responses to Climate Change Impacts on WASH: Case Study in Asumanu, Liquiçá, Timor-Leste*, ISF-UTS, Sydney.
- Leichenko, R. and Silva, J.A. (2014) 'Climate change and poverty: Vulnerability, impacts, and alleviation strategies', *Wiley Interdisciplinary Reviews: Climate Change* 5(4): 539–56 <<https://doi.org/10.1002/wcc.287>>.
- Megaw, T., Kohlitz, J. and Chong, J. (2020a) *Socially-inclusive Responses to Climate Change Impacts on WASH: Case Study in Manggarai, Flores, Indonesia*, ISF-UTS, Sydney.
- Megaw, T., Kohlitz, J., Gero, A. and Chong, J. (2020b) *Understanding and Responding to Climate Change Impacts in Inclusive WASH Programs: A Conceptual Framework*, ISF-UTS, Sydney.

Scoones, I. (1998) *Sustainable Rural Livelihoods: A Framework for Analysis*, IDS, Brighton.

Sultana, F. (2018) 'Gender and water in a changing climate: challenges and opportunities', in C. Fröhlich, G. Gioli, R. Cremades and H. Myrntinen (eds), *Water Security Across the Gender Divide*, pp. 17–33, Springer, Berlin.

Tam, T.N.T.P. (2012) 'Participation of women in rural water supply and sanitation projects: visible or invisible actors? The case of the sub-district of Maubara (Liquiçá, Timor-Leste)', *International Journal of Multidisciplinary Thought* 2(4): 149–70.