

Global Thematic Review on Training in
Community Based Research

Water Governance

Final Report

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Water Governance

Final Report

Introduction

This report presents a literature review and analysis of teaching and training materials in CBR with a focus on water governance. It also provides a typology of relevant training modalities, and a selection of several training programs as illustrative ‘best practice’ examples.

Water governance is a broad field: it encompasses many disciplines and it involves many different stakeholders. The study of water governance includes attention to:

“the range of political, organizational and administrative processes through which community interests are articulated, their input is incorporated decisions are made and implemented, and decision-makers are held accountable in the development and management of water resources and delivery of water services” (Bakker & Morinville, 2013, p. 1).

As this definition illustrates, water governance is complex and can include decision making related to consumption, irrigation, watershed management and other issues. Further, water uses and conditions are biophysically and socio-politically linked to many other topics, including farming, land uses, and resource management, adding to the complexity of decision-making processes, institutional dimensions, as well as research aspects. Given the breadth of water governance it was necessary to narrow the search strategy in this review. For the purposes of this research overview, fisheries were not included as part of the operational definition of ‘water governance.’ As well, natural resource management focused documents were only included if they had specific reference to water governance.

Community based research (CBR) is also a broad topic, with many components covering many different fields. It includes domains such as participatory action research, photo-voice, asset-based community development, and many more community-driven and community-based approaches. In a strict definition, CBR engages the community throughout the entire research process, from the beginning phases of designing a research question, to the final stages of producing findings. Though both topics are broad, finding resources specifically related to community based research training in water governance proved to be challenging. Many resources fit within one or two of the broad criteria, such as training resources in community engagement of water management, or participatory watershed management, but we found that few sources that fit the tight focus of *CBR training for water governance* specifically.

The resources that were found and discussed in this literature review have been categorized within five closely linked categories (established for the purposes of this review) related to this topic and are included here within a ‘typology’. The typology helps to situate the resources and literatures that are available that touch on dimensions of interest for this report, as well as to show the relationship of these domains to the field—even if resources dealing directly with the focal area are limited. The

categories are defined below and include: Training in Community Based Research in Water Governance; Citizen Science and Water Governance; Participatory Water Governance; Training in Formal Education Programs using Participatory and Community Based Research; and Training in Participatory Research Models for Civil Society and Practitioners. Appendix 3 is an overview table of the typology with specific examples for each of the categories outlined below. Though it is not an exhaustive list, it should serve as a guide.

Training in Community Based Research in Water Governance

Community based research is an approach that emphasizes doing research *with* communities on a topic that is relevant to both researchers and the community. Ideally, both the researchers and the community participants equally share control of the research trajectory, and any outputs or findings of the research are useful to the community, as well as to the researchers (Center for Community Based Research, 2015). We therefore searched for materials involving the training of researchers to engage in CBR specifically, within the field of water governance. As stated, while each of the fields (water governance, CBR and training) is broad and each encompasses a different type of literatures, once combined there is very little overlap and information resulting in few examples.

Two examples where the topics do appear to come together include the “Sisters Watershed Project” and the “Strengthening the role of civil society in water sector governance towards climate change adaptation in African Cities - Durban, Maputo, Nairobi” project, both co-hosted by York University and in partnership with universities in Brazil, Durban, Maputo, and Nairobi (Perkins, 2014; Perkins & Tavares Leary, 2012). Both of these projects emphasize knowledge sharing horizontally across higher education institutions (HEI), as well as vertically between these universities, government officials, and civil society. These projects incorporate CBR and participatory engagement training initiatives, such that the universities share methods with local NGOs and civil society organizations (CSOs), in order to train community members in water governance. It is important to note however, that in the case of these two projects, and for many of the projects included in this literature review, they do not fit neatly in one category according to our typology (see below), but rather they overlap across several. For example, the “Durban, Maputo, Nairobi” project had a *Training in Formal Education Programs using Participatory and Community Based Research* component, where masters students were sent to these three African countries for several months and engaged in participatory engagement as part of their degree curriculum.

A final example that fits within this typology is community-based research being led by Dr. Crystal Tremblay, from the Program on Water Governance at the University of British Columbia, in partnership with Iliso Care Society in Cape Town, South Africa and the Integrated Social Development Centre (ISODEC) in Accra, Ghana. A Participatory Video research project was conducted between November and April 2015 with various community members including citizens, government and civil society organizations in each country. The video production training focused specifically on building technical skills and capacity to co-produce a video on issues of water governance and sanitation in underserved areas of Teshie, Accra and Khayelitsha, Cape Town. The research participants conducted numerous interviews with community members and government officials, and participated in co-editing final videos, which were later screened in the community, and disseminated more broadly through academic and social media networks. Through this process, the participants developed capacity in co-creating research and gained a deeper understanding of the complexity of water governance and sanitation issues in their community including issues related to water and sanitation quality, access and affordability, and broader concerns related to environmental health and citizenship. The training materials that are currently available include the two community videos (www.watergovernance.ca), and other materials will later be made available online as they become available. A series of academic papers and a longer

documentary highlighting the methodology and process of the project within the larger context of water governance in these case sites is underway (see also www.crystaltremblay.com).

Citizen Science and Water Governance

Citizen Science includes the involvement of community residents (or citizens broadly defined), most of whom are not trained as scientists, to collect, categorize, transcribe, or analyze scientific data (Bonney et al., 2014). Given that water is a field that relies on extensive monitoring, data collection, and other aspects of science and technology, some projects and initiatives have begun to include local communities in citizen science initiatives. The goal is often to empower local communities, but also to enrich scientific information and databases, as individuals who live in an area often know more about the local context where the research is taking place, and perhaps are better able to deploy monitoring technologies and collect needed information. As monitoring especially is often resource intensive, citizen initiatives can extend and improve capacity through involving more data collection, both at more collection points, or more frequently than what might otherwise be possible. In this way, the science can also be improved, particularly qualitatively. Through these efforts, citizens are often trained in data collection, at times analysis as well—including gaining an understanding of what the data will be used for, and what purpose. One such project that has been highlighted within this literature review is the Ceiba Foundation for Tropical Conservation. Working exclusively in Ecuador, they enlist the help of citizens in their research to protect and monitor the quality of local waterways. Here, we can see that this example relates to citizen engagement for improved water governance science and practice, and often involves training and capacity building, but is not specifically about training researchers for community engagement.

Participatory Water Governance

As has often been noted in the literature, water related sciences are often highly technical, and have long been dominated by scientists and engineers (Baker, 2013). As water is recognized as a basic human necessity, there has been increasing focus and understanding in the importance of engaging communities in the water field. This is particularly true for governance, as decision making and management of water resources is increasingly understood as a domain that should involve not only scientific ‘experts’ and policy makers, but also the communities who are involved, and who may be most affected by decisions related to the resource (particularly if those communities have traditionally been marginalized and unable to exert control over water resources, (L. Harris, Goldin, & Sneddon, 2013). For decades there has been a push to include local communities in environmental governance—water governance is no exception; the hope is that incorporating local knowledge and participation will make projects more effective and sustainable (L. M. Harris & Morinville, 2013; Ostrom, 1990). In theory, including community participation offers the potential to make better, long lasting decisions, and to strengthen democracy (Aarhus Convention Newcastle Workshop, 2000).

The literature in this field is vast, and it includes several different types of associated training materials. However, in general, this type of work addresses how to better engage communities in decision-making related to water (how and why to engage in participatory water governance), but may or may not have a strong research component. In this way is it not necessarily training for CBR per se, but rather training and practices related to how to do more community engagement and inclusive water governance.. One example of an effort that we highlight in this report is the recently released report on Stakeholder Engagement for Inclusive Water Governance by the OECD (OECD, 2015). It highlights the importance of and policy guidelines for community participation and engagement in water governance, broadly defined. A number of critiques and concerns related to how communities are engaged in water governance are also available in the literature, and are referenced briefly [e.g. (L. Harris et al., 2013; Morales & Harris, 2014)].

Training in Formal Education Programs using Participatory and Community Based Research

Training in participatory research models increasingly occurs at institutions of higher learning, including universities. As such, students might engage in coursework, or MA or PhD training programs in ways that involve projects that are also intended to benefit the community, and to engage stakeholders in this process. This type of education includes community service learning as part of formal educational training programs, and can include varying degrees of local engagement. In this approach, students are encouraged to provide a service to the community, such as restoring a creek, and likely include different stakeholders at varying stages. This approach can also include the actual practice of community led or co-led research as implied by many definitions of CBR but there are examples across the entire gradient of community involvements; perhaps few examples would meet the strict definition of CBR where communities are engaged in the research from end to end.

There are many examples of community based (and community involved) research projects at universities, many of which include MA and PHD students (and as such, often involves some experiential training) while also involving communities (at times, in the full sense from research design, and in other senses, more in terms of engaging in certain aspects of the project). An example of this is the Angat Watershed Project and the courses offered as part of that program. Angat is hosted by The University of British Columbia involving various other Canadian and Filipino institutions. Community service learning is a component of a field course, whereby students are encouraged to work with NGOs and government officials while conducting research in order to also create a positive impact. In these examples, the training is often not about how to do CBR, but rather CBR related research forms an integral part of the formal training students are receiving towards their MA or PhD (with the broader goal of the training as being academic research related).

Training in Participatory Research Models for Civil Society and Practitioners

Training in participatory research models for civil society are often short courses or workshops designed to train practitioners how to conduct research that engages local communities. Though similar to *Training in Formal Education Programs* in that learners are given strategies for elements of participation in research, this type of training program is often more geared towards development practitioners, NGO workers, and civil society members, rather than graduate students. As such, these types of initiatives can be more accessible to communities than those offered at universities. Again, these examples may or may not be strictly focused on involving communities through the entire process, nor does associated research necessarily focus on community need. Instead, these examples are geared towards providing training on how to better engage communities when doing research on water, or when engaging in various aspects of water governance. The South African organization WaterNet can be considered an example within this category. One of their initiatives is to incorporate action-based research, such as water resource mapping, in working in local communities throughout the southern Africa region.

Other

This typology was created in order to simplify and structure the resources that we found during the literature review search. Though broadly all of the resources can fit within one or several of these categories, they are an ideal representation and thus cannot be considered as perfect delineations. Many of the resources fit into several categories, or do not fit one exactly and as such it is important to keep in mind the typology is to facilitate understanding and not to constrain or typecast the resources. The Water Dialogues (Galvin, 2009) is one such example; this multi-country process engaged CBR in order to provide a voice for local communities in water related stakeholder discussions to change policy. Similarly, “Crisis on Tap” (University of Victoria: Centre for Aboriginal Health Research, 2011) does not fit well into any of the above categories. Much like The Water Dialogues, the section called

“Indigenous Waterways” within the book “Crisis on Tap” offers researchers and NGOs a training guide how to engage experts and local communities in dialogue about water governance in order to create a shared vision and elicit policy change. Both of these sources, as well as the HarmoniCOP “Learning together to Manage Together”(HarmoniCOP, 2005) resemble dialogue based discussions surrounding inclusive water governance, with ultimate focus on more inclusive, equitable, and effective policies.

Narrative description of the entire search process

Between October 2014 and March 2015, we conducted a systematic search of CBR training for water governance within academic (peer reviewed) and grey (un-published) literatures. To do so, we searched several academic databases including: Web of Science, Academic Search Complete, Geobase and Compendex, Project Muse, Directory of Open Access Journals, ScienceDirect, CBCA Complete, Proquest Dissertations and Theses Global. The grey literature databases included: Open Grey, Education Resources Information Centre, OECD iLibrary, Oxford Handbooks Online, IDRC Digital Library, International Institute of Social History, FAO Water, UN Habitat, and Google. A few key online journal databases were also searched, including: The International Journal of Water Resources Development and Ecology and Society. We utilized a set of search terms for each search in each database. The water governance team met in order to decide on the key set of search terms and the same terms were used in each database in order to ensure consistency and replicability. The search terms were designed in order to include all three elements of what we were seeking, and involved a combination of: community based research, community action research, action research, knowledge mobilization, participatory evaluation, co-governance, co-management, water governance, water, training, education (see Appendix 1).

The search terms were modified slightly throughout the literature review search, as certain terms revealed too many, or too few sources based on the search engine (see note below on modifications)¹. Understandably, searches that had fewer terms, or more broad terms, yielded more results. For example, a search of “co-management AND water AND train*” yielded more results than “community-based research’ AND ‘water governance’ AND training”. The team also selected search engines based on the ones outlined in the Research Guidelines, and prioritized both grey and academic databases that were best suited to water governance. All searches were done in the ‘general’ search category of the database. As in the case of the other major themes searched within this report, some of the databases had high yields while others produced few or no results. See below for a sample of the different search results:

Database / Journal	Date	Key Terms/Search string	Search field (e.g., Topic, Title, Abstract)	# Results
Geobase and Compendex	January	“community based research” AND “water” AND “training”	General search	2
	January	“community action research” AND “water” AND “training”	General search	0
	January	“action research” AND “water” AND “training”	General search	9
	January	“knowledge mobilization” AND “water” AND “training”	General search	0
	January	“participatory evaluation” AND “water” AND “training”	General search	0
	January	“co-governance” AND “water” AND “training”	General search	2
	January	“co-governance” AND “water” AND “education”	General search	0
	January	“co-management” AND “water” AND “training”	General search	1
	January	“co-management” AND “water” AND “education”	General search	16

¹ In the search for various resources, we utilized between 10-15 of the same key terms in each database’ search engine. The exact words were changed slightly depending on the number of items found within the search engine. For example, in the event that no words were found using the phrase [“community based research” AND “water governance” AND “train*”], then we would refine it so it was slightly less specific. We would drop “governance” so that the phrase would then become [“community based research” AND “water” AND “train*”] and we would our discretion to search more generally.

Database / Journal	Date	Key Terms/Search string	Search field (e.g., Topic, Title, Abstract)	# Results
IDRC Digital Library	October	“community based participatory research” AND “training” AND “water governance”	General search in “All of DSpace”	1
	January	“community based research” and “Water”	General search in “All of DSpace”	141
	January	“community based research” AND “training” AND “water governance”	General search in “All of DSpace”	1
	January	“action research” AND “training” AND “water governance”	General search in “All of DSpace”	20
	January	“co-governance” AND “water”	General search in “All of DSpace”	1339
	January	“co-governance” AND “water” AND “training”	General search in “All of DSpace”	5
	January	“co-management” AND “water”	General search in “All of DSpace”	347
	January	“co-management” AND “water” AND “training”	General search in “All of DSpace”	280
	January	“co-governance” AND “water” AND “training” NOT “fish”	General search in “All of DSpace”	102

Database / Journal	Date	Key Terms/Search string	Search field (e.g., Topic, Title, Abstract)	# Results
ProQuest Dissertations and Theses Global	March	“community based research” AND “water governance” AND “train*”	General search	11

Database / Journal	Date	Key Terms/Search string	Search field (e.g., Topic, Title, Abstract)	# Results
Open Grey	October	“community based participatory research” AND “teaching” AND “water governance”	General search	0
	October	“action research” AND “training” AND “water governance”	General search	0
	November	“water” AND “teach” AND “community”	General search	0
	January	“co-management” AND “water”	General search	0
	January	“co-governance” AND “water”	General search	0

After searching for the terms in a database, in order to select a resource the Research Assistant, Kelly Sharp (hereafter ‘I’) then read each of the titles. Many of the results were not relevant (relating to fisheries, or land, for example) and I was able to exclude them based on their title. If the title seemed relevant I would read the abstract. If the source still appeared to be relevant (in that it targeted all three of the search areas), I scanned the entire document for specific training materials. I recorded relevant sources in the Metadata Table (Appendix 2) and ranked and saved the documents, including citations, in Endnote. Documents were ranked with 0 being the least relevant and 5 being highly relevant.

Given the difficulty in finding resources that met all three of the selection criteria (training materials for community based research in water governance) proved to be quite difficult, I conducted additional searches through personal contacts, interviews, email correspondences, and snowball sampling between February, March and April of 2015. Over the course of February to April 2015, 26 emails were sent to individuals, organizations, and listservs/networks (such as H-Net Water), seeking training materials. The contact list was created from the results of the systematic database searches, as well as from personal contacts from the water governance team, and the results of the Global Survey that the UNESCO team conducted in the fall of 2014. Email respondents often suggested other individuals to contact, or organizations that were working in the field. Those organizations were either contacted

or were assessed based on their websites and online resources. In the case of institutions or websites, it was necessary to do a search for relevant reports, training materials, or examples of CBR training in water governance.

I conducted the data synthesis between March and April 2015. The synthesis was conducted on the top 26 programs - all of those that were selected as high relevance. Sources with low relevance were excluded due their lack of applicability in terms of the project goals and selection criteria.

Limitations

Due to time constraints, all of the searches were conducted in English. Literature and training material written in other languages were still reviewed, but it was not possible to redo the search process in other languages. Further, efforts were made to look at resources beyond grey at academic literature, by contacting organizations, and individuals directly, however, small NGOs or CBOs may have been overlooked as a result of not being published or having a web presence.

Content of narrative synthesis

Below is an analysis of the top 26 training materials and literature within CBR for water governance. It is important to note that due to the iterative and dynamic nature of CBR, and it's focus on community participation, not all organizations and facilitators document their training processes. For example, in the case of Umphilo waManzi, they often tailor their training strategies to communities that they have pre-existing relationships with (and thus a contextual background), and do not record their strategies for various reasons. Similarly, Dr. Stroma Cole also noted that her CBR training is undocumented. As a result, such undocumented resources are missing from this review. Ideally, these resources will be transcribed in the future.

i. Terminology/language that best describes the practices related to training in CBR in water governance

There are numerous terms used to describe community-based research and water governance separately, and as described within the typology, there are various combinations of these terms used to describe training in CBR in water governance. Overwhelmingly, the most common terminology used for research was 'participatory action research', or simply 'action research'. This was used in nearly all resources, and was used most frequently within the documents themselves. Though many of the sources used the term 'community based research', it was often only mentioned once or twice within a resource, as a synonym for a more general term such as action research. Similarly, throughout the database search process, the key words that yielded the most results were 'co-management' and 'action research'. Interestingly 'community-based research' often resulted in the fewest results [see above tables]. Participatory Action Research attempts to democratize research by including local communities and stakeholders through social transformation (Greenwood & Levin, 2007; Scurrah, 2013). This definition is broader than community-based research, and perhaps is therefore used more often.

Other terms used for community-based research and participatory engagement were: 'participatory environmental education', 'community participation', 'adaptation strategies', 'knowledge building', 'community based adaptation', 'active participation', 'community involvement', 'co-management', 'gender sensitive appraisal', among others.

Water governance also includes a variety of alternative terms. Water governance, as defined in the introduction is broad, and includes many different aspects of water including watersheds, climate change, natural resources, gender roles, and management. The water terminology varies depending on the category of water it fell under. For example, water related to health had terminology related to

'contamination', 'treatment', 'water quality', etc. Water related to natural resources (including irrigation) had terminology such as 'participatory irrigation management', 'co-management', 'participatory watershed planning,' (see Section 2 iv for more information on the categories of water). Applicable to most resources are the terms: 'water governance', 'water management', 'watershed management', 'integrated water resource management', 'sustainable wetland management'. Again, certain sources include various other technical or environmental terms, such as riparian zones, aquatic habitat, piping, boreholes, etc.

ii. Places where people are getting training in CBR

The institutions providing CBR training varies depending on the type of training it is. Certainly, training in formal education programs and citizen science are conducted by universities and affiliated higher education institutes. This research found that training in CBR was also conducted by university researchers, often at Western universities. Participatory engagement training materials are frequently distributed by global institutions such as the United Nations, and are often targeted towards the facilitation of local NGOs or CSOs. Finally, training materials in participatory research methods are usually developed and produced through international NGOs or think-tanks, such as The International Institute for Environment and Development (iied), IRC (a water think-and-do-tank) and WaterAid. What is evident is a clear flow of knowledge from the Global North to the Global South. This bias could be due to the difficulty in locating small universities, NGOs or resources located in the global South. More research needs to be done towards uncovering training materials that originate in these regions.

Geographically speaking, the various types of training for CBR in water governance occur all over the world. The search process for this literature review found trainings were taking place in the global South including: Africa (Burkina Faso, Cameroon, Kenya, Malawi, Mozambique, South Africa, Uganda), Asia (India, Indonesia, Pakistan, Philippines, Thailand, Taiwan, Uzbekistan), the Caribbean (Jamaica), Latin America (Bolivia, Brazil, Colombia, Ecuador, Guatemala, Guyana, Peru), the Middle East and North Africa (Jordan, Egypt, The West Bank and Gaza). They were also taking place in Canada, the European Union, and the United States. Most often trainers and researchers came from Western universities and institutes and engaged in training in low income or marginalized communities, including in both the Global North and South.

Further, given that water is necessary for life all over the world, training of CBR in water governance occurred in both urban and rural areas. The brief methodology sections within the resources would suggest that many of the materials that focused on ecosystems and habitats, some climate change, and irrigation schemes (particularly for farming), often took place in rural areas. On the surface it appears as though there is relatively equal training between urban and rural areas, if not more rural training; however, there are significant barriers to the real participation of rural community members (Galvin, 2011). There is an urban bias to water delivery and training, as well as a biased institutional framework preventing rural communities, and women in particular, from being able to actively participate (Galvin, 2011). Given this information, more investigation needs to be done in terms of the extent to which communities, both urban and rural, are able to participate within CBR in the face of institutional, cultural, or other barriers.

Though the search process conducted for this research resulted in several HEIs that offer courses with service learning or community engagement elements, it was not clear the extent to which they included CBR.

iii. Types and length of training

The type of training material varied depending on the type of training it offered. For participatory engagement initiatives, which focus instead on inclusive development, offered short workshops to

develop specific skills technical such as how to repair to the water piping system, as well as conflict resolution and management skills. It was generally suggested that these be facilitated by local NGO or CSO officers. Other typologies, such as CBR in water governance, used similar techniques, but were often facilitated by an expert or academic within the field.

In terms of CBR, and research in general, as mentioned in the introduction, there were few sources that engaged in training for participatory research in water governance. Of the 26 resources reviewed here, less than 20 included a research component. This could be due to researchers not recording the trainings that they do, or just simply that there are limited numbers of organizations and individuals undertaking this type of work. The lack of tools and documentation highlights the importance of creating a centralized global repository for this type of material.

Training materials from higher education institutions are generally short-term field courses, a few weeks in length. In the case of the projects and institutions that offer courses with water governance and community-based research education (Justicia Hidrica, Angat Watershed, Ceiba Foundation, The University of the West of England, Climate Change for Urban Water Governance), they all occurred within the geographic area of interest. One unique program at the University of Michigan-Dearborn for at risk middle and high school aged children offered 3 workshops on water related geoscience learning within their communities (Murray, Napieralski, Luera, Thomas-Brown, & Reynolds-Keefer, 2012).

There appeared to be a trend in the distinction between the length of training for Participatory Water Governance and the other more research based initiatives. The Participatory materials suggested short-term workshops, but often did not include the long-term relationship with communities. The research based resources and literature emphasized the importance of establishing and maintaining a long-term relationship in communities, in an effort to make sure that the research was *not* exploitative. Such long-term work, including an emphasis on building relationships appeared in Tai Baan, The Guidelines for Climate Change Adaptation in South Africa, The Sister Watersheds and CCAA projects, and Crisis on Tap. Short-term training materials were offered in EMPOWERS, PROWESS (though PROWESS suggested 9-12 day trainings), “People Land and Water” and development initiatives. A lasting and positive relationship of co-learning is critical within CBR, and is something that was not always explicit within community engagement training.

Regardless of the type of training materials, in terms of the strict typology definitions, there was clear overlap in terms of activities used. Common activities included: participatory mapping, transect walks, benefit-analysis charts, and conflict resolution. And the most common tool used in all materials was dialogue with all stakeholders [see Section 2 iv below].

iv. Content of the training curricula and skills/capacities that learners are expected to learn to do CBR

The programs analyzed within this literature review are generally nested under the umbrella of a larger discourse, which situates the importance of water in the context. For example, the effects of water governance as a result of climate change, or how water governance plays a role in public health.

One such umbrella is water as a result of climate change, which several of the resources focused on. Within these initiatives, learners were supposed to gain a greater knowledge and understanding of climate change (including attitudes and preparedness), in order to identify adaptation strategies. Though water governance as a component of climate change appears to have a strong presence within this review, it is not necessarily well represented outside of the cases listed here. The Sisters Watershed Project, “Climate change and urban water governance in Africa” and Umphilo waManzi’s “Planning for

adaptation”, are all linked via researchers and are expansions on earlier projects. Outside of this context, few resources found during this search process involved climate change.

A second category is for resources set within public health and water for health. Such projects focused on learning outcomes related to contamination, human-related health risks, and access to safe drinking supply. Both Ceiba and Crisis on Tap fit within this category, yet both had other goals including links between human action and environmental outcomes, and increased agency towards governance of water supply, respectively.

Third, is the water governance for natural resource management including irrigation and river basin management. Learning outcomes within this category surround increased understanding of cascades and downstream effects, strengthening the capacity of locals to manage wetlands, to increase knowledge of river-basins and important habitats. This is seen within Tai Baan (Scurrah, 2013), HarmoniCOP (HarmoniCOP, 2005), and Participatory Planning for Water in Sri Lanka (Jinapala, 1996).

The final category, though small, is the role that water plays in tourism. Though the materials only came up in the work of Dr. Stroma Cole, she has written extensively on the topic, using participatory research to understand the role of tourism in water usage and governance, through a human rights approach (Cole, 2012, 2013). The learning outcome is for all stakeholders reach an agreement where tourists and locals can share water resources.

The most common thread throughout all training materials in all 5 of the typologies is a notion of dialogue and knowledge sharing between technical experts and local communities. This is present in Tai Baan (Scurrah, 2013), The Waters Dialogue (Galvin, 2009), Sisters Watershed and “Climate change and urban water governance in Africa” (Figueiredo & Perkins, 2013; Perkins, 2014), Planning for adaptation: Applying scientific climate change projections to local social realities (Galvin et al., 2014), Crisis on Tap (University of Victoria: Centre for Aboriginal Health Research, 2011), and cases from Pakistan, Guatemala, Colombia, Kenya, Nepal and Cameroon (Lammerink, 1998). Many of the programs emphasized ‘co-knowledge sharing’, where all stakeholders (including facilitators) have something to learn from the other participants.

Additionally, there was a frequent emphasis on providing a bridge from the technical to lay people; this is particularly evident within CBR for water governance due to the technical nature of water access, treatment and provision. Naturally, there is a link between the need to empower local populations by making this technical knowledge more accessible, and community-based research, which is designed to increase participation, knowledge, and dialogues. Tai Baan emphasizes “co-learning” where villagers must learn to organize their knowledge systematically and equally outsider research assistants must acquire a deep understanding of local ecological knowledge (Scurrah, 2013). At the same time, researchers will make an effort to distill technical knowledge to engage local groups.

Content varied depending on the scale. Some projects offered learners technical skills, others offered more effective ways and channels to communicate. And some utilized smaller skills in the hopes that they would develop into empowerment, agency and ability to engage in democratic processes to change policy.

Exemplar training programs

From the resources, I found seven to be highly relevant in order to be selected for careful analysis. The resources are representatives of some of the five typologies mentioned in the introduction. Some of the resources are training materials and others are organizations or projects that utilized an aspect of CBR training in water governance.

1) The EMPOWERS Approach to Water Governance²

The Euro-Med Participatory Water Resources Scenarios (EMPOWERS Partnership) was a partnership of 15 organizations designed to improve access to water for communities in the Middle East and North Africa (MENA). Their main strategy was to do this through including local people in integrated water resource management, including in management of drinking water supply, irrigation management, and management of quantity and quality within catchments. Though they focused on MENA, they worked specifically in Jordan, Egypt, and The West Bank and Gaza; the program was active in the early 2000s but has since ended programming. This summary focuses on one of their resources, “The EMPOWERS Approach to Water Governance” (Moriarty, 2007).

Training objectives

“The EMPOWERS Approach to Water Governance” was designed as a practical framework of activities for those who utilize and manage water, and through dialogue, can improve local water governance. Further, it was designed to create dialogue between local (water users including men, women and community based organizations) and intermediate levels of communities.

Content and Design

Included in the comprehensive training manual are: ways to address potential problems; roles and requirements of facilitation teams; detailed management cycle plan; tools for participatory learning action, assessing, working with stakeholders and monitoring. For each tool, of which there are 31, they have outlined: objectives, materials, methods, who to involve, tips and tricks, and related resources. Follow up examples are included in the appendix, with case studies from the Middle East.

Underlying philosophy/pedagogy

The EMPOWERS philosophy is based on two pillars: stakeholder dialogue and concerted action (SDCA); and management cycle. SDCA is the fundamental belief that “well informed water stakeholders who communicate effectively with each other on a regular basis will find locally appropriate solutions to pressing water problems” (Moriarty, 2007). As such, a platform for effective communication and consensus building are fundamental components of these training materials. The second pillar, the management cycle, is a six-step process (including: visioning, assessing, strategizing, planning, implementing, reflecting) designed to support the SDCA. The EMPOWERS approach argues that good water governance requires a process of experimentation, adaptation, and learning, and thus the six-step management cycle aids in the facilitation of that.

Facilitators’ and students’ profiles

The manual was created for any individuals working in the field of water governance and Integrated Water Resources Management, provided that the activities are led by individuals with high levels of technical capacity. The training manual outlines that the facilitation team members should each have experience in participatory approaches, and can be from NGOs, private sector or government ministries. The book emphasizes the importance of combining individuals and groups with different but complementary characteristics.

Participants are outlined as varying stakeholders without whom the process would not work. This includes: social groups who have rights to water (men, women; poor, better off), water user groups (farmers, domestic users, industrial users), and institutional stakeholders (private sector water providers, government, local NGOs/CBOs).

² EMPOWERS Approach and the book “ People, Land, and Water” were both found on the WaDImena resource page on the IDRC website. The WaDImena project had a large repository of training materials in the field of water governance. Though many of them discussed natural resource management in general (providing a briefs examples that include water), several directly provided examples in relation to water governance.

Expected learning impacts

The manual was created to increase the number of avenues and quality of methods for water users to work with water sector professionals through concerted action and attempting to reach a common understanding and strategy. Through the various training materials participants should learn to strategies to better manage water resources.

Language

“The EMPOWERS Approach to Water Governance” and training materials are written in English.

2) PROWWESS: Tools for Community Participation

Promotion of the Role of Women in Water and Environmental Sanitation Services (PROWWESS) began in 1983 as an interregional project at the United Nations Development Programs. It was designed to include women in water management and sanitation, and over the course of its time it worked in 20 countries conducting workshops. The program was based on principles of collaboration and outreach. This summary focuses on the book, “Tools for Community Participation” (Srinivasan, 1990).

Training objectives

The PROWWESS program was designed to improve the inclusion of women within the Water Supply and Sanitation Sector (WSS), as women manage the majority of the household water needs. It was created to solve the problem that communities would not change their behaviour to accommodate new WSS programming; it was believed that programs would be more likely to be adopted if women, and their families, played a role in management and planning.

Content and Design

The manual includes a variety of training activities to include in participatory development for WSS. Within the document are: complexities of community participation, how to develop the concept with a shared vision, logistical suggestions (such as locations, equipment and country level pre-planning), daily evaluation techniques, in addition to 39 participatory training activities, and how to select them. As well, it includes field insights throughout.

The manual acknowledges contextual differences in learning styles and potential problems that workshop implementers could face, and emphasizes the importance of human development and problem solving skills that occur in participatory training. This style of training is “learner-centered” and thus it encourages trainers to recognize the knowledge that the participants bring to trainings, and to engage in ‘two-way training’.

Underlying philosophy/pedagogy

PROWWESS is focused around SARAR methodology, which includes five characteristics: self-esteem, associative strengths, resourcefulness, action planning and responsibility. The manual emphasizes the use of SARAR methodology, in the empowerment and capacity development of communities, particularly women, in water management. They argue that including locals, especially women, in development projects, will create more sustainable projects as those individuals will engage in management, site selection, pump maintenance, fund-raising, etc.

Facilitators’ and students’ profiles

A facilitator, as defined in the book, is anyone who influences the quality of the program, but more specifically engineers, community development officers, environmental sanitarians, health assistants, and to some extents, policy makers. The author also includes a list of high-level officials that could be

involved with training of trainers workshops, such as NGO officers, senior and mid level government employees, and geologists/hydrologists.

Within the training manual there was little attention devoted to who the students should be, other than local women water users and their families.

Expected learning impacts

In general, the materials are designed to establish horizontal relationships, such that participants will understand the importance of team management. Other skills are specific to the training activity, for example the Health Case Study should provide problem solving skills; Water Transportation and Storage demonstrates how water becomes contaminate and what can be done to prevent it; Pump Repair Issues will teach participants what causes pump breakdown and how to repair them. The training materials also address intangible elements such as feeling of dependency, low self-esteem, or disapproval of husbands or elders.

Language

The training materials are written in English.

3) The Ceiba Foundation: Water Quality Monitoring Program

The Ceiba Foundation for Tropical Conservation was founded in 1997 with the purpose of conservation ecology, and preservation of tropical habitats in forests and coasts of Ecuador (Ceiba Foundation for Tropical Conservation, 2015). They do this through citizen science, public education, and community-based actions. Ceiba examines water through the role it plays in ecosystems and habitats, rather than through the political and administrative processes that are a part of the traditional definition of water governance. It facilitates various ecological and conservation programs, but its focus on water include a citizen science water-monitoring program, as well as an undergraduate course “Water for Life” offered through the University of Wisconsin.

Training objectives

Ceiba engages communities directly in understanding and managing their own water sources; by engaging in water quality monitoring Ceiba hopes that participants will not only understand what monitoring is, but also why it occurs. In this way, the hope is that training and participation will provide a deeper understanding of what affects water quality and how negative impacts can be avoided.

Content and Design

The water quality monitoring project training occurs once every year, with a one day session including a training powerpoint and videos in the morning, followed by a practical component where the citizen scientists practice the various monitoring techniques. The specific resource included in this literature review is the powerpoint presentation from the training (Ceiba Foundation for Tropical Conservation, 2014). The material was created by the team at Ceiba based on data collected by citizen scientists at the project.

There are six objectives of this training: including to monitor the quantity and quality of water used by humans; identify contaminated water sources; assessing health risks from water; assessing the quality of aquatic habitats; understand the effects of land use on the quality of water; understand improvements or deterioration of water based on human activities. The presentation provides an explanation of why it's important to address the objectives, what is already known about the effects of environmental degradation on water (such as erosion and fecal or fertilizer contamination), illnesses transmitted through water, what should be monitored, and what should be recorded.

As with some of the other projects, Ceiba fits in multiple categories of typology, as they not only engage in citizen science but also have higher education training initiatives as well. They offer a “Water for Life Sustainability and Community Health” service-learning course, where post-secondary students at the University of Wisconsin can enroll to learn about water-related human health risks in a field context. This course is two weeks in length and focuses on a holistic approach to understanding the link between land use, water quality and human health.

Underlying philosophy/pedagogy

Ceiba runs under the philosophy that conservation cannot succeed without the direct involvement of the people who benefit from that conservation. As such, a certain level of capacity building and education are required in order to involve local people; which provides the necessity for environmental education.

Facilitators’ and students’ profiles

The citizen science workshops are run by Dr. Catherine Woodward of the University of Wisconsin, along with a local Ecuadorian facilitator. Undergraduate students of the Water for Life course also aid in facilitating the practical component of the workshops. Dr. Woodward also teaches the Water for Life course with the help of local microbiologists or aquatic specialists.

Citizen science students are recruited from villages near the four rivers studied within the project. They are generally young high school students or high school graduates, but from time to time older adults join. The citizen scientists are majority male, due to the physical requirements of hiking to collect samples, as well as local gender inequalities. The Water for Life course is typically taken by undergraduate students often studying health, but could be from any discipline.

Expected learning impacts

There are three levels of skills to be learned. The first is specific, precise, and practical scientific skills including how to: use a turbidity tool, measure dissolved oxygen, identify common macro invertebrates, read a thermometer, assess e-coli indicators, and assess habitat quality in the riparian zone. The second set of skills is more general to science: how to fill in data sheets and calculate averages. Finally, there is an expectation that learning will make up a set of bigger picture skills: inquiry based thinking, understanding linkages between human action and environmental outcomes, empowerment and changing attitude towards scientists (such that civil society feels that they can participate and engage in science).

Language

All the training materials for citizen science are written and conducted in Spanish. The undergraduate course is taught in English, but community engagement is done in Spanish.

4) Crisis on Tap: Indigenous Waterways

The University of Victoria Centre for Aboriginal Health Research (CAHR) is a research centre with the goal of improving the health and well-being of First Nations, Inuit and Métis, and provides a research and student training centre for the dissemination of basic and applied knowledge. CAHR published the book “Crisis on Tap: Seeking Solutions for Safe Water for Indigenous Peoples”(University of Victoria: Centre for Aboriginal Health Research, 2011) and held conferences in 2010 called Small Water Systems Management. This selected study focuses on the mobile workshop series highlighted in Part III of “Crisis on Tap” called “Indigenous Waterways”.

Training objectives

The mobile workshop series, “Indigenous Waterways” was included in the book in order to offer a guide for developing and advancing solutions to water based public health issues. It was designed to be a

bridge between high-level decisions taking place in British Columbia (BC) and future community based research initiatives, specifically geared towards water quality and rights that impact British Columbia's First Nations groups. The main focus of the project was to increase the accessibility of knowledge in rural First Nation communities. Within that, there were six sub-objectives, including: building First Nation capacity to engage in CBR; promote networks of existing tools and resources; synthesize group discussions on community needs; translate knowledge into community visions of action; and increase reach and uptake of knowledge.

Content and Design

The workshops themselves were one day in length, and were mobile workshops, where the lead team brought on 2-5 local community-based partners. The trainings were facilitated by an advisory body, composed of several academic experts, as well as experts in policy, indigenous law, and indigenous history. Community members in attendance included Indigenous people, or non-Indigenous who shared the project values. The content varied between the workshops, but they all included an expert speaker, or professional facilitator, community mapping, and focused on meaningful and non-hierarchical conversations. The focus was to connect communities to academic experts in discussions on issues that affect the communities, to create a shared vision and community driven action plan.

Underlying philosophy/pedagogy

The workshops took place at a time when First Nations communities in BC did not have access to safe drinking water, nor were there enforceable standards regarding water quality for these communities, yet the provincial government was 'updating' its legislation that posed as a threat to water quality. Further, the project background material sites the lack of safe drinking water, and the resulting public health risks, that happen much more often on First Nation reserves than in other areas of Canada. Given the nature of CAHR being a health institute, there is a strong focus on the importance of safe water being necessary for good public and individual health, and as such water governance is seen as a tool towards reducing public health risk.

Facilitators' and students' profiles

The facilitators were representatives from the CAHR Advisory Body. This included: Dr. Sanderson, a Cree scholar; Dr. Jeannette Armstrong of the En'owkin Centre; Mr. Marlowe Sam, of the En'owkin Centre; Ms. Andrea Glickman, a Policy Analyst with the Union of British Columbia Indian Chiefs (UBCIC); and Mr. Don Bain, Executive Director of the UBCIC.

In order to identify participants, the Advisory Body sent out an open call for project partners to every First Nation in British Columbia, and from that CAHR began a dialogue with six communities. The team at CAHR collaborated with 2-5 community-based partners in order to identify themes of interest in the communities before they began the workshops.

Expected learning impacts

Communities gained knowledge and information on community mapping, climate change impacts on water, and the significance of water in Indigenous culture. Further, they acted as a channel through which participants including First Nations community members and academic experts were able to engage in a knowledge exchange. These workshops were also used as an avenue through which communities could create action plans towards gaining agency to govern their water.

Language

Materials from the workshop and workshop agendas are included in the book in English, however there was an emphasis made on the importance of utilizing the historic language of the First Nation, including in water policies.

5) Justicia Hídrica and the Paraguas Project

Justicia Hídrica is an international alliance that focuses on research, capacity building and action, in order to lead to more equitable distribution of water, and more democratic water policy. The resources included below are the “Métodos de recolección de datos” (Methods for Data Collection) (Delgado, 2014) and “Propuesta de investigación acción” (Proposal for Action Research) (Post Uiterweer, 2014) from the Paraguas Project. The Paraguas Project was designed to create a permanent network exchange and cooperation between Andean universities, as well as develop applied research in coordination with water stakeholders (public and private sector, NGOs and water users), and finally to establish a graduate program in Integrated Water Resource Management (IWRM) that is accessible to disadvantaged students including women.

Training objectives

Both of the documents were written as guides for graduate students undertaking action research as part of Paraguas Integrated Water Resource Management program. “Propuesta de investigación acción” is written to help graduate students write research proposals that include participatory action research. The other, “Métodos de recolección de datos” was designed to teach graduate students methods of data collection in participatory action research (PAR).

Content and Design

The data collection methods manual outlines several different ways to collect data in PAR for water governance including: case studies, participant observation, interviews, focus groups, life histories and biography research, participatory mapping, water monitoring, and flow monitoring. It also outlines how to manage and analyse data.

The proposal design manual outlines how to develop a water governance research proposal with a participatory approach. The author explains how to write about the methods, work plan and budget. It includes a step-by-step process of the different stages necessary in defining a participatory research proposal.

Underlying philosophy/pedagogy

They attempt to address the theories of three influential individuals who worked in Participatory Action Research in Latin America: Roberta Chambers, Fals Borda and Paulo Freire. The documents acknowledges the basic principles of PAR, including the use of active participation of the community and researchers to increase understanding, particularly when working with oppressed communities. The authors argue the importance of PAR in water management, as groups are often deprived, excluded, or exploited from water. The authors also outline the three components of PAR including: understanding the asymmetrical power relations, training, informing and giving a voice to participants, and finally establishing actions to transform the reality of the communities.

Facilitators’ and students’ profiles

The guides were written for graduate students at universities in Latin America including: Universidad Mayor de San Simón in Cochabamba, Bolivia; Universidad del Valle in Cali, Colombia; Universidad Central del Ecuador in Quito, Ecuador; Pontificia Universidad Católica del Perú in Lima, Peru. These universities, as well as Universitat de Politècnia de Catalunya in Barcelona, Spain, and Wageningen University in The Netherlands contributed to creating the training materials.

Expected learning impacts

Through these two resources, students in IWRM should have an understanding of how to create a research proposal using PAR in water governance, as well as strategies to collect, manage and analyse their PAR water governance data.

Language

The documents were written in Spanish.

6) “Sister Watersheds” and the “Strengthening the role of civil society in water sector governance towards climate change adaptation in African Cities - Durban, Maputo, Nairobi” Projects

The Sisters Watershed Project (Perkins, 2014) was based at York University in partnership with Ecoar, a Brazilian NGO, and the University of São Paulo and took place from 2002-2008. A similar and subsequent project ran from 2010-2012 called “Strengthening the role of civil society in water sector governance towards climate change adaptation in African Cities - Durban, Maputo, Nairobi”, or “Climate change and urban water governance in Africa” for short (Figueiredo & Perkins, 2013; Perkins & Tavares Leary, 2012). It was also led by York University with university and CSO partners in Kenya, Mozambique and South Africa. Both were designed to improve water governance for climate adaptation and resilience, particularly for vulnerable communities and women living in urban areas.

Training objectives

These projects were designed to increase the knowledge interest and engagement of urban residents of water related issues, as they relate to climate change adaptation. While focusing on impoverished urban residents, as well as women, the goal was to educate these communities in water governance, which would ultimately lead to more empowerment in democratic processes, as well as provide university students with opportunities to engage in participatory research.

Content

Both programs include elements of community engagement, student exchanges, research, community based research, and capacity-building. They focus on water management, environmental education, community development and democratic participation while emphasizing female empowerment and socioeconomic equity.

Design

The project workshops targeted urban residents of Toronto, São Paulo, Durban, Maputo and Nairobi. Their workshops and approach were based on a bottom up approach with eight components, including an inclusive and participatory process beginning at the community levels that prioritized local subsistence and basic needs. Students and Faculty and York University worked together with local partners and communities in order to create training materials, which were designed to increase knowledge and confidence of knowledge of water governance. Various types of training included: Materials available online (blogs, websites, books, articles, etc); Storytelling Parade (participatory performance); community mapping, photo-voice, community-based water monitoring, watershed learning circles, learning journeys. There was an emphasis on creating linkages between NGOs, CSOs, Universities (including faculty and students), and civil society, in order to create channels of understanding and shared learning.

Underlying philosophy/pedagogy

The Sister Watersheds and “Climate change and urban water governance in Africa” projects were based on the belief that by educating communities and women in water governance, they would be better able to participate in democratic and decision-making processes. Second, there was also an understanding that an exchange between higher-education-institutes and local communities would serve to benefit both groups, such that the exchange would provide tools and skills to both groups. Finally, they believe that educating and including women and communities of low socioeconomic status in formal-decision

making processes can enhance their adaptive capacity, as well as lead to more empowerment to engage in other decision making processes. They were based in a bottom-up approach of training.

Facilitators' and students' profiles

Project facilitators included Professors and Masters of Environmental Studies students at York University, as well as faculty from other partnering universities, and staff from NGOs and CSOs.

Participants and collaborators include civil society members, government officials, working professionals (including public health agents, nurses, teachers), and civil society organizations. Though they targeted all individuals living in urban residential areas of low socioeconomic status, including youth, and seniors, they focused on women.

Expected learning impacts

Outcomes were to educate local communities in water governance, empower vulnerable populations, establish curriculum on participatory water governance and engagement, improve the ability of civil society to engage in democratic processes surrounding watershed management and planning, improve the ability of the partner universities and NGOs to facilitate such participatory training and research projects, create a strong international network of universities, NGOs, and CSOs.

Language

The materials for the Sister Watersheds project were written and delivered in Portuguese for the Brazilian audience, and English for the Canadian Audience. Many of the Portuguese documents have subsequently been translated into English. The materials for the “CLIMATE CHANGE AND URBAN WATER GOVERNANCE IN AFRICA” project were written mostly in English, however a few were published in Zulu. They were all written in plain and accessible language in order to be accessible to the widest audience.

7) Umphilo waManzi and “Planning for adaptation: Applying scientific climate change projections to local social realities”

Umphilo waManzi, or Water is Life in isiZulu, is a South African NGO established in 2008, with the goal of improving livelihoods and services, particularly related to water, for low income communities, through action research and advocacy. Umphilo waManzi has both theoretical and practical goals. They aim to change policy and include local groups in policy making through action research. As well they make an effort to strengthen delivery of water and sanitation through engaged research, consultation and communication with local stakeholders. This review focuses on one of their projects “Planning for adaptation: Applying scientific climate change projections to local social realities”. The “Guidelines for Community Based Adaptation Workshops in South Africa” (Galvin et al., 2014) reviewed below, was written for researchers based off their work in climate change and water, but is general such that it is not limited to water researchers.

Training objectives

The goal of “Planning for adaptation: Applying scientific climate change projections to local social realities” was to create a communication channel between technical researchers and poor communities in South Africa in regards to climate change adaptation and its relationship to water.

Content and Design

The guidelines focus on conducting research that is beneficial to the community, and as such they provide a detailed guideline how to choose, enter and stay in communities. In terms of specific learning outcomes, included in the Guidelines is a strategy to incorporate science into workshops, through

techniques such as climate modeling, exercises to find out what people know about climate change, participatory mapping, visualization, and transect walks.

Underlying philosophy/pedagogy

The Guidelines and Umphila waManzi aim to resolve the disparity between the technical and exclusive nature of the water sector, in order to create policy and water delivery systems that addressed community needs. In order to do this they focus on shifting power dynamics that control water governance by having the project be community driven from the beginning.

Facilitators' and students' profiles

Given that these Guidelines were written for a broad audience, it is not specifically targeted to climate change and water governance researchers. The facilitators can be NGOs working at the grassroots level, as well as any CBOs or municipalities who would like to design adaptation strategies, plans and interventions. They should embrace participatory approaches, encourage full participation of workshop attendees, be flexible to thinking on their feet, and be adaptable to the different levels of education and understanding of students.

The Planning for Adaptation initiative recommends engaging with communities that the facilitators already have a pre-established relationship with, such that research is not exploitative and truly does serve the community by strengthening a working relationship and understanding. Further, they should be in areas which are 'hot-spots' for climate change, they should have a history of civil engagement, community leadership, social mobilization, and they should have a level of interest in engaging in the project and engaging in climate change research.

Expected learning impacts

Participants and researchers should both gain an understanding of the community members knowledge, attitudes towards and preparedness for climate change, and work together to identify adaptation strategies.

Language

The Guidelines are written in English.

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