Chapter 1
Exploring Indigenous Water Knowledge, Values, and Practices: Insights and Examples

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Abstract This book presents a detailed and insightful account of indigenous water knowledge, values, and practices with examples from across the Global South. The main objective of this volume is to explore and understand the diverse indigenous knowledge that exists in the Global South and document the local water use and conservation practices adopted by indigenous people and local communities. The book includes several examples of water values and conservation practices that are still functional and practiced. In addition, the book includes a section on the spiritual and/or religious and cultural values of water which opens a new arena of understanding water resources and valuing them. In the process of exploring and understanding the existing indigenous and local knowledge and practices, the book identified several commonalities, one of which is the lack of integration of indigenous and local knowledge into mainstream policy-making. This chapter introduces the key concepts and definition, objectives, and organization of this book.

Keywords Indigenous knowledge · Water values · Water resources · Cultural value · Indigenous people · Local practices · Traditional knowledge

1.1 Introduction

Science-policy arenas and agreements such as the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Convention on Biological Diversity (CBD) acknowledge the importance of indigenous and local knowledge and explicitly support the diversity of knowledge systems in informing international biodiversity assessments and decision-making (Díaz et al., 2015). The IPBES Global Assessment (GA) is the first ecological assessment to systematically incorporate indigenous and local knowledge (ILK) at the global scale (Díaz et al.,

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2019; IPBES, 2019). Engaging with indigenous and local knowledge systems involves encounters of different worldviews, identities, practices, and ethics, in a context of asymmetries of power and rights.

Mercer et al. (2010) assemble several literatures to define indigenous knowledge as "a body of knowledge existing within or acquired by local people over a period of time through the accumulation of experiences, society-nature relationships, community practices and institutions, and by passing it down through generations" (p. 217). Similarly, Cuaton and Su (2020) aggregated local and indigenous knowledge as "a body of different types of knowledge and practices of societies accumulated through a continuous interaction with their natural surroundings." Boven and Morohashi (2002, p. 6) treat indigenous knowledge as local knowledge and define the concept as "a complete body of knowledge, knowhow and practices maintained and developed by peoples, generally in rural areas, who have extended histories of interaction with the natural environment [. . .] these sets of understandings, interpretations and meanings are part of a cultural complex that encompasses language, naming and classification systems, practices for using resources, ritual, spirituality and worldview." Indigenous knowledge is local, empirical, and practical, develops independently, is transmitted orally or by imitation, mostly remains undocumented, and is usually shared (Lauer, 2012; Williams and Hardison, 2014).

The characterization that is gaining wider acceptance from scholars is perhaps best stated by UNESCO which defines ILK as "the understandings, skills, and philosophies developed by societies with long histories of interaction with their natural surroundings." Over an extensive succession of observations conveyed from one generation to another, indigenous people have a historical continuousness of practices on resource-use practices and often own a wide-ranging knowledge based on the intricate ecological structures in their own vicinities (Gadgil et al., 1993).

Such knowledge can be developed over many generations and handed down. Indigenous and local knowledge are acquired experientially, grounded in the sociocultural context of the need to address issues of everyday living (Bwambale et al., 2020). It arises from context-specific and outcome-based understanding of the natural realities (Bwambale et al., 2021). On the other hand, scientific knowledge is developed through a formal evidence-based technical systematization of information to carefully provide explanations of phenomena.

When taken independently, the term "local knowledge" is derived from a community's place-based relationship with the local environment, while "indigenous knowledge" is gained from long-term cultural ties or traditional ownership of a place (Agrawal, 1995). Similarly, the IPCC (2018) characterizes the former to be the understandings and skills specific to where people live, while the latter is developed out of long-standing interaction with the natural environment. Distinctions between the two exist in literature. However, in reality, the difference between local or indigenous and traditional knowledge is blurred since communities often use varied sources of knowledge concurrently.

Collaborative research initiatives based on Western science and indigenous knowledge for addressing issues such as climate change impacts have the potential to be advantageous to both the indigenous communities and the researchers.

Dichotomies between Western science and indigenous philosophy are often underpinned by long-standing prejudices and not so subtle better or worse views: Western knowledge as rigorous, scientific, evidence-based, systematic, and universal and indigenous knowledge as unempirical, cultural, intuitive, local, and non-generalizable. Indigenous ontologies, although incredibly diverse and dynamic, hold commonalities, one of which is an understanding of water as a relative (or something similar) to whom people are linked through an intricate web of extended kin-based relationships (Mistry & Berardi, 2016). The idea of water as a living more-than-human entity is widely articulated through indigenous oral traditions, laws, governance regimes, and management practices.

Water has been fundamental to the existence of humanity. All the civilizations formed along the banks of the rivers as rivers provided a steady supply of drinking water as well as water for growing crops and navigation. Indigenous and local knowledge on water has been a key ingredient of sustenance in the face of challenges and vulnerabilities for many indigenous and local communities across the world. The information sustained in the indigenous and local knowledge are already identified to be highly significant for the development of sustainable water management practices, and there has been an urgent call to mainstream them into formal water management planning for their wider acceptability at a local level. The existing literature on indigenous and local water knowledge has been mainly confined to case studies from countries like Australia, New Zealand, and Canada and from some parts of Africa and Asia. This book volume contains case studies from different countries across Global South and documents the knowledge and practices of not only the indigenous people but also local rural communities.

1.2 Cultural, Spiritual, and Religious Values of Water

Indigenous societies, in general, hold spiritual values about water that are not found in the mainstream of Western culture. Water, in Western cultural theory, is a resource. It is inert and not alive and is mainly defined in terms of its physical and chemical properties. It has no consciousness, and it has no life. It has no value but has great potential value in being applied to some productive purpose. There is no benefit from water's existence other than the extent to which humans can benefit, directly or indirectly, from the water itself, or the environments that water supports (e.g., stocks of food fish that depend on the viability of a lake ecosystem). Water is a resource much like coal or oil. It is not only culturally permitted but culturally preferred to make use of the resource by mining it or recovering it in whatever way is technologically feasible. The environment within which water is found is also a resource which can be utilized for productive benefit. Recent views about the water environment have changed to confer economic value to the environmental services of the ecosystems that water supports, for example, a riverine environment that includes fish, birds, wildlife, wetlands, and the associated plants and microorganisms. This recent appreciation of the ecological aspects of river systems, and the

associated economic benefits of water ecosystems, has led to reconsiderations about the desirability of water diversions for irrigation and reanalysis of the costs and benefits of hydropower dams. But while the equations have changed with the new values accorded to biological and ecological factors, the cultural theory underlying the equations has stayed the same: the value of water is defined in economic terms.

In contrast to Western culture, the indigenous spiritual perspective of the environment is clearly articulated and directly experienced. It also provides a more dominant "voice" within the society, than is the case in the West. The introductory words of the Indigenous Peoples' Water Declaration (United Nations Educational, Scientific and Cultural Organization, 2003) very clearly demonstrated the identification that indigenous spirituality makes between people and nature:

1. We, the Indigenous Peoples from all parts of the world assembled here, reaffirm our relationship to Mother Earth and responsibility to future generations to raise our voices in solidarity to speak for the protection of water. We were placed in a sacred manner on this earth, each in our own sacred and traditional lands and territories to care for all of creation and to care for water.
2. We recognize, honor and respect water as sacred and sustains all life. Our traditional knowledge, laws and ways of life teach us to be responsible in caring for this sacred gift that connects all life.
3. Our relationship with our lands, territories and water is the fundamental physical cultural and spiritual basis for our existence. This relationship to our Mother Earth requires us to conserve our freshwaters and oceans for the survival of present and future generations.

Water is not only an aspect of indigenous spirituality but a very major component of that spiritual world. Water, whether as a substance or in the form of water bodies (rivers, lakes) and meteorological phenomena (rain, snow, fog, clouds), are seen through a spiritual, not an economic, lens.

1.3 Indigenous Water Governance

Water governance is defined as "[t]he range of political, organizational and administrative processes through which communities articulate their interests, their input is absorbed, 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, 2003, p. 3). Indigenous outlook of water governance differs from mainstream Western approaches (Boelens, 2003; Boelens et al., 2006), which consider water as a resource available for human exploitation (Bakker & Cook, 2011). Indigenous people often value water as a living entity that carries deep spiritual and cultural meaning (e.g., Barbera-Hernandez, 2005; Boelens et al., 2006; McGregor, 2012). Furthermore, indigenous peoples' worldviews influence their patterns of water use and management, and their relationships to water, as well as

other elements of the environment, fundamentally contribute to their distinct identities (Barbera-Hernandez, 2005).

Indigenous governance refers to a vast field of study related to indigenous peoples and decision-making that is generally considered to include indigenous identity, sovereignty, self-determination, values, ways of knowing, and race, as well as historical and ongoing colonialism and the resulting consequences of marginalization (Coulthard, 2008; Ford & Rowse, 2012). In the Indigenous Peoples Kyoto Water Declaration, self-determination for indigenous peoples is defined as "the right to control [their] institutions, territories, resources, social orders, and cultures without external domination or interference" (United Nations Educational, Scientific and Cultural Organization, 2003). Indigenous water governance puts the need of the communities and their hydrosocial relations at the center of decision-making. For indigenous peoples, indigenous knowledge is crucial to understanding hydrosocial relations. These hydrosocial relations include distinct uses and values and are complexly connected, context-specific, dynamic, and adaptive.

1.4 Objectives and Organization of the Book

This edited book volume consists of 19 chapters including this introductory chapter and the last concluding chapter. The rest of the 17 chapters are divided into two sections for easy reading and understanding. With both reviews and case studies, the book includes studies from various parts of the world like Africa, Middle East, Southeast Asia, South Asia, and East Asia. Hence, it can be claimed that the examples of indigenous water knowledge, values, and practices mentioned in this book predominantly represent the knowledge repository of the Global South. The existing literature on indigenous water knowledge, practices, and governance mainly consists of examples from Global North like from Australia, New Zealand, and Canada. This book can be considered as a first attempt to document and publish about indigenous water knowledge, values, and practices from the Global South.

Chapter 2 focuses on a critical debate of power dynamics, water resource management, technological interventions, and inability to include indigenous knowledge into mainstream natural resource management.

The first section of the book is on religious, cultural, and spiritual value of water and compiles examples from Hinduism, Islam, and Shintoism.

Chapter 3 provides a review on symbolization of river water, especially river Ganga in India. The chapter provides a critical insight into the purification property of river water and the different rituals that are practiced with river water, symbolizing the spiritual value of water to Hindus.

Chapter 4 elucidates the role of Islam in water management and water governance by carrying out extensive review of existing literature. The chapter highlights the use of water for different rituals showing its significance in ablution as well as provides a detailed insight on how Islam has directed its followers regarding the use, conservation, and distribution of water.

Chapter 5 highlights an interesting take on Shintoism and water, which is again a not so well-known arena. Similar to other religious beliefs, Shintoism is also found to consider water as the highest purifying form which can be used to purify ourselves from our impurities.

Chapter 6 by Ali and Chatti focuses on the philosophy of Islam and how it governs the use and distribution of water in the countries of Middle East. In spite of a rich traditional knowledge about water storage and use, this part of the world is facing severe water crisis which might be due to overreliance on technological intervention and Western theories of water management.

Chapter 7 by Sah is an interesting account of how spiritual values are intertwined with cultural approaches to use and conserve water in northern hilly terrains of India. This approach helps in developing ethics and moral codes among people that helps to create awareness.

Chapter 8 examines the current water status in New Delhi, the capital of India. Considering the chronic water stress situation in the megacity, sole reliance on technological interventions may lead to unsustainable water future. Hence, to have consistent supply of safe and sufficient amount, it is important to include indigenous knowledge in the water management planning.

Chapter 9 focuses on the drying up of Lake Urmia in Iran due to overexploitation of the lake water without considering its significance in supporting irrigation in the lake basin. Lessons from indigenous water management practices in Iran are drawn upon to assess the long-term social sustainability of common pool resource management in the region.

Chapter 10 explores the nature and internal dynamics of indigenous knowledge systems in contemporary rural Zimbabwe while noting how policy-makers can influence the strengthening of indigenous systems. It also explores opportunities of the integration of indigenous and formal water governance systems to enhance water access and equity. The chapter is based on a review of literature that highlights emerging debates related to how indigenous water governance systems are operating in post-colonial Zimbabwe.

Chapter 11 examines the role of indigenous water conservation structures like ponds, ditches, and dug wells in supplying water for farming in rural areas in India. Based on primary data analysis, these structures are identified to be highly beneficial to the farmers as they provided an alternative source of water, and with the surplus water, they could grow other crops that helped them to improve their livelihood as well as food security.

Chapter 12 investigates the local knowledge on water use and other natural benefits derived by the lowland, midland, and upland villages in the Libungan-Alamada Watershed in Mindanao, Philippines, from their water sources (i.e., river and spring) or water-related ecosystem services (WES).

Chapter 13 highlights the water use, filtering, and conservation practices adopted by the *Munda* community from Southwest Bangladesh. Due to increased salinity, the community faces increased water crises, not only for domestic use, but the agricultural lands are also damaged. The indigenous community adopts traditional practices to cope with the vulnerabilities.

Chapter 14 presents a case study on Basin School Network in Taiwan that involves grassroots communities to take part in monitoring and conservation of the river basin under study. The Basin School Network adopts a cultural approach to involve local communities like conducting musical concerts in the basin or bird watching events or stone stack competitions. The process not only creates awareness among the local community but also incurs a sense of responsibility among them to protect and conserve the basin.

Chapter 15 explores the various indigenous water conservation and storage practices adopted by the indigenous communities from the red lateritic belts of Southwest Bengal in India. The indigenous communities like *Sabor*, *Kol*, *Santhal*, *Hor*, etc., predominantly living in this region, face chronic water scarcity which has compelled them to develop different indigenous techniques of storing and using water at both household and agricultural levels. The chapter provides a detailed account of the different practices for a clear understanding.

Chapter 16 explores the perception of elderly rural women regarding the significance of water and their indigenous water knowledge in Aranayake, Sabaragamuwa Province, Sri Lanka. The primary data for the study is collected through interviews in the study area, and the elderly agreed to the fact that piped water supply across the area has made water easily available at home and hence the local people do not need to practice any indigenous technique to filter or store water or to keep them cool. The indigenous water knowledge is now mostly lost in the study area.

Chapter 17 looks into the water harvesting methods used by local communities in Indian Sundarbans and their utility in augmenting livelihood. Ponds are an indigenous water harvesting structure that not only provide water for household and agricultural use but can be also used for fish farming which can be an alternative livelihood for the local communities.

Chapter 18 highlights the cultural discourses and indigenous conservation tactics adopted in India in response to continued water stress.

Chapter 19 consolidates Chapters 2–18 to summarize the main findings and identify the key learnings that will contribute to sustainable water management and governance in the future.

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