

## Technical Annex to the Concept Note

### The Intangible Values of Water

This activity proposes to take forward the notion of water as a space provided by *The Rising Tide* and systematically assess what is known about the non-conventional values of water, and how they can be measured. Specifically, the activity will seek to answer four overarching questions:

1. What are the different social, ethnic, religious, spiritual and cultural values associated with water? How do these differ across communities, geographies, religions and identities?
2. Why should water managers account for these non-conventional, intangible values of water?
3. What are the different methodological approaches available for measuring intangible values of natural resources such as water? How can the methodology to assess non-monetary values of water be made more rigorous?
4. Finally, how can social, spiritual and religious aspects of water be leveraged for modern day water administration and governance?

This Technical Annex summarises the findings of the literature review on intangible values of water, broken down by question.

**Question 1: What are the different social, ethnic, religious, spiritual and cultural values associated with water? How do these differ across communities, geographies, religions and identities? What are the intangible values that communities associate with the Brahmaputra river?**

**Water is one resource which is valued across religions, communities, geographies and identities.** Water is used as a purifier in most religions. Some faiths use water especially prepared for religious purposes (e.g. holy water in most Christian denominations). Many religions consider particular sources or bodies of water to be sacred and auspicious; examples include Lourdes in Roman Catholicism, the Zamzam Well in Islam and the River Ganges (and many others) in Hinduism. Ritual washing (ablution) is common in many religions including Christianity, Hinduism, Buddhism, Sikhism, Judaism, Islam, the Bahá'í Faith, Shinto, and Taoism. Immersion of a person in water is a central sacrament of Christianity (baptism); it is also a part of the practice of other religions, including Judaism (*mikvah*) and Sikhism (*Amrit Sanskar*). A ritual bath in pure water is performed for the dead in Judaism and Islam. Water is also used in funeral ceremonies of the Hindus and Buddhists. In Islam, the five daily prayers can be done after washing certain parts of the body using clean water (*wudu*). Water is also used for purposes of immersion of deities, particularly in Hinduism at the final stages of the festivals of Ganesh Chaturthi and Durga Puja. Finally, many holy places in Hinduism are located on the banks of rivers, coasts, seashores and mountains. Sites of convergence, between land and river or two rivers, carry special significance and are specially sacred. The Kumbhamela, for example, is a pilgrimage of Hindu devotees

and is held every three years at four different pilgrimage sites where rivers meet – Hardwar, Nasik, Prayaga and Ujjain.

**The cultural narrative around water is particularly pronounced for indigenous peoples.** For example, water has been, and still is, central to culture and religion in rural Africa. As a “source of life”, it represents birth or re-birth. It also represents purity. And these qualities confer a highly symbolic and even sacred status to water. Water is therefore a key element in ceremonies and religious rites (e.g. baptism, ceremonies that involve initiation of young men and women into adulthood, funeral rites and so on). It is also considered to have medicinal uses. Yet, many of these fresh water sources are drying up, which can adversely affect these uses. Water has similar significance in many Native American communities (see Box 1). In most cases, these cultural and religious uses require very little water to be extracted, but most generally the preferred site is a fresh water source.

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#### **Box 1. Why is water sacred for Native Americans**

On March 10, 2017, 5000 Native Americans gathered for a Native Nations March in Washington D.C all of them chanting, “Mní wičhóni,” or “Water is life”. “Mní wičhóni” has been the Lakota phrase used, almost as an anthem, in the year-long struggle to stop the building of the Dakota Access Pipeline under the Missouri River in North Dakota. The Great Plains of North America, home to the Lakota, the Blackfeet and other tribes, are dry and arid. Water therefore not only sustains life; it is sacred. For thousands of years, Native American tribes across the Great Plains have developed their own methods of living with the natural world and its limited water supply. They have also learned from their religious ideas, passed on from generation to generation in the form of stories. For example, the Blackfeet tribe believes in an entire realm of the water world, and traditionally could not kill or eat anything living in water; they also could not disturb or pollute water.

There are many other examples among Native American communities which have relied on their cultural practices to value and preserve water. The Tohono O’odham of Southern Arizona, for example, are working to foster an understanding of water’s value that integrates sacred and economic dimensions. For the Tohono O’odham culture, water is sacred and is built around the calling for, and celebration of, rain. Similarly, the Southern Paiute of the Arizona-Utah border understand the value of water from a holistic and relational perspective. Although their small reservation is far from the river, the traditional homeland of the Southern Paiute is bounded by more than 600 miles of the Colorado River. Despite the distance, the Southern Paiute still consider it their right and responsibility to protect and manage the land and water of the Colorado River Canyons.

The social and cultural value of water is also made evident in the acequia communities of New Mexico and Southern Colorado. Acequias—like their counterparts in Spain and the Middle East—are communal, gravityfed earthen canals that divert stream flow for distribution in fields. These autonomous collective organizations of water users developed as a mechanism to ensure a formal civil process to resolve water-rights issues, especially in times of water scarcity, lie at the heart of complex self-maintaining interactions between culture and nature that maintain community identity, cohesion and economic sustainability through drought adaptation. Maintaining and repairing the common canal is considered a sacred duty.

Working communally to keep up the community's primary irrigation supply has bonded villagers together over the years. As a social institution, the acequia have therefore worked to preserve the historic settlements and local culture in a region that has undergone major political transitions from Spanish, to Mexican, to territorial, to modern U.S. sovereignty. Water is seen as a conduit for preserving the homeland and identity of hispanic communities in this region.

Source: Eden, Efrein and Radonic (2014); LaPier (2017).

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**States according legal status to water bodies and rituals associated with them is not uncommon.** The government of New Zealand recently recognized the ancestral connection of the Maori people to their water. On March 15, 2017, the government passed the "Te Awa Tupua Whanganui River Claims Settlement Bill," which provides "personhood" status to the Whanganui River, one of the largest rivers on the North Island of New Zealand. This river has come to be recognized as having "all the rights, powers, duties, and liabilities of a legal person" – something that the Maori have believed all along. Many other countries have come to view the natural world and water from a similar perspective. In Bolivia, for example, the government passed laws in 2010 and 2012 for the "Law of the Rights of Mother Earth," which were motivated by the belief that nature has legal rights. The Ecuadorian constitution in 2008 recognized the rights of nature or "Pacha Mama," with "respect for its existence," which included water. In December 2016, in a landmark decision, the states of Uttar Pradesh and Uttarakhand in India passed an order to preserve and conserve rivers Ganga and Yamuna, and declared the rivers, and all their tributaries, streams, every natural water flowing with continuous or intermittent flow, as juristic/legal persons/living entities, having the status of a legal person with all corresponding rights, duties and liabilities of a living person read with Articles 48-A and 51-A(g) of the Constitution. The Court additionally observed that doing so was important to preserve the faith of millions of Indians who have many religious practices associated with these rivers.

**Winding its way through Tibet, India and Bangladesh, and covering almost 3,000km, the Brahmaputra has religious significance for both Buddhists and Hindus.** The river has many names — Tsangpo in Tibet, Lohit or Brahmaputra in India, and Jamuna (not to be confused with Yamuna of India) in Bangladesh. The Tibetans believe that long before human occupation, the Chang Tan plateau was covered by the waters of a great lake. A Bodhisattva (an enlightened being) decided that the waters had to flow in order to help the people in the region. So, he cut an outlet through the Himalayas for the Tsangpo or 'Great River'. The mountains, gorges, and jungles through which the Tsangpo flows in Tibet are considered extremely holy. Ancient Tibetan scrolls written by sages, speak of sanctuaries or beyuls deep in the Himalayas. Here, ageing is slowed down and, animals and plants have miraculous powers. The Tibetans believe that in this area, perhaps through one of the waterfalls at the bottom of the world's deepest gorge, is the doorway to paradise on Earth, Shangri-la. In India, the river flows through Arunachal Pradesh and Assam and has many myths associated with it, including why the river has a reddish tinge (hence the name Luit in Assamese from the Sanskrit word for blood). From India, the Brahmaputra enters Bangladesh. Few rivers in the world

are called by as many names as the Brahmaputra, testifying to the diverse cultures that have sprung up along the course of its long journey.

**The lives of many millions of Indian and Bangladeshi citizens are reliant on the Brahmaputra river; but their link to it varies by their distance to the river.** The Brahmaputra delta is home to 130 million people and 600 000 people live on the riverine islands.<sup>1</sup> These people rely on the annual ‘normal’ flood to bring moisture and fresh sediments to the floodplain soils, hence providing the necessities for agricultural and marine farming. Two of the three seasonal rice varieties (aus and aman) grown in the basin cannot survive without the floodwater. Furthermore, the fish caught both on the floodplain during flood season and from the many floodplain ponds are the main source of protein for many rural populations. Such is their association with the river that for many tribes, the Brahmaputra signifies life. But in a recent primary study along the entire Brahmaputra basin, Sen (2018) finds that people’s reliance on the river is influenced by their distance to it. According to her, “it is only the poorest of the poor who have stayed back by the river who face increasing uncertainties that come with it” (for more details, see Box 2). In any dialogue around the river therefore, the concerns of these groups need to be articulated separately, so their voices can be heard (Sen 2018; v).

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#### **Box 2. How societies in Assam are organized along the river**

According to Sen (2018), there is a spatial pattern in which communities are broadly organized with respect to their distance from the river. The Deoris and the Ahoms, who are the earliest residents of Assam live the farthest from the Brahmaputra (2-5 kms). Their use of the river is minimal as they have shifted to tubewells both for domestic and irrigation purposes. The Das community, on the other hand –a Scheduled Caste group –lives closer to the river. They have tubewells, but on account of their proximity to the river, these wells submerge during floods, making the water extracted from them unfit for drinking. The closest to the river are the Nepalis who represent the most recent wave of migrants in the state. They use the river water for their domestic consumption, including for drinking, washing clothes and their vessels. During floods, they end up losing whatever subsistence land they have for cultivation, and speak of taking debt or resorting to measures such as selling their livestock for survival. This is not to say that those who move away from the river lose its significance. For the Deoris, for example, the Brahmaputra has great ritual significance and some who have moved 2-5 kms away from the river, still retain a community prayer house (deoghar) near the river.

Source: Sen (2018)

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**The river is also a site or a ‘space’ for reproduction of gender inequalities.** For instance in the study cited above, Sen (2018) speaks of gender inequalities that are deeply interlinked with whether women live upstream or downstream along the river. Specifically, women in the lower reaches of the Brahmaputra river are generally

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<sup>1</sup> The biggest and the smallest river islands in the world, Majuli and Umananda, are on this river.

speaking, less empowered given a context of better land quality, which has historically attracted male domination of economic activities around land while reducing the demand and value of female labor.<sup>2</sup> This according to Sen has led to a more deeply embedded, patriarchal culture in states like Assam and in Bangladesh. In contrast, societies in the more upstream reaches of the river such as Arunachal Pradesh and Bhutan have been characterized with common property regimes of less fertile and less accessible land. Women in these areas have been more visible in workspaces including in cultivation (Sen 2018: iii-iv). While these may be the general trends, Sen cautions how the river may play a role in further deepening or diluting gender divides. For example, she finds that while gender divides are high during pre and post disaster periods, they dilute substantially during the period of a disaster (e.g. flood). Similarly, Assam is a 'plural genderscape' depending on where women live within Assam. In the upper reaches of the river, while there is patriarchy, women can exercise a few, limited choices e.g. some may enter cultivation, as their men migrate outward in search of work. In Majuli in middle Assam, given the harsh landscape, there is recognition among both men and women of the uneven burden of work on women. In lower Assam, a context characterized by poverty, intersectionalities play a role i.e. Muslim women and SC women are more excluded. In sum, the physical landscape of the Brahmaputra river expressed in its upstream and downstream characters plays out in the spatial patterns of gender roles (Sen 2018:1).

**There are many cultural and social rights associated with the Brahmaputra.** For example in Arunachal Pradesh where the river goes by the name of Siang, the customs of tribes that live along the river are such that entire stretches of the river belong to different households. The tribal settlement or clan subcontracts out parts of the river through a process of clear bidding to one household, which then gets the right to oversee activities like sand mining for that stretch. The bid money is retained by the village council, and rights are assured through a written contract for a period of one year, after which the process of tendering starts again. There is a strong sense, therefore, of ownership of the river among the different tribal groups in Arunachal Pradesh. It comes as no surprise then that anti-dam movements have gained strength in the state, so much so that the state machinery has had to retreat significantly with respect to the dams it had commissioned in the past in consultation with the central government. Under these circumstances, transboundary management of the river excluding the culture of locals as associated with the river, is neither desirable, nor feasible (Sen 2018:15).

### **Question 2: Why should water managers account for the non-conventional, intangible values of water?**

**There have been instances of water projects being stalled because of religious and cultural concerns.** A recent example has been the World Bank funded Vishnugad

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<sup>2</sup> According to Krishna (2009), prosperous river valleys usually had in-migration of men and establishing of stricter private property right regimes due to the high values of land. The construct of the gender roles in these contexts was based on the devaluation of women's labour and their restriction to private spaces. This segregation was further entrenched by rites and rituals and gender roles around purity and pollution, that not only differentiated gender but caste roles (Krishna 2009).

Pipalkoti Hydro Electric Project (VPHEP) which is a run-of-the-river hydro generation project located on the Alaknanda river, a tributary of the Ganges, in district Chamoli in the state of Uttarakhand, India. A complaint about the project eventually led to its inspection by the Inspection Panel.<sup>3</sup> In their complaint, the requesters, primarily Chamoli residents and a local activist, submitted that their rights had been infringed on as “there is no river water available for religious and cultural rituals like bathing festival, funeral rites, river worship etc.” They further stated that the diversion of river water into a tunnel stopped its free flow and robbed it of its “special qualities”, and that the “joy of a free-flowing river cannot be measured”. The complaint in fact went on to add that these values had not been estimated by the “dam users” (for more details see Box 3).

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### **Box 3. The Vishnugad Pipalkoti case**

In a request to the Inspection Panel on the Vishnugad-Pipalkoti Hydro Electric Project (VPHEP) the complainants raised several issues, including how the project would lead to water shortages, a deterioration in water quality, biodiversity loss, an adverse impact on local livelihoods, and harm to local women’s freedom and safety with an influx of construction labour from outside the area. One of the other, significant concerns cited by the complainants was a loss in the “joy of a free-flowing river”, what they called *nirmal* Ganga or *avirul* Ganga. The complaint went on to state that the Ganga is a deity for millions of Indians who derive huge aesthetic, non-use and existence value from the free flow of the river. The satisfaction or utility obtained by them from the knowledge that this free flowing river exists – even though they may never use it –will be significantly reduced by the project.

The complaint further added that when the complainants raised this issue with project officials, the management response was evasive. “Specifically as concerns your observations on the aesthetic value of the river, this is an example of a value that can be posited but which is difficult to measure with existing data or contingent valuations methods in general. This value is above (exogenous to) the project level and, therefore, more appropriately reviewed in a higher level decisionmaking process that examines the relative costs and benefits of river basin development versus non-development”.

Source: VPHEP Request for Inspection, internal document, World Bank 2011.

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**Some countries have framed laws with regard to protection of “sacred rivers”.** For example in India, any activity (infrastructure, construction etc) around rivers, violating or disturbing certain rituals and ceremonies that are performed on the river and which are considered essential to a particular religion, are considered to be in violation of the religious and customary rights under Articles 25, 26 and 29 of the Constitution of India, 1950. Activists have often used these Articles of the Indian Constitution to stall

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<sup>3</sup> The Inspection Panel is an independent accountability mechanism of the World Bank (IBRD/IDA) that can be approached by individuals or communities if they believe they have been, or are likely to be, adversely affected by a World Bank-financed project as a result of the Bank’s noncompliance with its internal policies and procedures.

hydroprojects, as seen in the case of the Lepchas stopping hydropower projects along the river Rathong Chu in Sikkim, India.

**Besides the legal implications, water managers need to understand that consumption behaviour and consumer decisions around water are affected deeply by cultural and religious contexts and practices.** As Gibson et al (2011) argue, “households must be understood within broader contexts, as they are enrolled in networks, with consequences for behaviour and resources use and for the extent to which households are actually able to change’ (Gibson et al., 2011, p. 5). People’s decision-making vis-à-vis water consumption and management therefore is either directly or indirectly attached to preferences and habits which stem from norms and beliefs developed in a certain cultural context (Elizondo and Lofthouse, 2010; Gibson et al., 2011; Medd and Shove, 2006; Allon & Sofoulis, 2006). For example in India, many religious practices such as immersion of deities and funeral rites and cremations along the river have been cited as one of the primary sources of pollution, particularly for the Ganga and the Yamuna.<sup>4</sup>

**Conversely, cultural and religious institutions can play a positive role in water management.** In a community level project in Pakistan, for example, complaints about water shortage due to illegal pumps reduced by 26 percent after a local group involved the imam in its campaign (Shah et al, 2001). A survey on reasons for water conservation in the Syr Darya basin in Central Asia similarly found that financial incentives would lead to water conservation among 20 percent of survey respondents; another 30 percent said they would be guided by their moral and religious motives (Abdullaev 2005: 7; also see Box 4).

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#### **Box 4. Jordan: Using religion to save water**

Jordan is one of the most arid countries in the world. The swelling number of refugees from Syria is putting an increasing burden on the country’s water supplies. At the same time, neither the Jordanian population nor the Syrian refugees are sufficiently aware of how to use water sparingly and efficiently. On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is developing solutions for tackling water shortages.

GIZ is working with religious authorities to inform as many people as possible about saving water. As GIZ Project Manager Björn Zimprich explains, ‘Over 90 per cent of Jordanians and Syrians are followers of Islam, and all worshippers attend mosques regardless of their ethnic origin.’ Until June 2016, GIZ had already run two-day courses for 500 imams and 300 female preachers to train them as ‘water ambassadors’. Here, they also learn how conflicts can be avoided or resolved. The imams build their newly acquired knowledge into their sermons in the mosques, while the preachers visit Jordanian and Syrian women at home to raise awareness of the issue.

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<sup>4</sup> For more details, see <https://www.ucanews.com/news/as-indias-rivers-turn-toxic-religion-plays-a-part/70040>

GIZ is also advising mosques on how they can reduce their own water consumption. For example, mosques in Amman use on average 500 million litres of water a year for cleaning buildings and especially for ritual washing. To conserve water, as a pilot project, mosques are being fitted with facilities that collect rainwater or reuse wastewater. The aim is to enable the 'Blue Mosques' to reduce their water consumption by 30 per cent. Consumption of drinking water in mosques has also increased in the host communities. In Mafraq, therefore, 22 mosques had been equipped with 50 water-saving filters until June 2016, reducing their need to purchase drinking water.

Source: <https://www.giz.de/en/press/39199.html>

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**An understanding of the social and religious values of water can help project managers develop solutions which are more rooted to local realities and are sustainable.** Schelwald-Van Der Kley and Reijerkerk (2009) divide these into three categories, symbolized by what they call a Nautilus shell:

- Values norms and beliefs: These form the core of any culture. Often, they are based on historic circumstances, which do not correspond to today's living environment any more. For example, a river may be classified by environmentalists as filthy and unhealthy but may not be regarded as such by locals living adjacent to it. They might have adopted the belief that water from that river is healthy as it is passed on from their ancestors. Their perception of water quality therefore may not correspond to current reality. Similarly, in Islamic countries and other traditional cultures, cultural and religious beliefs may guide why water use should be free of charge. This makes it challenging to convince people to pay for water supply services or to use clean water.
- Traditions, rituals and practices: At the next level are traditions, rituals and practices that characterise a culture. For example, even when poverty is low and potable water is available, cultural attitudes and social habits may impair people from the use of sanitation facilities considered hygienic by today's standards (Warner et al 2008). To give another illustration, in a rural village in southern Africa, good quality drinking water was traditionally fetched at the river. When industrialisation and wastewater discharge upstream started to impair the water quality, waterborne diseases like diarrhoea started to increase. In order to improve the situation, a local NGO proposed to use sand filters: they were cheap, did not use electricity and could be made from locally available material. However, the NGO did not take into consideration cultural traditions and practices of the community. Historically, they were used to only drinking running water. And because water coming from a sand filter stands for a day while being processed, the users refused to drink it, although the water quality was very good.
- Symbols and artefacts like expressions, stories, gestures or pictures: The outermost layer of the shell comprises symbols, artefacts and stories that are local expressions of culture. Using culturally known symbols and stories to convey messages about water and sanitation can be of value especially in educating communities about sustainable water and sanitation systems' management.

**To be inclusive, water projects also need to take into account how different identities work with water, and the norms and traditions that shape their association with water.** In India the caste system is inextricably linked to sanitation, with many Dalits or the caste lowest in the Hindu hierarchy still serving as manual scavengers –it is estimated that around 1.3 million Dalits in the country, mostly women, make their living through manual scavenging.<sup>5</sup> These groups need to be identified and targeted separately in sanitation projects. Similarly, women are considered the traditional water-bearers in Indian communities. Sourcing water is also an important social event in rural contexts when women meet and communicate at the water sources (van Wijk-Sijbesma, 1998). Yet, this responsibility can also become a source of disadvantage and exclusion for many women. The case of Maharashtra’s ‘water wives’ is illustrative. With long standing droughts, many villages in this state in India are now seeing a trend of men marrying multiple times so they have more women in the household to fetch water.<sup>6</sup> These identities and how social norms determine their intersection with water need to be acknowledged and addressed by water projects, if they are to be inclusive.

**The new Economic and Social Standards (ESS) for the World Bank re-emphasize why it is important for project managers to look at values like cultural values.** Specifically, ESS 8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. Tangible cultural heritage may include movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. These may be located in urban or rural settings, and may be above or below land or under the water. Intangible cultural heritage may include practices, representations, expressions, knowledge, skills—as well as instruments, objects, artifacts and cultural spaces associated therewith— that communities and groups recognize as part of their cultural heritage, as transmitted from generation to generation and constantly recreated by them in response to their environment, their interaction with nature and their history. The ESS applies therefore to all projects which are likely to have risks or impacts to such heritage. Water projects are likely to be affected by this standard particularly if they cause changes to the environment or impact in any way the practices and culture of communities.

**Question 3: What are the different methodological approaches available for measuring intangible values of natural resources such as water? How can they be tested and made more rigorous (using the Brahmaputra basin as a pilot context)?**

**Before we describe the methods currently available to value ecosystem services such as water, it is important to define a few key concepts.** The term ‘value’ may be defined as the socially determined worth of something; it may be based on economic, social, cultural, and/or symbolic assessments. ‘Cost’ implies the investment required

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<sup>5</sup> <https://idsn.org/key-issues/manual-scavenging/>

<sup>6</sup> <https://www.indiatimes.com/news/india/this-story-of-maharashtra-s-water-wives-is-as-heartbreaking-as-the-drought-itself-253278.html>

in the production or use of something. 'Price' is the amount asked for and/or paid to acquire something. 'Fee' is the amount assessed for access to something. 'Rate' is the price paid per unit for something. And a 'market' is a place, real or notional, where buyers and sellers interact (Eden, Efrein and Radonic, 2014).

**The value of any resource is influenced by several factors.** The first is the resource's utility which tends to vary by time, quality, use and location. For example, in the case of water, conventional definitions of value state that utility of water is high in places where water is scarce. Marginal utility decreases as the amount of water increases. The extreme proliferation of water, as in the case of flooding, creates negative utility. In contrast, during dry periods of the year, or during droughts, the value of water is much higher than in other periods. The utility and value of water also increase in certain seasons or times of the year because of critical water demands for crop growth, heating, cooling, industrial production or shipping. (FAO, 1995). But these are sources of utility described in 'conventional' terms. The utility of water is determined by its non-conventional uses as well, for example as used in cultural, spiritual, religious, ethnic and social practices and beliefs. Second, the value of the resource depends on who does the counting. For example, the value of a river may be very different for an Indian tribe and a utility company. Both view the river as a form of natural capital, a resource of great value, but conflict arises because the river simultaneously cannot drive a turbine and remain in its current shape for the Indian tribe to preserve its rituals around the river (see Box 5).

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#### **Box 5. The "value" of the Skokomish river**

The Skokomish River is a river in Mason County, Washington, United States, takes its name from the Twana Indian word *sqoqc.'bes*, which means "People of the River". In 1930 the City of Tacoma built two dams on the North Fork of the river, and diverted the flow into a pipe to drive a hydropower plant located on the reservation.

The river, once the largest and most productive salmon river in Puget Sound, dried up in its salmon produce. Hydrologists attributed this change to the combined effects of the accumulation of sediment in the main stem channel since the dams were constructed, and the loss of flow from the North Fork. The "People of the River" opposed the construction of the dams and for several years have sought to return the river to its wild state, so they can maintain their primary livelihood of fishing and also the river as a sacred site for their rituals and ceremonies. But their efforts have been hampered by the problem of translating their conceptions of the value of the river into the language of Western economics. The Skokomish case provides a particularly vivid example of how two societies can attach quite different values to the same physical resource. It remind us that "value" is not a measureable physical property, but a social construction. Asked to define the value of a riverine resource such as salmon, an economist might investigate the price per pound at dockside or in the supermarket. But when asked the same question, a Umatilla Indian answered "How can I tell what the salmon are worth? The salmon define who I am. What else can I say."

Source: Lansing, Lansing and Erazo (1998)

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**The methodology employed to determine the ‘value’ of water is complex.** This is on account of two reasons. First, and as described above, water has multiple uses which are not easily measurable, especially its non-conventional uses. Second, the cost of water often does not reflect its different values as a utility. Water is both priceless and free (Frederick 1986: vii). Estimating the value of water, in market or non-market situations is therefore complicated because consumers attach immense value to it, but expect it to be “free” or “cheap” and water purveyors reinforce those expectations by charging only for storage and transportation costs as they do in many parts of the world.

**There is a rich tradition of efforts to value water as an economic good.** In 1992 more than 500 participants, including water experts from across the world, gathered at the Conference on Water and the Environment and issued the Dublin Statement on Water and Sustainable Development. The statement, which came to be known as the Dublin Principles, was the first document of its kind to codify the importance of valuing water as an economic good, with the objective of promoting efficient use of water and water conservation. The Dublin Principles were influential in the establishment of the Global Water Partnership, an international network of organizations created in 1996 to foster an integrated approach to water resource management.

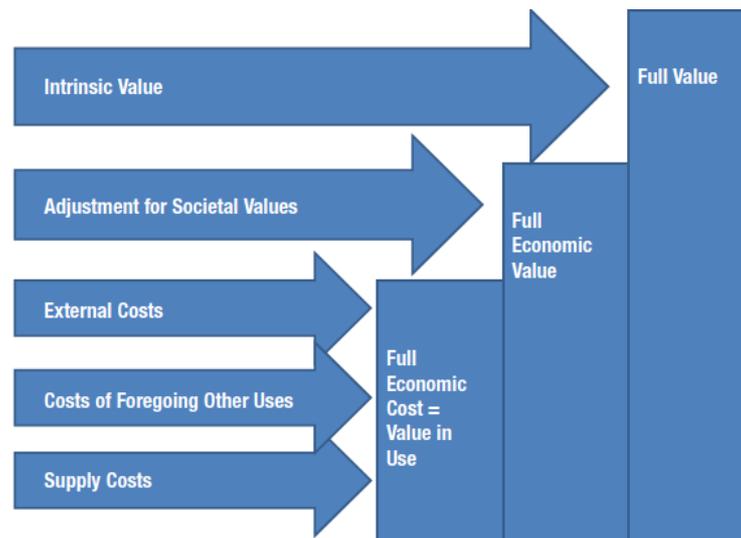
**A report by the Global Water Partnership in 1998 proposed a method for valuing water that includes multiple component values.** A concept of *full value* based on this method starts with the value of water in its many uses—its use value. *Use value* includes more than just supply costs, but also the cost of foregoing other uses and other so-called “external costs” left out of the calculations of the water user, such as environmental impacts. The *economic value* of water, then is the use value with adjustments for societal values.<sup>7</sup> Finally, the “intrinsic” value of water must be included to arrive at the *full value* of water (see Figure 1). Intrinsic value is difficult to define, because it includes notions such as community and spirituality, to which many people do not attach a monetary value. Consider the case of the Menik Ganga river in Sri Lanka. Each year, the instream water from the river is used for the Kataragama religious festival that attracts both Buddhist and Hindu followers, about 100,000 people per day over a 15-day period during July and August. A cultural practice at the festival is the offering of pure water to gods and bathing in the ‘holy’ water of the Menik Ganga prior to visiting God Kataragama to worship. Due to increasing levels of water pollution arising from low flows, festival officials have deemed the river water unsuitable for bathing. But the satisfaction of the “bathing requirement” is the absolute minimum during the festival. This requirement is currently fulfilled by bowser water supplies. Festival organizers contend that water from the bowser is unlikely to provide the same “satisfaction” to pilgrims as that received from using the river (Dissanayake and Smakhtin, 2007). Water economists have therefore started to argue that these intrinsic values of water are important to consider for it is based on these values that entire communities manage water. Across the world, many societies

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<sup>7</sup> Note, we make a distinction between the economic and monetary value of water.

manage their water resources based on social relations, and not exclusively on technical calculations of supply, demand and operation costs; the social and spiritual values of water often prevail over its economic value.

**Figure 1: Conceptual Accounting for the Full Value of Water**



*Source:* Eden, Efrein and Radonic, 2014.

**There have been many studies that have attempted to assess the economic value of ecosystems and natural resources such as water.** Monetary approaches may be used to capture the economic value of some or all of the elements of a resource such as water. A systematic review of biodiversity valuation studies in least developed countries covering two databases, the Environmental Valuation Research Inventory (EVRI) and the ISI Web of Knowledge (WoK), found a total of 195 monetary valuation studies in the former database and 183 monetary and 101 non-monetary valuation studies in the latter (Christie and Kenter, 2012). The most widely adopted techniques included contingent valuation (73 papers), opportunity costs (56 papers) and questionnaires (48 papers). Overall, it found that a wide range of approaches had been utilised to evaluate the benefits of biodiversity and ecosystem services in LDCs, of which two-thirds had attempted to evaluate the monetary benefits.

Box 6 presents a broad summary of monetary and non-monetary approaches being used currently to assess the value of natural resources and figure 2 organizes the latter according to the method of data collection.

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## **Box 6. Monetary and non-monetary techniques available to value biodiversity**

### Monetary techniques

**Market price approaches:** Market-price approaches utilise prices from actual markets related to the environmental good as a proxy to the value of that good. Examples include: local trading prices (e.g. Le Roux and Nahman, 2005; Turpie et al., 2003); revenues from tourists to areas of high biodiversity; and the value of bio-prospecting contracts (Nijkamp et al., 2006; Nunes and van den Bergh, 2001).

**Market-cost based approaches (including replacement cost, damage cost avoided, production function approaches):** These utilise the costs from a market good related to the environmental good as a proxy to the use value of an environmental good. Examples include the costs of replacing an environmental service (e.g. soil erosion: Moller and Ranke, 2006), or mitigating environmental damage (e.g. storm protection services from mangroves; Barbier, 2007). The production function approach focuses on the (indirect) input costs of a particular environmental service to the production of a marketed good (e.g. the ecosystem service inputs

into crop production: Amaza et al., 2006). Market-cost approaches do not measure the total economic value of natural resource, but rather present a proxy of the value.

**Revealed preference (travel cost, hedonic pricing) methods:** Revealed preference methods utilise observations from actual markets related to the environmental good to provide a measure of the value of that good. In the travel cost method for example, data on the costs of travel to a natural resource are used to evaluate the recreational benefits of that resource (Clawson, 1959; Hanley et al., 2002). Hedonic pricing studies reveal the value of the environmental good through observations in a related market: usually house prices (Humavindu and Stage, 2003). Revealed preference methods are usually restricted to measuring use values.

**Stated preference methods (contingent valuation, choice modelling):** Stated preference studies estimate economic values by constructing a hypothetical market and asking survey respondents to directly report their willingness to pay (WTP) to obtain a specified good, or willingness to accept (WTA) to give up the good. Contingent valuation studies tend to elicit WTP for a single policy option (Kramer and Mercer, 1997; Turpie, 2003), while choice modelling also allows assessment of the attributes of the policy (Kenter et al., 2011).

**Value transfer method:** The value transfer method uses economic information captured at one place and time to make inferences about the economic value of environmental goods and services at another place and time (Wilson and Hoehn, 2006). Value estimates may be transferred as monetary values or value functions conditioned on explanatory variables.

### Non-monetary techniques

**Consultative methods (questionnaires, indepth interviews):** Consultative methods are structured processes of inquiry into people's perceptions of an environmental issue. Although both questionnaires and indepth interviews tend to be administered to individual respondents, questionnaires tend to focus on gathering quantitative data (Struhsaker et al., 2005), while indepth interviews collect qualitative data (Gareau, 2007). Neither approach directly elicits a

monetary value, but both can be used as a basis of monetary valuation methods such as contingent valuation.

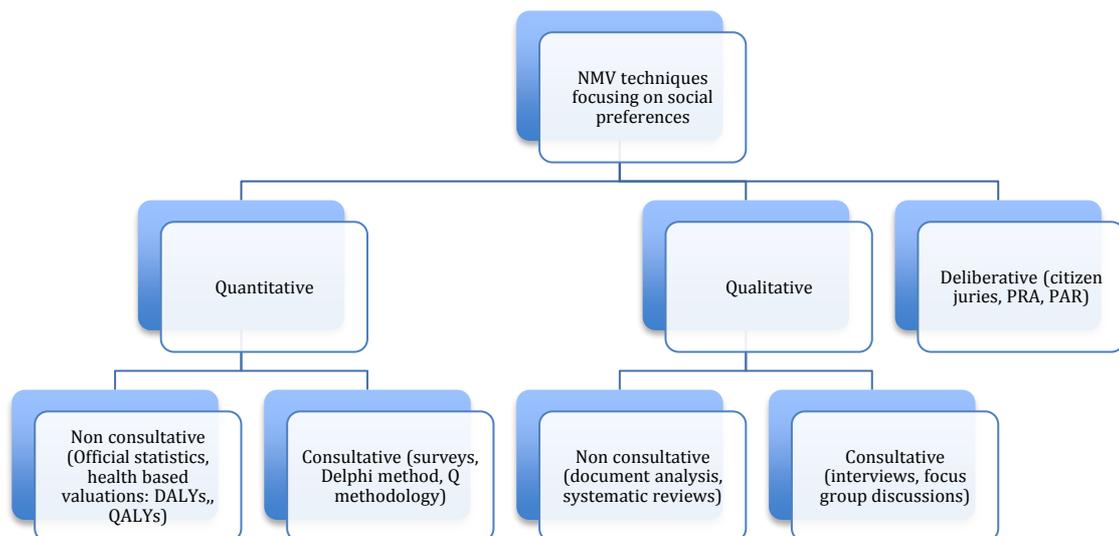
**Deliberative and participatory approaches (focus groups, citizen juries, health based approaches, Q methodology, Delphi surveys, participatory rural appraisal (PRA), participatory action research (PAR)):** Deliberative and participatory approaches utilise group based activities and participatory and deliberative approaches to attain detailed information about people’s relationship with the natural environment. PRA and PAR approaches are used extensively in developing countries and along with data gathering, aim to promote local knowledge to enable local people to make their own appraisal, analysis and plans (Chambers, 1992; World Bank, 2008). Citizen juries involve a court-like process in which participants review the available evidence before making final judgements on the future of the environmental good (Kenyon et al., 2001). Health-based valuations measure the combined outcomes of health related factors on the quality and length of a human life: examples include QALYs (Doctor et al., 2004) and DALYs (Briggs, 2003). Delphi surveys involve multiple rounds of questioning participants. After each round, the interviewer summarizes the results of the previous round, and participants are asked to reflect on their answers in light of the answers given by others. The idea is to decrease the range of answers so that the group converges towards one answer. Finally, the Q technique involves giving participants a few statements, and asking them to rank them, the idea being that the participants consider a statement in relation to others.

**Systematic reviews:** Systematic reviews are a rigorous way of assessing and reviewing scientific evidence of the likely outcomes of various actions. A key aspect of systematic reviews is that both the protocols before the systematic reviews and the final reviews are peer-assessed (Fazey et al., 2004; Pullin et al., 2004).

Source: Christie and Kenter (2012)

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**Figure 2: Non-monetary valuation techniques grouped according to method of data collection**



Source: Adapted from Keleman et al (2016).

**Among the monetary valuation methods, the most commonly used are stated preference techniques (willingness to pay, willingness to accept) which are capable of capturing both use and non-use, societal values** (Christie et al., 2006; Nunes and van den Bergh, 2001; see also Box 7). Revealed preference techniques, in contrast, can capture use values only (Navrud and Mungatana, 1994; Shrestha et al., 2002). Market-based and cost-based approaches can also be used to provide a proxy measure for direct use value. E.g. replacement-cost analysis can be used to estimate the cost of replacing the protection of mangroves with coastal defence works (Gunawardena and Rowan, 2005).

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#### **Box 7. Using willingness to pay to capture non-use societal values: Two case studies**

##### *The Elwha River Restoration project, U.S.*

In the early 1900s, two dams, Elwha and Glines Canyon, were built on the Elwha river near Olympic National Park in Washington, U.S. The dams fueled regional growth, but blocked the migration of salmon upstream, disrupted the flow of sediment and wood downstream, and flooded the historic homelands and cultural sites of the Lower Elwha Klallam Tribe.

A decision was made in 2006 to remove the two dams, an expensive proposition with costs of nearly \$250 million. It was also estimated that it would take decades before significant increases in harvestable fish return to support appreciable commercial and recreational fishing. Yet, the government went ahead citing that most of the benefits derived by Washington residents would be based on the existence value of the river, rather than its immediate use value. These 'passive' values associated with the removal of the dams and river/salmon restoration were calculated using a Contingent Valuation Method survey in which Washington households were asked about their willingness to pay for dam removal and salmon recovery. The willingness to pay question was framed as a voter referendum question, asking whether they would vote in favor of dam removal and salmon restoration at a specific increase in cost. The average WTP was \$73 (with a 90 percent confidence interval of \$60-\$99). This translated into about \$94 million in passive use values to Washington households *each year*, leading to the government deciding in favour of dam removal.

##### *Borivilli National Park study, India*

A study by Hadker, Sharma, David, and Muraleedharan (1997), entitled "Willingness-to-pay for Borivilli National Park: Evidence from a Contingent Valuation" tried to assess the willingness to pay (WTP) of residents of Bombay (Mumbai) for conservation of the Borivilli National Protected Area. Average household WTP was estimated at US \$ 0.23 per month or about US \$ 31.6 million in aggregate present value terms, which far exceeded the budget of US \$ 520,000 to maintain the area. The main direct use value of the area (primarily for recreation) was heavily outweighed by its indirect, societal values including the area's role as a source of Bombay's drinking water (through its two lakes – Vihar and Tulsi) and as home to many endangered animals.

Source: Loomis (2006); Hadker, Sharma, David, and Muraleedharan (1997)

<<end box>>

**Not all values of an ecosystem resource such as river water, however, can be expressed in monetary terms.** As discussed above, people associate many ‘intrinsic’ benefits including mental well-being, ethical, religious, spiritual and cultural values with water (see figure 1). These are all the more prominent in less developed or developing countries where people are more poor and more dependent on the biodiversity and ecosystem services offered by water to meet their basic needs (UNEP, 1999). Monetary valuation techniques can be challenging especially for measuring such intrinsic values. People *may not be able to* or *may not want to* express the intangible value water holds for them in monetary terms, over and above its use and societal value. In such cases, researchers may use non-monetary approaches to elicit people’s preferences for and value of water (Eftec, 2006; Ormsby and Kaplin, 2005). These methods may be more appropriate in contexts where the market for water is absent, more so in peasant, indigenous, or other community based societies where environmental values are deeply interwoven with community and spiritual values.

**Non-monetary valuation techniques to value ecosystem services are only just emerging.** These include quantitative and qualitative research techniques (i.e. surveys, interviews), participatory and deliberative tools (focus groups, citizens juries, participatory or rapid rural appraisal (PRA/RRA), Delphi panels, etc.), as well as methods expressing preferences in non-monetary but quantifiable terms (i.e. preference assessment, time use studies, Q-methodology) (Christie et al., 2012; Terer et al., 2004; Kaplowitz, 2001; King and Faasili, 1999; and Mendoza and Prabhu, 2005). While these methods may not provide a monetary valuation of a river, they can provide useful information on the importance of the river to people in ways that monetary methods cannot. For example, in-depth interviews and focus groups may allow greater in-depth assessments of the motivations underlying people’s intrinsic value for the river, including its cultural and spiritual values (Kaplowitz and Hoehn, 2001). They can help to ensure that valuation is applied through traditional, cultural or thinking practices, and not by imposition of a technical way of conceptualising environmental goods and services (Asia Forest Network, 2002; Jackson and Ingles, 1998).

**What distinguishes these non-monetary valuation methods from the usual monetary valuation techniques is their emphasis on the ‘human expression of preferences’.** Here methods like the stated and revealed preferences fall short. Both rest on the assumption that each individual is endowed with a stable and coherent set of preferences and satisfying these preferences maximizes one’s decision utility and consequently enhances welfare. But individual preferences are not necessarily stable and tend to be influenced by past and day-to-day experiences. Further, each individual is unable to predict accurately his or her *future* utility. Studies by behavioural scientists have found that there is often a risk of mis-predicting one’s decision utility i.e. under or over-estimating the gains arising from a particular decision. Therefore, in addition to decision utility, there is also a need to base appraisal on “experienced utility” (Kahneman and Krueger, 2006; Kahneman and Sugden, 2005; and Kahneman and

Thaler, 2006), which includes an individual's experience of emotions such as happiness and overall satisfaction with one's life. These may be derived from more qualitative probing.

Broadly qualitative methods define the subject of valuation and the meaning of value along different perspectives. These may be subjectively revealed or deliberately arrived at for an individual stakeholder (Aretano et al, 2013) or may be 'discourse based', involving 'psycho-cultural valuation' of entire communities to understand group values and how preferences are formed as part of a valuation process (Kumar and Kumar, 2008). More recently, 'sociocultural evaluation' has been applied as a broad umbrella term for methods analyzing social preferences towards ecosystem services (Castro Martínez et al, 2014). There have also been efforts to make these methods flexible to adapt to specific worldviews and decision contexts (Santos-Martín, et al, 2016).

**Participatory and deliberative approaches to valuing a resource such as a river offer other advantages over monetary methods.** First, they address concerns that respondents of a typical 20–30 minute valuation survey do not possess the time or cognitive capacity to assimilate and process enough information to make meaningful valuations of complex environmental goods. Instead, utilizing 1-2 hour focus groups in which respondents are presented with more information on the environmental good and provided with opportunities to discuss and reflect on their preferences, can ease the cognitive burden on community members and improve preference expression (Christie et al. (2006), MacMillan et al. (2002)). Second, by incorporating deliberative democracy into valuation, they have the potential of involving communities in research. By doing so, they can help water managers promote dialogue and deliberation with local people thus fostering ownership and responsibility of problems; promote learning and awareness; and build local capacity to analyse problems and make more effective collective decisions (Chambers, 1997; Reed, 2008; Wadsworth, 1998). Finally, participatory and deliberative approaches provide respondents with the 'time to think' about and reflect on their preferences, which has been demonstrated to improve the accuracy of valuation surveys (Kenter et al., 2011; Whittington et al., 1992, 1997). Box 8 provides examples of studies wherein qualitative techniques were used in combination with monetary valuation methods to value ecosystem services.

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**Box 8. Valuing ecosystem services: a deliberative and participatory approach**

*Solomon islands*

Kahua is a remote and isolated region of the Solomon Islands. It is a region of high species endemism and therefore is globally important for its biodiversity (Green et al., 2006; Lamoreux et al., 2006). In addition, the indigenous population has a high dependence on local biodiversity and ecosystem services to sustain their largely subsistence existence. The Kahuans practice subsistence agriculture, and are engaged in fishing, hunting, wild food and non-food harvesting (Bourke et al., 2006; Jansen et al., 2006). However, they face a number

of pressures on their resource base, such as those from logging and mining companies, increasing impacts of climate change (Donner et al., 2005; Ebi et al., 2006), and rapid population growth (Bourke et al., 2006; Fazey et al., 2011). Many ecosystem services including provision of building materials, water purification and crop disease regulation are declining. The stress that this causes in communities leads people to look for monetary solutions such as cash crops, which further reinforce many of the problems by intensifying pressure on resources. Traditional customs and values and social cohesion have also come under pressure from the drive for monetary wealth (Fazey et al., 2011; Kenter et al., 2011).

In 2010-11, Kenter et al conducted a novel deliberative choice experiment that aimed to value ecosystem services in Kahua. The experiment started by asking participants to make choices about which service of the ecosystem did the Kahuans value the most. A total of 46 focus groups were conducted with 447 participants in total. Intervention exercises were added to further stimulate discussion and thinking on key issues in relation to ecosystem services. The focus groups were held in the local language and led by Kahuan facilitators who had been extensively trained by external researchers (c.f. Fazey et al., 2010).

The experiment found that the willingness to pay for different ecosystem services amounted to a substantial proportion (circa 30%) of the Kahuan household income. This willingness to pay however *increased* through the deliberative intervention exercises. Participants realised the importance of biodiversity to such a degree that they expressed a willingness to sacrifice their whole monetary income in order to safeguard resources. A standard monetary valuation exercise – e.g. using stated preferences – may not have been able to capture the true appreciation for ecosystem services, as it requires income constraints to be taken into account (Arrow et al., 1993).

The group based deliberation also resulted in significant learning for participants. The consequences of learning on perceptions of the environment included development of a more sophisticated view of ecological-cultural linkages, greater recognition of deeper held values, and greater awareness of the consequences of human actions for the environment.

#### *Valuing ecosystem services provided by the Mediterranean mountain agroecosystems*

In a more recent study, Bernués et al (2014) combined deliberative (focus groups) and survey-based stated-preference methods (choice modelling) to elucidate the socio-cultural and economic value of a number of ecosystem services delivered by mountain agroecosystems (mostly grazing systems) in the Euro-Mediterranean regions. They found that cultural services (particularly the aesthetic and recreational values of the landscape), supporting services (biodiversity maintenance) and some regulating services (particularly fire risk prevention) were clearly recognized by all groups, with different degrees of importance according to their particular interests and objectives. The prevention of forest fires ( $\approx 50\%$  of total willingness to pay) was valued by the general population in the region as a key ecosystem service delivered by these agroecosystems, followed by the production of specific quality products linked to the territory ( $\approx 20\%$ ), biodiversity ( $\approx 20\%$ ) and cultural landscapes ( $\approx 10\%$ ). The value given by local residents, however, to the last two ecosystem services differed considerably ( $\approx 10$  and  $25\%$  for biodiversity and cultural landscape, respectively). The Total Economic Value of mountain agroecosystems was  $\approx 120$  € per person per year, three times the current level of support of agro-environmental policies.

Source: Christie and Kenter (2012)

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**Until the field of non-monetary valuation becomes more settled and formalized, this activity proposes to follow Keleman et al (2016) in proposing a consortium method, of using a 'learning by doing' protocol to test and improve the applicability of different valuation techniques.** Methods proposed to be tested are: semi-structured, key informant interviews, individual preference assessment surveys conducted separately with men and women of different age groups, other variations of preference assessment (including the ecosystem services card game, photo elicitation survey), and deliberative techniques (including focus groups, valuation workshops, citizens' juries). So that the weaknesses and strengths of the proposed techniques can be identified with some rigor, the activity proposes to test these methods in different areas of the Brahmaputra basin (both upper and lower reaches). Depending on funding, the fieldwork will be carried out in the Indian part of the Brahmaputra basin and extend to one more riparian state (Bangladesh or Bhutan).

#### **Activities proposed for the second phase**

- Testing of a few monetary and qualitative/non-monetary techniques described above in 1-2 sites of the Brahmaputra basin (India)
- Documentation of pilot results
- Fieldwork using selected tools
- Documentation of findings
- Identification of weaknesses and strengths of selected tools, and their refinement for measuring intangible values of water
- Final deliverable: tools which can be used by TTLs/project managers to assess intangible values of water.

#### **Q5. How can social, spiritual and religious aspects of water be leveraged for modern day water administration and governance?**

**There are currently many stakeholders working on valuing water as a theme, and specifically on the Brahmaputra basin.** These include experts in the water world constituency such as in the International Water Association; those working on the HLPW; the IFC; the World Wildlife Fund (WWF); the International Union for Conservation of Nature (IUCN); research bodies such as the South Asia Consortium for Interdisciplinary Water Resources Studies (SACIWaters) and the International Centre for Integrated Mountain Development (ICIMOD); donors such as Australia's Department of Foreign Affairs and Trade (DFAT) and the Asia Foundation; the Australian Centre for International Agricultural Research (ACIAR) and its Sustainable Development Investment Portfolio (SDIP) program; and independent researchers and NGOs working in the Brahmaputra basin. The latter include for example, the Centre for North East Studies (CNES), Guwahati, which deals with health concerns of communities living on the river through boat clinics, and Aaranyak in Guwahati and Jagrata Juba Shangha (JJS) in Khulna which work on wide ranging issues, but not necessarily restricted to engagements with the river. One of the first activities in the second phase will involve building a stakeholder chain from the top to the bottom,

involving these key players and interviewing them about how intangible values of water can be taken into account. This activity will also help build an audience for the report for dissemination later.

**The report and its theme will be of practical use only if it integrates the views of those involved in water administration and governance.** Finally, the report will build on internal World Bank interviews that will be conducted with TTLs and practice managers working in the water practice area, including those working on water supply, irrigation, ground water management, hydropower and sanitation in the South Asia region. A few indicative questions that they may be asked are listed below:

- In their experience, did they ever see cases where norms and practices around the use of water solidified existing hierarchies (around gender, caste, religion)? If yes, in what ways? Did they affect the World Bank operation/project? And was the operation/project able to address them in any way? If so, how?
- In their experience, did they encounter any local beliefs, motivations, social, cultural factors that influenced individual and community choices in river management? NB: These can help identify potential intervention points to prevent both unsustainable practices and push for more local, sustainable practices.
- Are there any projects to their knowledge on a river wherein project decisions induced trade-offs between the multiple and incommensurable values that the river holds for the local communities?
- Identification of best practices: Are there any examples from around the world, where integration of social, spiritual, religious, cultural aspects of water, resulted in improved effectiveness of water programs and projects? At what stage of program or project engagement were these aspects addressed (at design or later)?
- Suggestions for cross-GP collaboration: their views.
- Reference to similar analytical work that they think is relevant.

Responses to these questions will be integrated in the final report, which will also document best practices viz. Bank operations and how they addressed intangible aspects of water to improve effectiveness in delivery.

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