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What does valuing water mean in practice? A case study from the Ewaso Ng'iro River Basin, Kenya

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ABSTRACT

Valuing water is receiving increasing attention within the global water policy agenda as a new water management paradigm. However, it is not yet clear how it can be operationalized in local water management contexts. We apply the Value Landscapes Approach as a conceptual framework to show how water-related preferences are informed by underlying assigned/water values and governance-related values and how these values may explain three different visions for water management among professional respondents in a Northern Kenyan case study. Through making shared and conflicting values explicit, these insights may serve as a foundation for addressing water conflicts in practice.

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SUSTAINABLE DEVELOPMENT GOAL

(SDG) 6: Clean water and sanitation

Communities [...] say water belongs to God. But everybody belongs to, even us, we belong to God, but we must manage ourselves. So, water must be managed so that it can be enough for almost everybody. (Chairperson, Water Resources Users Association (WRUA))

Introduction

Valuing water has received increasing attention among policy-makers, stakeholders and researchers around the world in recent years. The theme of the World Water Day 2021 was 'Valuing Water', which prompted reflections on the value of water by water-related organizations around the world. The United Nations (UN) published a report on Valuing Water in 2021 (UN-Water, 2021). Earlier, in 2018, the UN and World Bank-led High-Level Panel on Water proposed five Valuing Water Principles, the first of which calls for 'recognising and embracing water's multiple values to different groups and interests in all decisions affecting water' (High-Level Panel on Water, n.d.). The Government of the Netherlands launched a Valuing Water Initiative in 2019, with participation from governments, private sector, and civil society organizations from many different countries (Government of the Netherlands, 2019), whereas the Scottish Government placed

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a legal duty to develop the value of Scotland's water resources as early as 2010 (Martin-Ortega et al., 2013).

Despite these many policy initiatives towards a new water management paradigm that would embed values in decisions affecting water, it remains unclear how such high-level ideas discussed at the global level can be translated into practice in local and regional contexts. In this paper, we present findings of an interview-based study with 20 water managers, water users, researchers, and stakeholders from the Ewaso Ng'iro River Basin of Northern Kenya to explore this question; that is, our objective is to investigate the potential for applying a values-based water management paradigm in a real-world water management context. The term 'water management paradigm' itself has been defined as: 'the mindset of how water management should be implemented by the actors of a certain community' (Akhmadiyeva & Abdullaev, 2019, p. 1000), although there are competing definitions and uses of the term (e.g., Fornés et al., 2021; Kibaroglu & Sumer, 2007; Pahl-Wostl et al., 2011).

Our study builds on earlier conceptual and empirical work on the Value Landscapes Approach (VLA), a conceptual framework for valuing water (Schulz, Martin-Ortega, Glenk, et al., 2017; Schulz, Martin-Ortega, Ioris, et al., 2017; Schulz et al., 2018). More specifically, our objective is to establish whether relatively broad findings from a global online survey with water professionals about how various types of values may explain contrasting water policy preferences (Schulz et al., 2024) resonate in a real-world context, this way 'ground-truthing' them, and expanding the still incipient empirical evidence base testing the various conceptual elements of the VLA. Despite the increasing interest in valuing water among global water policy institutions, there is still no consensus on what valuing water may actually mean in practice. Our study thus provides important new evidence on valuing water at the interface between academia and policy. Although we also comment on the specific context of Kenya's water policy and water management in the Ewaso Ng'iro River Basin, the ambition of this paper goes beyond a specifically Kenyan context, seeking to establish more broadly whether 'global' ideas on valuing water can be translated to local and regional scales.

This paper is structured as follows: the next section presents an overview of the conceptual framework that informed this study. Following that, the Ewaso Ng'iro River Basin is introduced. Then, the dominant values that influence decision-making about water are summarized, and several strategic priorities for water management in the region and how they may be linked with values-based water management are discussed. The final section discusses implications for policy and concludes.

Valuing water and the Value Landscapes Approach

Valuing water as a new water management paradigm is founded on the idea that we need to better account for multiple and contrasting values in decision-making about water (Hellegers & van Halsema, 2019; High-Level Panel on Water, n.d.; Schulz et al., 2024). This includes the various tangible and intangible values that water has to humans and the environment, for domestic, agricultural, industrial, and other uses, but also for cultural and spiritual reasons. Thinking about valuing water, we may also consider the broader principles and values that inform *how* we take decisions. Is water management in a given context fair, participatory, effective,

efficient? These are also relevant questions in a values-based approach to water management (Akhmouch et al., 2018; Grotenbreg & Altamirano, 2019; Neal et al., 2014; Tortajada, 2010). Inseparable from these questions is the need to ensure that all water users' perspectives and preferences are heard and considered, even where it is not possible to fully implement potentially conflicting preferences, and compromises need to be negotiated. Valuing water is a political process. Through mapping various values and using them to inform decision-making, this water management paradigm thus has an expressly political dimension to it (Hellegers & van Halsema, 2019).

Although valuing water is ostensibly the latest water management paradigm, it is not the first to have considered various kinds of values in decision-making about water. In particular, literature on Integrated Water Resources Management (IWRM; El-Gafy & El-Ganzori, 2012; Korsgaard et al., 2008; Schoeman et al., 2014), adaptive management (Failing et al., 2004; Huntjens et al., 2011; Schoeman et al., 2014), cultural theory (Heinrichs & Rojas, 2022; Koehler et al., 2018; Tantoh & McKay, 2021), resilience thinking (Fallon et al., 2022; Miralles-Wilhelm et al., 2023), and the social-ecological systems (SES) framework and socio-hydrology (Baudoin & Arenas, 2020; Dunham et al., 2018; Wesselink et al., 2017) have previously made implicit or explicit reference to the role of values in shaping water management.

Yet, despite the relatively long history that many of these approaches share in proposing alternatives to traditional, hierarchical government or command-and-control approaches, none has made values its central concern. The SES framework and socio-hydrology, as well as resilience thinking, tend to underplay the human dimensions of environmental change and/or model human behaviour according to ecological principles (Wesselink et al., 2017). Likewise, adaptive management has quite a technical focus on experimenting with water management systems to test for different kinds of environmental feedback (Schoeman et al., 2014), where values are, at best, understood in terms of the costs and benefits of different water management options (Failing et al., 2004). Occasionally, values are introduced as part of extensions to existing conceptual frameworks (e.g., Fallon et al., 2022) or recognized as deeper principles that may shape resilience or adaptation outcomes (Huntjens et al., 2011; Miralles-Wilhelm et al., 2023), but they ultimately remain a marginal concern. Implications of the various conceptual frameworks are often also discussed exclusively in terms of economic values (Baudoin & Arenas, 2020; Dunham et al., 2018; El-Gafy & El-Ganzori, 2012; Korsgaard et al., 2008), a limitation which is perhaps least expected for the case of IWRM, given its emphasis on stakeholder participation and integration of different perspectives (but see Schoeman et al., 2014, which also considers ecological and cultural values).

Cultural theory does, on the surface, have a relatively explicit treatment of (cultural) values. Relevant case studies applying cultural theory highlight mismatches between universal approaches to water management and local contexts, often pointing towards culturally specific perceptions of risks, management cultures, and values as the cause (e.g., Koehler et al., 2018; Tantoh & McKay, 2021). However, the treatment of values remains relatively limited (Heinrichs & Rojas, 2022), typically making use of a typology proposed by Douglas and Wildavsky (1982), which places societies and collective entities into the categories of individualists, hierarchists, egalitarians, and fatalists (Tantoh & McKay,

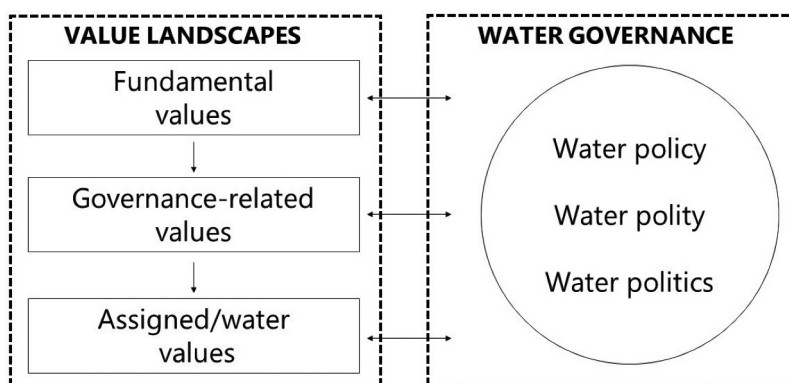


Figure 1. The Value Landscapes Approach, a conceptual framework for valuing water; adapted from Schulz, Martin-Ortega, Glenk, et al. (2017).

2021). Whereas different values may underpin this typology, they are not the primary focus of analyses of water management applying cultural theory either.

In contrast to these various approaches and conceptual frameworks, there is one structured approach that explicitly considers various forms of values, making them a central concern, that is, the VLA (Schulz, Martin-Ortega, Glenk, et al., 2017; Schulz, Martin-Ortega, Ioris, et al., 2017; Schulz et al., 2018; see Figure 1). Applying the VLA involves mapping the different kinds of values that are held by water users, managers, citizens, and stakeholders in a given geographical context to better understand water management options, conflicts about water, and pathways for their resolution (Schulz, Martin-Ortega, Ioris, et al., 2017). This conceptual framework guided the present study in the Ewaso Ng'iro River Basin. It also broadly aligns with the objectives of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), which calls for integrated approaches to understand diverse values of the natural environment (IPBES, 2022).

The framework suggests identifying several categories of values: *assigned/water values*, *governance-related values*, and *fundamental values* (see Figure 1). *Assigned/water values* are the various values that people assign to water resources, associated with the ecosystem services that they provide (Seymour et al., 2010). This could be the value of water for sustaining rural livelihoods, its value for the economy, or cultural values, among others. Some researchers have used the term 'water values' (e.g., Haileslassie et al., 2020), others have proposed the term 'assigned values', although this term may also refer to other elements of the natural environment beyond water (e.g., Seymour et al., 2010); hence, here we use the combined label 'assigned/water values', in line with previous publications applying the VLA (e.g., Schulz et al., 2024), accounting for these differences in usage in referring to the values that people assign to water. Assigned/water values are obvious targets for water management, and they are most commonly associated with the idea of 'valuing water' (see, e.g., Hellegers & van Halsema, 2019; Koundouri & Rulleau, 2019; Middleton et al., 2022). Valuing water will often involve finding a balance between different assigned/water values that satisfies different water users and stakeholders to varying extents and is broadly perceived as an improvement on

the status quo. If, for example, water is managed only for economic benefit, or only for the benefit of wildlife, it is clear that problems will ensue. However, as noted above, valuing water is a political process, and as such, it is important to recognize that this will not normally result in a single, objectively 'best solution', but rather, a relative improvement that is overall more in line with the values assigned to water by different parties in a given context.

Governance-related values are more abstract values that are not about water itself, but about what people believe to be the best process to take decisions about it (Schulz, Martin-Ortega, Glenk, et al., 2017). Examples are stakeholder participation, economic efficiency, or social justice. When water governance violates widely shared governance-related values, conflicts will emerge, although different stakeholders may have different priorities (León Montealegre & Roa-García, 2023). Some may focus on taking decisions quickly and efficiently, to ensure adaptability and effectiveness. Others may prefer wide stakeholder and citizen participation, or maximum transparency and accountability, to ensure social justice and equity.

Fundamental values are guiding principles associated with our personal beliefs that guide our life (Schwartz, 2012). For example, some people may value self-transcendence, that is, devoting their life to supporting others. Other people may value self-enhancement, that is, developing professionally or obtaining formal education. Although fundamental values are generally shared among all people, we may differ in how we prioritize them. Previous research has shown that many attitudes of professionals towards water management can be linked to these fundamental values (Schulz et al., 2024). However, links between fundamental values and assigned/water values and governance-related values are not normally made consciously, thus remain implicit and invisible, unless specifically investigated (Schulz, Martin-Ortega, Ioris, et al., 2017). Fundamental values (and their implications for preferences about water management) are most commonly assessed with close-ended surveys, to be analysed with statistical techniques. The existence of universally recognized fundamental values across cultures and contexts has been established with data from thousands of respondents from around the world (e.g., Sagiv & Schwartz, 2022; Schwartz & Cieciuch, 2022). Conducting further empirical research to explore these values qualitatively is thus not a key priority. In our interviews (see Methodology), we focused instead on governance-related values, case-specific assigned/water values, as well as water policy preferences. With regards to governance-related values and water policy preferences, our objective was to ground-truth findings from a previous study applying the VLA (Schulz et al., 2024), whereas for assigned/water values, it is important to explore these in qualitative depth, as their expression may vary across geographical contexts and scales.

The VLA suggests that these values shape water governance, that is, the entirety of water policy (the management interventions used to reach a certain outcome), water polity (the institutions within which decision-making takes place) and water politics (the interactions and power play between different stakeholders and actors; Schulz, Martin-Ortega, Glenk, et al., 2017). Using data from an online survey with 300 respondents from 57 countries, and statistical analysis, such links between water professionals' values and their preferences for water governance have been shown to exist (Schulz et al., 2024). However, the case study presented here focuses on a qualitative, in-depth understanding of how water governance is shaped by various kinds of values.

There are several benefits to a value-based approach for managing water. First, making values visible helps understanding whether interests and objectives in water management are appropriately balanced. Good water management will not only reflect one value but will respond to a range of assigned/water values, as well as governance-related values. Second, mapping values is useful to address water conflicts. Conflicts often emerge where different stakeholders and decision-makers do not prioritize the same values. Where values are implicit, making them visible is a necessary first step to work towards conflict resolution. Third, creating a 'map' (or landscape) of values may aid with making water management more inclusive and equitable. If decisions about water only reflect the values of more influential stakeholders, this becomes visible through this approach. Considering that there is a growing awareness that decisions about water are often taken without consulting with politically less-influential water users (Mdee et al., 2022), knowing their values is important, and may allow adapting water management decisions towards greater equity and social justice.

Methodology

The Ewaso Ng'iro River Basin is a very large and diverse river basin, covering the north-east of Kenya, that supports a great variety of water values, livelihoods, communities, and ecosystems (Kiteme, 2020). Broadly, upland areas near Mount Kenya and the Aberdares mountain range see seasonal rainfall that allows farming, with lowland areas significantly drier, and dominated by pastoralism. There is also some agro-pastoralism in the middle part. The river basin has abundant wildlife and hosts a large number of conservancies and ecotourism enterprises (Wiesmann et al., 2000).

In terms of its sociodemographic composition, the Ewaso Ng'iro River Basin is very diverse as well. Upland areas with more abundant water supplies are much more densely populated than lowland areas. Major population centres in the uplands are the towns of Nanyuki, Timau, and Naromoru. Nanyuki has a strong military presence, with the local Kenya Air Force and the foreign British Army Training Unit Kenya (BATUK) maintaining bases there. In the middle part, the main population centre is the town of Isiolo, a major transport hub featuring prominently in Kenya's economic development plan Vision 2030. Isiolo is diverse in terms of ethnicities, cultures, and religions. Finally, a major town in the arid or semi-arid lands (known as 'ASAL' in Kenya) of the lowlands is Marsabit, although it is surrounded by much larger, sparsely populated lands. According to one source, there are at least six major ethnic communities in the river basin: the Kikuyu and Meru, who are agro-pastoralists, and the Maasai, Samburu, Borana, and Somali, who are nomadic pastoralists (Gichuki, 2004). The majority of respondents were consulted in upland areas, which are most densely populated, and which have also been the focus of most academic literature on water management in the river basin (e.g., Kimwatu et al., 2021; Lanari et al., 2018; Mutiga et al., 2010; Mutisya & Tole, 2010; Mwaura et al., 2020; Ngigi et al., 2008; Wamucii et al., 2023).

The Ewaso Ng'iro River Basin faces seasonal water scarcity, which has led to conflicts between water users from across the entire basin area. Although naturally water scarce, the region also faces climate change impacts. That said, other anthropogenic factors contribute more strongly to water scarcity than climate change, including overuse of

water, unsustainable land use, population growth, and ecosystem degradation (Kimwatu et al., 2021; Mutiga et al., 2010; Wamucii et al., 2023). During the dry season, there is thus strong competition for water allocations. This and its diversity make the Ewaso Ng'iro River Basin a highly suitable case study for applying a values-based approach to water management.

Although water conflict is a recurring issue in the river basin, it has also seen cooperation in water governance, in the form of WRUAs (Kiteme, 2020; Mwaura et al., 2020). The earliest WRUAs were established in the Ewaso Ng'iro River Basin in the 1990s as self-help groups between different water users, and often focused on water rationing programmes to improve the reliability and equity of river water supply between upstream and downstream users. These WRUAs thus pre-date even the Kenyan Water Act 2002, which serves as a legal basis for the creation of WRUAs in sub-basins within the entire country (Agade et al., 2022; Richards & Syallow, 2018). Most water professionals interviewed for the present study suggested that the intensity and frequency of conflict have noticeably decreased over the years, although water scarcity continues to be a challenge, including in 2022, and conflicts do still break out, sometimes involving violence (Makokha, 2022). There are also still many areas of the basin not yet covered by a WRUA, and not all existing WRUAs are equally effective. All WRUAs would benefit from having more financial resources.

Several types of conflict are well-known in the region and affect large numbers of water users (IMPACT, 2020; Lesrima, 2019). First, there is conflict within and between communities about water access and water use (Wiesmann et al., 2000). In situations of severe scarcity, competition about limited water resources is unavoidable, and it is often not possible to find agreement about water allocations. This may lead to very high rates of illegal or unsustainable water abstraction affecting neighbouring and downstream communities (Mutiga et al., 2010; Ngigi et al., 2008). In response, pastoralists from the drier downstream areas may migrate upstream, watering their livestock there, sometimes degrading or destroying farmland. This upstream–downstream conflict over water use has a long history, extending into colonial times (Parker, 2022). Second, another common pattern of conflict is between commercial and small-scale farmers (Lanari et al., 2018), who may accuse each other of overusing scarce water resources, especially where there is no direct communication between both groups. There are also concerns about water pollution and fertilizer runoff associated with commercial farming (Mutisya & Tole, 2010).

Third, human–wildlife conflict is a concern, as elephants and other animals migrate and may degrade or destroy ecosystems, as well as human-made (water) infrastructure and agricultural fields, when they cannot access water in their normal habitats (Duporge et al., 2022; Graham et al., 2010). This may take a heavy toll on farmers who have to guard their fields or see their crops destroyed. Several technical solutions to address water-related human–wildlife conflict have been proposed over the years, including the installation of water troughs that can be used by both livestock and wildlife. Further conflicts were mentioned in interviews, but much less frequently, including excessive sand harvesting, concerns about water quality and pollution with sewerage and pesticides, and trans-boundary conflict between Kenyan water users and those in neighbouring countries.

These conflicts were discussed in individual in-depth interviews with 20 water managers and regulators, water users, researchers, and stakeholders from different parts of the Ewaso Ng'iro River Basin in April 2022. We employed a purposive sampling strategy,

which has the 'aim of increasing the depth (as opposed to breadth) of understanding [...] and is a way of identifying and selecting cases that will use limited research resources effectively' (Campbell et al., 2020, pp. 653–654). Purposive sampling thus does not seek to maximize the number of interviewees, but ensures that the most relevant respondents are approached, using clear criteria for inclusion and exclusion. In this case, the criterion for inclusion was that respondents were either water users themselves or had close knowledge of water management in the case study area, given the overall focus of the present study. Most interviewees were either part of WRUAs or had close knowledge of WRUA activities (often representing interests of domestic water users and small-scale irrigators), but we also sought to ensure all water user types were represented in our sample.

Although interviews had a focus on water conflicts, where different values might be clashing, it is important to note that values may also underpin situations of consensus, where many or all water users and managers agree, due to shared values. Interviews were recorded, transcribed, and analysed with software for qualitative analysis (NVivo 12); all quotes used in this paper are from interview transcripts. In line with guidance for the presentation of findings from qualitative research, we employ direct quotes from interviewees as empirical evidence in support of the broader theoretical claims that we are making (Rockmann & Vough, 2023). Given the primary objective of this study of 'ground-truthing' abstract claims, a relatively large number of direct quotes was purposely integrated into the broader narrative of this paper. This helps showcase directly how applied statements about water management, made by interviewees involved in water decision-making, can be interpreted in line with the valuing water paradigm. This strong degree of transparency, in turn, will allow other researchers and practitioners with an interest in valuing water to conduct interviews and interpret their qualitative data using a similar approach. Interviews contained both open-ended parts, in which relevant water challenges were explored from the perspective of interviewees, as well as more targeted questions about the importance and values of water, the role of various institutions in managing water (especially WRUAs), and various strategies for managing water (building infrastructure, using payments and charges, and restoring ecosystems; see further sections below).

Results: valuing water in the Ewaso Ng'iro River Basin

Assigned/water values

There is universal consensus that water is valuable because it ensures human survival and public health, but different opinions exist about what other values are important in a given place. A simple and straightforward way is to consider the value of water to the economy and to the environment, as well as its cultural values. Although the specific scenario may differ across places, these categories of values are assigned to water almost everywhere but allocated different levels of importance. Many values will also fall into more than one of the three categories. For example, water may be used for raising cattle, which brings economic value, but this use is also a way of life, thus also of significant cultural value. Such hybrid categories of values can be thought of as the norm, rather than the exception, and a classification of assigned values into the categories of 'economic', 'cultural' or

'environmental' is necessarily a conceptual simplification for analytical purposes. Assigned values are rarely completely 'pure', that is, pertaining to only one category, but to facilitate an assessment of values in a given place, it is also necessary to use categories, despite the commonness of value hybrids. In valuing water, striving for greater balance between different values of water may often be desirable. Although in practice there are many ways in how this balance can play out politically and different stakeholders will have different views on what they might consider the 'right' kind of balance, the very first step is always to list these values. We report findings for these values in the following subsections for the case of the Ewaso Ng'iro River Basin.

Economic values of water

If you come to these other communities that are exercising the small-scale farming and horticultural farming, they value it. For example, here, people buy land here, very, very expensive because of water, access to water so, the land is very expensive here. [...] the land here is valuable, the reason being there's water here, there's access to water. (WRUA Chairperson)

Water resources in the Ewaso Ng'iro River Basin are of very high economic value. They sustain all livelihood activities and farming and pastoralism in particular. Tree nurseries, ecotourism, beekeeping, and fish farming were cited as other water-dependent activities producing economic value. Farming is often classified into commercial and small-scale farming (cf. Lanari et al., 2018), although small-scale farming is not just a subsistence activity, and produce is also often sold at the market, including in distant places such as Mombasa. Competition for economic values was cited as a main driver of conflict in the river basin, for example, where farmers were competing for limited water resources to produce highly valuable commodities for agricultural export. Small-scale farmers were considered to be more vulnerable as they lack capital to invest in water storage, are more likely to grow produce in areas with unstable water supply, or may suffer disproportionately from economic shocks (such as the high cost of fertilizer) or from human-wildlife conflict (as they cannot afford electric fencing). Some respondents mentioned that flood irrigation is highly profitable, much more so than drip irrigation, even if unsustainable. Flash floods were also cited as of high economic benefit to pastoralists in some downstream areas, because they support and renew grazing areas.

Unsurprisingly, commercial farming was associated primarily with economic values; not just through the sale of agricultural products for export, but also indirectly, through the creation of employment opportunities and attracting workers from other parts of the country (cf. Ulrich, 2014). Flower farms, for example, could be seen as producers of 'pure' economic value from water, in the sense that the produced flowers are not of cultural value in Kenya, nor does their production contribute to maintaining local ecosystems. However, flower farms are also a good example that one may choose to invest in broader water values, being conscious about the need for a more balanced approach. A flower farmer interviewed for this study gave a series of examples of how they engaged in managing environmental values, alongside economic values, among others, through investing in carbon neutrality and improved soil management.

Cultural values

When they're irrigating and the hunters have no water, the conflict comes in, so, the cultural diversity being a livestock keeper or a hunter, I'm seeing my camel, you are seeing your cabbage, you see? So, what I value is not what you value and that's where most of the conflict comes in. (Government representative)

Many cultural values of water in the river basin are expressed through people's livelihood activities (cf. Daskon & Binns, 2010), as the quote demonstrates, and in this sense, there may be an overlap with economic values. Considering these activities as economic, rather than cultural, led some respondents to dispute the idea that cultural values mattered for water management in the Ewaso Ng'iro River Basin.

However, there are also many cultural values of water that overlap with environmental values. One respondent noted that in Borana society, tradition mandates that water must always be provided for wildlife. Another representative discussed the cultural importance of specific springs that 'no one interferes with' (Community representative) and that may be considered places of worship, which also has ecological benefits. In other places, shrines may have a similar function; they are an important element of local culture, but also part of traditional water management, conserving water sources (cf. Bryan, 2017).

Several respondents explained the strong cultural value of water for the Maasai (and other communities):

For example, the Maasai they have during their ceremonies, circumcision ceremonies, some families take the boys to the river before they get circumcised. So, without the river flowing it's a challenge and it's a really valuable resource because they need it. Traditionally, Maasais, the circumcision ceremony is the biggest and the most important ceremony for a man, in his life, in a life. And for those families that take boys to the river, early in the morning at 05:00 latest, some 04:00, 03:00 in the morning. They don't have that river, the river dries, because it used to be there, and it dries. That value, that one time event for a life, it's very important for their men, and they may actually complain for that. We have, we need to have a river flowing because one time in a life a man needs this, you see? So, this is how much they can give it, they can value it ... (WRUA Chairperson)

Environmental values

The perhaps most visible environmental value of water in the river basin concerns its role in sustaining wildlife and biodiversity, including terrestrial large and small herbivores, carnivores, but also aquatic and semi-aquatic species (cf. Ericksen et al., 2012). Although water-dependent wildlife has economic value to ecotourism providers, most respondents did not think of its value in such terms. Rather, its environmental value is important, regardless of its economic impact. That said, some respondents felt that maintaining environmental values requires human intervention; an overpopulation with certain animal species was seen as a threat to ecological integrity.

Opinions were also ambivalent about native tree species, despite their value for biodiversity conservation; one respondent suggested that they grow too slowly, and as such, they may pose an indirect risk to ecological integrity, as they may not regrow sufficiently fast to cope with human demand for wood, making foreign, fast-growing species more beneficial for the environment (but see Dye, 2013). Generally, respondents felt that maintaining ecosystem health was important, because this was associated with

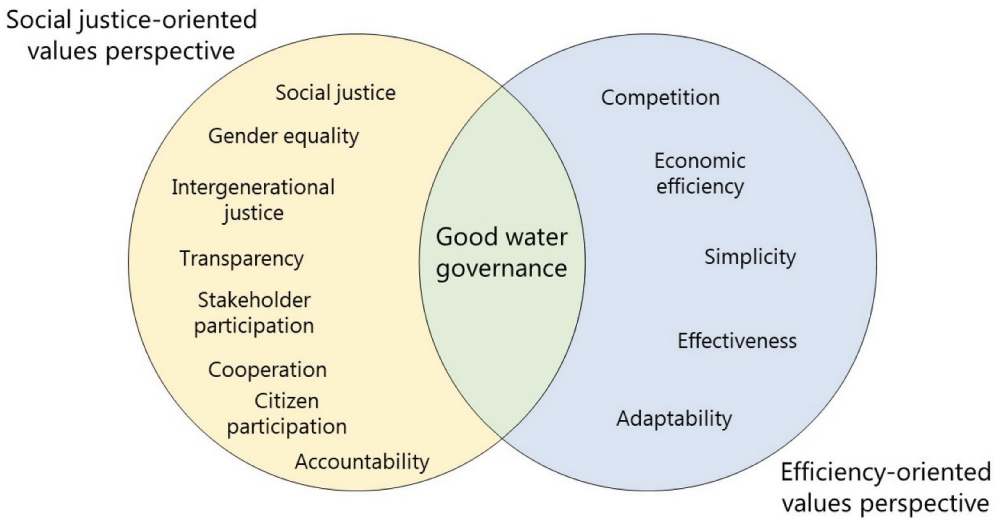


Figure 2. Two types of governance-related values; based on findings from Schulz et al. (2024). The social justice-oriented values perspective and the efficiency-oriented values perspective are meta-categories of governance-related values that include a series of individual governance-related values, listed within the yellow and blue circles, respectively. In the statistical analysis provided by Schulz et al. (2024), these individual values clustered together, suggesting that water professionals perceive them as conceptually related.

the sustainability of water resources and would also bring other benefits, such as supporting beekeeping (see also the ‘Working with nature’ subsection).

Governance-related values

Governance-related values are not about water per se, but rather, about the ways in which decisions about water are taken. Previous research has shown that such values can be grouped into two main perspectives (Schulz et al., 2024; see Figure 2): first, policy-makers, stakeholders, and water users may be concerned with the efficiency and effectiveness of water management (cf. Akhmouch et al., 2018). They may want simple procedures that are clear and unambiguous, that can be adapted to changing circumstances, and which are competitive. Second, and in contrast to the first perspective, social justice may be an overarching concern (cf. Neal et al., 2014), alongside a desire for citizen and stakeholder participation, cooperation, accountability and transparency, gender equity, and intergenerational justice.

These broad value perspectives are of concern globally, but they also mattered to respondents interviewed for this study. Whereas some referred to them explicitly, others considered them implicitly, when highlighting problems with water management in the Ewaso Ng’iro River Basin. Where water management practices violate governance-related values, it typically leads to conflict, opposition, or frustration among water users and managers. Below, the two main perspectives are explained with reference to the specific situation in the case study area, with the next subsection introducing concrete examples

of how an efficiency-oriented values perspective plays out in practice in the case study area, and the subsection after that introducing the social justice-oriented values perspective.

Efficiency-oriented values perspective

Whatever money is coming to help people, [investment in water projects] should be done in such a way that it doesn't have to be popular; it has to be right. (Civil society representative)

Efficiency and effectiveness were perhaps the most dominant concerns of respondents. Although these values are similar and related, they are not the same (Akhmouch et al., 2018). Effectiveness concerns whether a policy or water management intervention will actually achieve the claimed impact, and very often, respondents felt that even good policies should not be adopted, because they were seen as unworkable in practice. For example, compensating farmers for damages caused by wildlife was universally seen as a desirable policy, but there were strong concerns about its effectiveness, given that the responsible government department lacks the financial resources to actually pay, causing additional frustration among affected farmers. Alternative, more effective policies may thus be preferred.

Efficiency, in turn, is about achieving the best possible impact with given resources (or using the smallest amount of resources to achieve a desired outcome), be it water, money, or land (Akhmouch et al., 2018). Again, this was a strong concern to almost all respondents. For example, many respondents, including small-scale farmers themselves, felt that irrigation on small plots was often unnecessarily wasteful. One respondent expressed this as follows:

So, you realise that [small-scale farmers] take the water, it is God-given, so, they waste it. So, we are looking also at efficient water use, you have taken the water, you have denied the people downstream, you have denied the wildlife, you have denied everybody. The whole of that area has got this very rich biodiversity, you are denying everybody. (Civil society representative)

This concern for the value of efficiency in a context of severe scarcity is perhaps to be expected. However, respondents had many different views on how to achieve efficient resource use. The shared understanding that efficiency matters to everyone is a necessary first step to come to an agreement about solutions (see also 'Linking values with water management and policy'). One respondent also suggested that efficient water use is not enough to ensure sustainability of water resources:

Large-scale users [...] say they are very efficient on water use. But I think efficient can only take you so far. If you are growing 1 acre inefficiently or when you become efficient and you grow 10 acres, eventually you are abstracting more water than the one inefficient user. So, I think there is a huge gap there, my perception is that water is not enough and as it is, it is not going to be sustainable, unless people ... [...] we need to train our people on the value. (Researcher)

This concern about the efficiency of irrigation is shared globally, because many empirical studies have found that increases in irrigation efficiency may not necessarily lead to water savings and may paradoxically even increase the total consumption of water, as irrigators expand their activities (Pérez-Blanco et al., 2020).

Less frequently mentioned but important components of this first set of related values (see values marked in blue in [Figure 2](#)) were also the values of adaptability, simplicity, and competition. Adaptability refers to the ability to quickly adapt to novel circumstances and is often discussed in the context of climate change (Cheng et al., 2022). One respondent suggested that some pastoralists had adapted to the drier climate by switching from cattle ranching to camels. There were several examples for putting the value of simplicity in practice, which may directly contribute to effectiveness. One civil society representative mentioned how they had simplified potentially complex water laws and regulations

... so that even those who haven't been to school can be able to understand what it is they are supposed to do, or somebody in the street that comes and settles here will know what does the Water Act mean. (Civil society representative)

Competition or competitiveness, although perhaps the dominant overarching value within a market economy (cf. Ansink & Houba, 2012), was rarely referred to, and not normally considered to be desirable. One private-sector representative explained:

there's a tendency which is a bad tendency, is, sometimes [...] no one wants anybody to benefit. So, it sort of gets stalled so that no one can take advantage of something [...] I don't want him getting ahead so, everything sort of gets stopped, which is a shame. (Private-sector representative)

Others felt that Kenyan farmers needed more support to be able to compete with their Tanzanian and Ugandan counterparts.

Social justice-oriented values perspective

The social justice-oriented values perspective contrasts in many ways with an efficiency-oriented values perspective (León Montealegre & Roa-García, 2023). For example, involving stakeholders and citizens in decision-making about water is costly and time-consuming, even if it may lead to a greater sense of social justice within the population. Some may also argue that greater participation can lead to ineffective decision-making, where decisions are blocked, perhaps due to a lack of knowledge. In the case study area, the controversy around the stalled construction of the Crocodile Jaws dam captures this value conflict well (cf. Bersaglio et al., 2021); although local activists were able to influence the decision, stalling the project and, from their perspective, achieving social justice, many other respondents felt that not building this dam was a great loss, and that it was a good example of lacking efficiency and effectiveness, because the free-flowing river can be interpreted as a symbol for the waste and/or non-achievement of economic opportunities and objectives, a common motive for dam construction worldwide (e.g., Adams, 1992; Kingsford, 2000; Parry & Norgaard, 1975):

So, to me, it is a sad day to see that the Crocodile Jaws project didn't take off, but it was also a government problem because they did not involve the people properly. Even the county integrated development projects, some of them are very good. But then, the way they are introduced to the people is questionable. But of course, public participation is a very expensive thing. We are wasting more money sitting down, collecting people who have no ideas and expecting them to say something. People should be given the opportunities, but you also need people who can be able to meaningfully do it, so, you don't know where to put the balance. (WRUA Chairperson)

A more positive and mostly supported example for achieving social justice and cooperation was the construction of common intakes for water supply (cf. Ulrich, 2014). These were seen as a technical solution to allow diverse groups of water users to enable a fair allocation of water resources. Common intakes also relate well with two other, similar values, that is, transparency and accountability. Whereas the use of water via individual intakes cannot be controlled easily, common intakes add a great level of transparency and were often considered an almost ‘magical’ solution to reduce intra-community water conflict. They also add accountability, given that communities take decisions about water use jointly, and their impact will be felt in the same place, allowing decision-makers to be held to account. A representative of a community forestry association in the river basin provided another example for the value of accountability, stressing how all of their activities are guided by a forest management plan, and how every stakeholder or user can hold them accountable to this plan, which is accessible to all.

Finally, gender equality and intergenerational justice, that is, a concern for the well-being of youth and future generations, were considered important values by some respondents (cf. Murray et al., 2023; Widomski, 2014), which are also associated with this perspective (see values marked in yellow in Figure 2). One respondent explained the importance of considering gender in the formation of WRUAs:

In the management committee, we say it is not complete when one of the genders is not there. [...] We have gone another – I can say, another step ahead, we have defined also the criteria, you are not supposed to be just there, because you are female or you are a lady and you have no voice. So, we have said we want people who can advocate and then we have also given a direction of the location. (Government representative)

Linking values with water management and policy

Valuing water is not just about abstract values and principles. Valuing water is also about considering how water management and governance may be designed to contribute to meeting a variety of contrasting values in practice. Values are everywhere, although normally left implicit. In this section, we build on previous work that has shown how various water management paradigms and strategic priorities can be linked to implicit values, which nevertheless guide the decision-making of water professionals: Schulz et al. (2024) identified three values-informed archetypes of water management and policy through their global online survey, which they call ‘mastering nature’, ‘market-based water management’, and ‘working with nature’. In this section, we show how these archetypes and associated values may be relevant for our case study, ground-truthing them.

Mastering nature: technological solutions and building water infrastructure

For me my request and my plea to the stakeholders who want to add value: I would request let’s embark on water harvesting storages. (Government representative)

Under the national government, under the Ministry of Water, they should do the bigger dams, the mega dams. At the county level they should [...] do the small dams, [...] at institutional level, where we have the schools and the hospitals, the social amenities [...]

do the rainwater harvesting, the roof harvesting or you can also do the pans. Then at the [...] individual farm level those storages, it is perfect. (Government representative)

Throughout the history of humanity, people have sought to manage and improve water allocation through the construction of physical infrastructure. This desire to control and master natural water resources is reflected in storage tanks, dams, water pans, roof water harvesting, pipes, intakes, and many other components of water infrastructure (cf. Faulstich et al., 2023; Käkönen & Nygren, 2023; Kim et al., 2023). A major focus of water infrastructure is to provide water for domestic use, including drinking water, but in terms of other assigned/water values, such infrastructure is commonly linked with economic values, for example, related to the production of agricultural goods, or hydroelectric energy (Schulz et al., 2018). In the Ewaso Ng'iro River Basin, this is also clear from the fact that commercial farmers have been able to build advanced water storage systems, allowing them to have a reliable supply of water, even in the dry season. In contrast, building water infrastructure for cultural or environmental reasons is rare, although some respondents noted positive side effects on the environment; for example, large dams may enable the maintenance of environmental flows even in the dry season, this way preventing animal migration from drier downstream areas to the uplands.

Water infrastructure also has implicit links with governance-related values. The most obvious link is perhaps with the value of efficiency. Using drip irrigation may reduce waste of water (but see Pérez-Blanco et al., 2020); building dams, small and large, makes irrigation more reliable and effective. Links with social justice are less obvious, although may also be construed, with common intakes being one example of an infrastructural investment that may lead to more participation, transparency, social justice, and accountability. This broad appeal is perhaps why the construction of common intakes was relatively popular among respondents.

Some water infrastructure may negatively impact governance-related values. An example could be the construction of ever-deeper boreholes to source water for irrigation (cf. Funder et al., 2010). Some respondents suggested that the hydrological and ecological impacts of borehole water abstraction on groundwater resources and neighbouring ecosystems were not sufficiently understood, leading to problems with transparency and accountability. Others warned of the risk of creating conflict and reducing cooperation where boreholes were built serving multiple communities who may not necessarily get along and might thus begin fighting over water access.

Market-based water management: managing water through payments and charges

You must put a value on water, I am a strong believer in that. There must be value to this resource that is shared among people and you, you are lucky to use it. You must produce something to go to sustain the source of this water that you are enjoying. I am a strong believer in that. So, water has value and we must be able to pay something towards it. (Civil society representative)

Valuing water is often understood as appreciating its value in economic terms, allowing management and control through payments and charges (Grafton et al., 2023). This can be thought of as a water management paradigm that is closely linked with the

recognition that water is an economic good, made popular around the world through the 1992 Dublin Principles (Warner et al., 2006). Consequently, the role of payments in water policy and law has grown over the years (Dias Simões, 2017). Many respondents believed that having a better link between payments and water allocation could address many, if not most, water management issues, as is also evident from the above-cited quote (cf. Hanjahanja & Omuto, 2018).

In Kenya, there is a legal requirement that abstracted water is paid for, although this is not (yet) widely enforced. Where water is used for the production of commercial goods (or economic values), including agricultural produce, paying for it seems natural, and can be interpreted as a cost of production or investment; but some respondents also saw potential in applying charges to manage water for ecological benefits, to avoid overuse, or incentivize ecosystem restoration (cf. Yuan et al., 2019). No synergies were found between payments and cultural values – traditional ways of managing water evolved without the need to introduce payments and paying for water is at odds with the idea that water has spiritual value or is sacred:

The government says water is a resource and a resource which must be paid for, it's in Kenyan law. [...] [The citizens], they say water is from God [...] it becomes hard work to train them to understand, that water is a resource. (WRUA Chairperson)

However, among respondents, who all had a professional interest in water, the idea of paying for water had widespread support. In particular, paying for water was closely linked with the value of efficiency (cf. Charara et al., 2011). What is paid for (and measured through water meters), will not be wasted, as expressed by a respondent as follows:

The smallholder who pays for their water or has got a well, they're incredibly efficient. The smallholder on a community scheme where they're not paying a water fee and it's just, it's a free resource effectively [...] If it's free they'll take advantage of it right, as we all do somehow, maybe it's a human condition. But I do, I think 90% of the problems of water conflict would be resolved if everybody was paying and everybody had a sense that there was a real value to it, yes. (Private-sector representative)

Yet, most also noted challenges and concerns about water charges, many of which were associated with governance-related values. In particular, excessive water charges were noted as a social justice concern (cf. Enqvist & van Oyen, 2023; Martins et al., 2013; but see Perez-Pineda & Quintanilla-Armijo, 2013), because poorer water users would not be able to afford them, exacerbating their economic situation, while giving greater access to water to large-scale users with the means to pay for them:

You know, water is a resource, it's a resource which must be paid for, if not paid for, many, many people will misuse it. But it must be, payments of water, must be in line with the economy of the country, so, that they should not be charged excessive. (WRUA Chairperson)

Similarly, some respondents acknowledged that there is a risk that the payments that sustain WRUAs may be seen as a vehicle to gain political influence inside these organizations, where some water users can afford to pay much more than everyone else, negatively affecting stakeholder participation and justice. WRUA managers and also large-scale water users interviewed for this study sought to actively counter such developments, either by empowering stakeholders with fewer financial resources (from a WRUA

perspective), or by withdrawing from WRUA activities (from a large-scale water user perspective, to avoid being drawn into local politics, despite the potential gain in influence).

The actual implementation of charges caused many concerns and frustrations. One respondent felt that charges for water were too low and paled in comparison with the much higher cost of the initial investment in water access infrastructure, providing insufficient incentive to use water efficiently. Others felt that water charges were a punishment for the well-organized, because they are not collected from those users who are not following water laws and regulations:

You suddenly find you pay and you're still expected, well, then there seems to be a scheme to sort of increase the charges. But you go, 'But if you just collected from everybody you would have 10 times the revenue.' Rather than just the 10% of people who are paying, charge them 10 times more. (Private-sector representative)

There was also concern about the lack of transparency about how the money collected would be used, and the accountability of government entities spending it. The relationship between government and water users may sometimes be problematic, where water users feel they receive no benefit for their payments, whereas authorities are frustrated about enormous levels of illegal water abstraction, which they are unable to fully control (cf. Mutiga et al., 2010).

To summarize how respondents thought about payments and water charges in terms of governance-related values: in the best of cases, payment-based water management creates transparency, efficiency, and even social justice, where people receive the water that they paid for, and adjustments are made to account for different levels of economic status, to achieve an equitable allocation. Designed poorly, water charges can create novel injustices, where only those with financial capital are able to afford water, excluding those who need it most.

Working with nature: using nature-based solutions for managing water ecosystems

The major and the key is conservation in the catchment, the water sources. Because even if you have a big storage and there's no water to fill the storage that does not make sense. [...] if you go downstream, you even find the land is bare, there are no trees. They have used it as a source of livelihood, they have used it for charcoal burning as fuel. They cut the trees and then the trees take too long to grow, you find now the land is bare. [...] So, if the catchment is properly conserved, that will increase the yield from the area of the springs, they'll maintain the wetlands and the water will flow. Because even if you have infrastructure in big quantities and there's nothing to flow to the infrastructure the challenge would remain. But if you have both it will work. (Government representative)

Recent years have seen a renewed focus on ecosystem service-based approaches for managing water (Niasse & Cherlet, 2015); similarly, there is a growing trend to focus on nature-based solutions (Diep et al., 2022). This trend is also present in Kenya, as one respondent remarked:

... currently the country wants to go green, if you have a tree nursery, other groups can be buying from you. And then even the government departments can buy, to plant in there, to grow them in the water towers, the water sources. (Government representative)

The shift towards ecosystem restoration was considered fundamental by some respondents; they explained that neither water infrastructure nor payments for water would be of use in an environment with no water to distribute, due to ecosystem degradation. They also stressed synergies between approaches; support for ecosystem services-based approaches does not necessarily imply rejection of other ways of managing water. A common approach to restore ecosystems and springs is to plant water-friendly trees (cf. Shaban et al., 2016), an activity that is often sponsored by local and foreign donors, as one respondent explained: 'If we plant trees, water friendly trees then, you know, it can even pull rain. It can also stop strong winds. And erosion' (WRUA Chairperson).

However, several respondents felt uncomfortable about the concept of planting trees, which they felt was insufficient to restore degraded ecosystems:

You plant the trees because it is on the onset of the rains, you don't go back to tend for the trees. I hated that, if a stakeholder tells me about planting, I'll tell him kindly: 'Please, can we grow them, growing you take good care of the tree until it is at the reasonable age, and you can leave it now to mature.' But the issue of planting is, it's hit and run. (Government representative)

Another remarked:

Planting trees doesn't help, first of all, you need [the demand], the market, you need to have policy of where the riparian goes. It needs to be enforced, anybody coming within the water system should be kept off. Two, you need to grow, not plant trees, you need to grow the proper trees. [...] It is nonsense, we have no money to waste. Anything, whether it is a dollar or a sterling pound, let it be used properly and the people should be accountable for it. (Civil society representative)

Neither of these quotes suggests that planting trees is not required, but rather, that planting trees is only useful where the value of accountability is present. If there is no commitment and oversight to ensure that planted trees survive until mature, then there is indeed a risk that money will be invested without benefit for water resources, an exercise that might be repeated every few years.

Conclusions

The *valuing water* paradigm has been gaining traction in global water policy, but there is still a lack of clarity of what this may mean in practice. In this paper, we have proposed concrete ways of how this global proposal for a new paradigm can be translated into a regional water management context, with the aim of expanding the empirical evidence base underpinning global discussions. This can only be a first step within a longer and broader process of translation or operationalization of this paradigm, that will ultimately require extensive cooperation between committed researchers and relevant decision-makers. We provide insights from interviews with relevant stakeholders, water users, and government representatives in Northern Kenya that demonstrate how various elements

of the valuing water paradigm may present themselves in the concrete case study context, this way ground-truthing it.

Using the VLA as our conceptual framework to guide the identification of these elements, we suggest that as a first step, valuing water requires mapping assigned/water values and governance-related values held by relevant stakeholders, water users, government, and citizens, in a given location. We also find that three values-informed, broad water management archetypes ('mastering nature'; 'market-based water management'; 'working with nature'), previously identified through statistical analysis with quantitative data (Schulz et al., 2024), are of relevance in the case study context in Northern Kenya. Although such mapping of assigned/water values is not new per se, the joint consideration of assigned/water values with governance-related values represents a more systematic and explicit approach for putting the valuing water paradigm into practice that has thus far been lacking within water policy frameworks globally. Our observation that the three values-underpinned archetypes described above can be 'observed' in practice is another noteworthy contribution of this paper – this suggests, perhaps counterintuitively, that valuing water does not require the reinvention of existing water management approaches; rather, it requires a more reflective and political approach in choosing among them, not least mindful of power imbalances between involved parties, making this arguably the most politically explicit of water management paradigms.

Accordingly, a second step will be to ensure that water management appropriately combines archetypes in line with competing stakeholder demands and perspectives, rather than considering any one of them as a universal solution to water issues, although this is a task for local water governance, and not the primary focus of this paper. Participatory and collaborative institutions can serve as relevant decision-making forums for this purpose, where the negotiation between shared and contrasting values can take place. In the Kenyan context, WRUAs would be ideal for valuing water in practice, given that these already have formal support through the Kenyan Water Act 2002. It is worth noting that there has been a global trend towards such participatory institutions and multi-stakeholder governance of water, in line with the earlier aspirations of IWRM, on which the valuing water paradigm can build. That being said, countries of the Global South may face particular challenges with this, as decisions about water are often taken through a mix of formal and informal water management institutions (Lukat et al., 2022), and a coordinated and negotiated approach that involves all relevant stakeholders, water users and their values may thus be more difficult to realize than in the Global North (although this is a broad generalization and specific scenarios will vary across local, regional, and national contexts).

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