

The Value Base of Water Governance: A Multi-Disciplinary Perspective



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ABSTRACT

Some scholars promote water governance as a normative concept to improve water resources management globally, while others conceive of it as an analytical term to describe the processes, systems and institutions around the management of water resources and water supply. Critics often highlight how specific water governance scenarios fail to deliver socially desirable outcomes, such as social justice or environmental sustainability. While water governance is often perceived as a technical matter, its conceptual and practical components are in fact based on multiple values that, nonetheless, often remain implicit. The present paper seeks to uncover this value base and discusses existing research on values from multiple perspectives, using material from economics, philosophy, psychology, and other social sciences. In different disciplines, values can be understood as fundamental guiding principles, governance-related values or as values assigned to water resources. Together, they shape complex relationships with water governance, which from an analytical perspective is understood as a combination of policy, politics, and polity. Introducing a new conceptual framework, this study seeks to provide a theoretical foundation for empirical research on water governance processes and conflicts.

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1. Introduction

Water governance is being promoted, at least since the 1990s, as a normative concept to improve water resources management globally, with a focus on increased stakeholder engagement, flexibility, and less hierarchical forms of interaction between the state and society. At the same time, water governance is subjected to continuous criticism for not being sustainable, equitable, or democratic. Water governance, as well as its criticisms are heavily influenced by value judgments of all the actors involved. This value base, however, usually remains implicit and is rarely investigated (Glenk and Fischer, 2010; Groenfeldt and Schmidt, 2013). This paper aims to develop a theoretical foundation for investigating the role of values in water governance processes.

Research on the value base of water governance is complicated by the complexity of water governance and value concepts. This paper therefore proceeds by discussing various meanings of water governance, before introducing multiple perspectives on values, a term that is of central importance to economists, philosophers, psychologists and other social scientists. Water governance may refer to a theoretic

ideal which prescribes that government organisations should jointly tackle water management issues with stakeholders and civil society, rather than act by themselves in a top-down manner (Castro, 2007; UNDP, 2004). In the literature, this perspective is known under the headline of “the shift from government to governance” (Walker, 2014). Alternatively, water governance describes an analytical approach to researching water management processes, which is more generally concerned with state-society relations within water management. Values can be understood as guiding principles or abstract goals that people seek to uphold in decision-making. In relation to natural resources, values can also be understood as expressions of the importance and meanings that are assigned to them. This paper proposes a new conceptual framework for investigating value-governance relationships. The framework, which is also relevant to other areas of environmental governance, integrates these multiple strands of theory on values and water governance into one interdisciplinary approach.

2. Water Governance as a Normative and Analytical Concept

There are several competing understandings of the term ‘governance’ and, consequently, of water governance. Governance may firstly be understood as a *normative* concept, which advocates that government organisations should work with stakeholders and society in political steering processes (Hill, 2013). It represents a ‘shift from government to governance’ (Walker, 2014), that is, from rigid forms

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of rule enforcement to more flexible and interactive mechanisms of public engagement and supposedly shared decision-making. It is thus normative with regard to the decision-making process itself, without making any claims about the content of such decisions. This conception of governance has been developed in the context of liberalising state reforms in reaction to persistent criticism of the failures of the previous model of public administration associated with Fordist policies (Ioris, 2014) and is therefore opposed to hierarchical forms of interaction between the state and society which are perceived as outdated and inefficient. In the policy arena, governance is a concept often associated with 'Integrated Water Resources Management' and the Dublin principles, which also place public participation at the heart of the agenda (Benson et al., 2015).

There is considerable overlap with the intrinsically normative term 'good governance', which describes desirable properties of governance systems, such as strong public participation and consultation, efficiency, transparency, the absence of corruption, accountability, legitimacy, justice, and the rule of law (Tortajada, 2010). Both governance and good governance are being promoted by international organisations in the water context, e.g. the OECD (2013) water governance initiative.

Governance may alternatively be understood as an *analytical* concept, generally concerned with the relationship between state intervention and societal autonomy in political steering processes (Héritier, 2002) to understand public decision-making processes. Several different modes of governance have been discussed in the literature, ranging from hierarchical modes to networks and market mechanisms (Schneider, 2005). These modes differ with regard to the level of state intervention versus societal autonomy, with market-based governance being the most autonomous and decentralised form of governance. An analytical understanding of governance is widespread in political science. Governance has three different dimensions: polity, politics, and policy, i.e. institutional aspects, power relations between political actors, and the mechanisms and instruments used to achieve certain outcomes (Treib et al., 2007).

It is important to be aware whether an analytical or a normative perspective is applied. For example, the normative understanding of governance is conceptually close to the network mode of governance, given that networks are seen as a form of joint decision-making among public and societal actors (Schneider, 2005). While a normative stance on governance would advocate that governance should be characterised by joint decision-making, applying an analytical perspective would imply describing and analysing patterns of joint decision-making without commenting on their desirability.

In human geography and related disciplines, environmental governance and water governance have been frequently criticised because in their normative conception they contain highly simplistic, utilitarian claims about the expected benefits and alleged advantages (Ioris, 2014; Swyngedouw, 2005). While acknowledging that state reforms have created novel institutional arrangements within which political decision-making processes are performed, some scholars criticise a democratic deficit of these 'new' forms of governance, despite the fact that they are supposed to achieve greater inclusiveness and empowerment (Swyngedouw, 2005). Given the absence of well-established rules on participation in a society with marked asymmetries (Hajer, 2003), state actors may cooperate disproportionately with stakeholders who are more favourable towards government policy anyway (Swyngedouw, 2005). From this perspective, governance is thus perceived merely as an array of new 'technologies of government' that is part of the conservative modernisation of the state apparatus.

Furthermore, much criticism is directed to cases in which particular governance arrangements have been used to exclude parts of society from public services, such as urban water supply, creating social injustice. Case studies have been conducted from a political ecology perspective for example in Lima (Ioris, 2012) or Mumbai (Anand, 2011). Ioris

(2012) claims that water scarcity is artificially created and preserved by political elites using neoliberal water governance reforms, with the intention to perpetuate social inequality. In the case of Mumbai, its municipal water corporation has been allegedly systematically discriminating against Muslim settlers by providing only unreliable water supply to their settlements. Both cases highlight the political dimensions of water governance and how conflicts and injustices may persist despite institutional reforms. For political ecologists, water governance is rarely simply a set of neutral and objective tools.

Finally, neoliberal water governance as one common type of water governance has been attacked for its failure to produce socially and environmentally sustainable outcomes, often within a broader critique of neoliberalism, and the associated impacts of privatisation. Furlong and Bakker (2010), for example, found that neoliberal reforms within Canadian municipal water utilities seeking to increase the distance between government and management may reduce incentives to work towards social and environmental goals. However, they argue that conventional government-led service delivery may face other trade-offs, and thus call for "strategic (rather than ideological) improvements in governance" (ibid.: 349). Budds and McGranahan (2003) make a similar case in arguing that water governance problems in developing countries may be related to land tenure issues rather than public versus private water supply management.

In many cases, critics of water governance may not offer any resolution of the problems raised, especially if water governance is criticised on very fundamental, philosophical terms (e.g. Bustamante et al., 2012). The normative work of authors who focus on political aspects of water governance, e.g. citing a lack of democracy or equity, can be interpreted as part of a political and ideological struggle against the foundations of the dominant international water governance agenda, which in their opinion represents the interests of small political and economic elites in charge of water management reforms.

The normative defence of water governance and criticisms of particular water governance arrangements, such as neoliberal water governance, have something in common: they are both based on values. Values are sometimes listed explicitly as properties of 'good governance' (see e.g. Tortajada, 2010), but are mostly left implicit. Where authors criticise a democratic deficit, for example, they may be appealing to values such as social justice, transparency, fairness, and equity. The recurrent criticisms of neoliberal reforms in water governance do not stem from a general opposition to needed political and economic reforms, but should be interpreted as value conflicts; neoliberalism may violate values of equity for the sake of efficiency, for example. Or in more applied terms, cultural or ecological values of water may be sacrificed for economic values, for example where a river is straightened to facilitate navigation to support economic development, with detrimental impacts on river ecology and traditional livelihoods.

3. Values – A Multi-Disciplinary Perspective

This section seeks to shed light on and bridge competing understandings of the term 'value' with a heuristic discussion from different perspectives. It introduces understandings of value and their interrelations across a very diverse set of disciplines and discusses approaches towards the measurement and analysis of values. Due to limitations of space, not every discipline that deals with values (e.g. anthropology) has been discussed here and we leave an inclusion of other disciplines for further consideration in the future. At this point, our review focuses on the following four disciplines: environmental and ecological economics, whose concepts are pervasive in environmental governance more generally; philosophy, which has the longest history of discussing values and provides the foundations for all other disciplines; psychology, whose understanding of values is highly relevant for decision-making and has significant overlap with sociology and political science;

and geography, including political ecology, which covers human–environment interactions as have to be dealt with in water governance.

3.1. Economics

Within economics, the link between water values and governance is commonly addressed by the sub-discipline of environmental economics. Environmental economics is rooted in neoclassical economics, which has evolved into the mainstream school of economic thought today (e.g. Mankiw and Taylor, 2006). It is based on a conceptualisation of human beings as rational actors that aim to satisfy their substitutable preferences and make choices in a way that would maximise their utility, considering costs and benefits as well as uncertainties associated with every possible action (Dietz et al., 2005; Pearce and Turner, 1990). Welfare economics, which deals with allocation decisions affecting human well-being, assumes that such rational behaviour produces the best outcomes in terms of efficient resource allocation (Pearce and Turner, 1990). Welfare or human well-being is defined as the satisfaction of individuals' preferences, as long as these are not immoral or illegal, ideally through market exchanges. Preferences are considered as given and the analysis of their origin is usually beyond the scope of economics (Turner et al., 1994).

Social welfare optimisation requires resources to be allocated both efficiently and equitably. Government intervention may be justified if markets alone do not produce optimal outcomes for society. Market failures may occur under certain conditions, and collective choice or government intervention may correct these failures. To determine how resources should best be allocated, environmental economists estimate changes in human well-being associated with environmental change. Policies or programmes should be pursued if they enhance social welfare, understood as the sum of individual welfare changes. In this context, economic value is then defined as “the change in human well-being arising from the provision of [an environmental] good or service” (Bateman et al., 2002: 1), i.e., not the good or service itself is valued. To be able to compare these welfare changes in a single measurement unit within cost-benefit-analyses, monetary valuation techniques are commonly used to ascribe exchange values to environmental goods and services. These exchange values are determined by individual preferences and the extent to which individuals are willing to trade off scarce means (i.e. usually money) to obtain an environmental change, for example an improvement in environmental quality. Although ways to consider distributional impacts within cost-benefit analysis exist, in practice they are rarely applied.

Ecological economics has been established as an alternative school of thought that addresses environmental values and governance not necessarily in relation to exchange value. Combining insights from economics, ecology and other disciplines, ecological economics shares some of its methods with environmental economics, but differs in its underlying paradigm, i.e. the economy is perceived as a subsystem of the wider ecosphere and connected to the balance of energy and the exhaustion of biotic resources (Gómez-Baggethun et al., 2010). It also places greater emphasis on the social impacts of environmental governance. More importantly, however, ecological economics has tried to incorporate a multiplicity of value standards, as opposed to the single value of human wellbeing as in environmental economics (Martinez-Alier et al., 1998). Ecological values, economic values, aesthetic values and other values of the environment are each considered a value standard in their own right. Apart from using predominantly money as a unit of measurement of value, ecological economics also works with bio-physical indicators to determine environmental sustainability (Martinez-Alier, 2002). In philosophical terms, this represents a shift from value monism (human wellbeing as a single ultimate value, usually measured in monetary terms) to value pluralism. Value pluralists argue that there is a variety of basic values, which cannot be converted into each other or ranked according to an ultimate principle, i.e. values are incommensurable (O'Neill et al., 2008).

3.2. Philosophy

In philosophy, the study of values is known as ‘axiology’, which in turn comprises the fields of ethics and aesthetics. Environmental aesthetics deals with the sensory perception of landscapes and other environments and the qualities ascribed to these (Brady, 2003). For environmental ethics, one of the principal considerations is the notion of an ‘intrinsic value’ of the environment as a basis for environmental protection, which is commonly opposed to an ‘instrumental value’ for human well-being (which is key for environmental economics, as discussed above) (O'Neill et al., 2008). Intrinsic value is present when “the referent entity is an end in itself, such that the value is autonomous and independent of any other entity” (Lockwood, 1999: 382).

Some philosophers argue that ascribing intrinsic values is a way of claiming that it makes sense to care about certain things. Thus, the concept is seen as central for environmental ethics and may help people to understand why and how they should care about the environment (McShane, 2007). However, other philosophers argue that the concept of an intrinsic value of the environment should be discarded. They state that all values are inherently relational and, ultimately, decided by humans (Morito, 2003); or, from a pragmatic and empirical perspective, that the concept is unhelpful in motivating people to protect the environment (Light, 2002).

It is important to point out that there are several possible interpretations of ‘intrinsic value’ that sometimes, but not necessarily overlap. O'Neill (1992) distinguishes at least three types. First, intrinsic value may be a synonym of ‘non-instrumental value’, i.e., something has value for its own sake. With regard to the environment this claim has recently been made for example by ecosocialists (Kovel, 2014), conservationists (McCauley, 2006) and earlier by deep ecologists (Naess, 1984). Second, intrinsic value may refer to an object that has intrinsic properties, i.e., properties of a ‘non-relational’ nature that reside in an object. Third, intrinsic value may refer to some sort of ‘objective value’, i.e., value is present independent of human valuers, although this claim is often rejected and sometimes used to discredit the concept of an intrinsic value of the environment altogether (Morito, 2003). In environmental and ecological economics, intrinsic value usually refers to the first type, which has also been denoted as ‘end value’ (Lockwood, 1997).

There are also varying definitions of what intrinsic value should extend to, i.e. which objects constitute ‘the environment’ that may or may not be bearers of intrinsic value. McDonald (2004) summarises this debate stating that philosophers differ in their degree of radicalism. Some may ascribe intrinsic value only to higher animals, or to all living beings, or even to non-living beings. They also differ in the sense that some ascribe intrinsic value to individuals, while others have a more holistic perspective and ascribe intrinsic value to the survival of a species or ecosystem. Ecocentrism refers to the notion that ecosystems are bearers of intrinsic value, while in biocentrism all living things bear intrinsic value.

The philosophical debate of intrinsic values can also help us to understand and criticise the concept of ecosystem services, which has become a common way to frame properties of the environment in academic publications and policy documents alike (Gómez-Baggethun et al., 2010; MA, 2005; Martin-Ortega et al., 2015). It is equivalent to stressing the instrumental value of the environment to humans. Ecosystem services have been defined as “the benefits people obtain from ecosystems” (MA, 2005: 53). While the classification of ecosystem services into supporting, provisioning, regulating, and cultural services is a broad interdisciplinary undertaking with an origin in ecology, the definition of the concept of ecosystem services is fundamentally a question of environmental ethics, since it favours an anthropocentric approach over biocentric and ecocentric approaches. The division of benefits of the environment into different ecosystem services also raises philosophical questions on the incommensurability of multiple types of value as outlined in the brief overview on ecological economics in the previous section. Especially cultural values are characterised by incommensurability and intangibility and are thus often left out in economic

valuations, which leaves researchers calling for alternative value measurement techniques (Chan et al., 2012).

Generally, it appears that most axiologists have an affinity towards deliberation as a tool to 'measure' values, including both aesthetic and moral values. Such deliberation may include experts and non-experts in a given field or location (Brady, 2003). For environmental governance, citizens' juries, consensus conferences, and deliberative polls have been suggested as alternatives to economic valuation methods (O'Neill and Spash, 2000), while in water governance, river basin committees are probably closest to this theoretic ideal (van den Brandeler et al., 2014). From a logical point of view, deliberation as a method is important, since practical conflicts about values cannot be resolved by resorting to 'higher-order values' or general principles as these may face the same problem (O'Neill, 1993). Moreover, values can often not easily be separated from each other and scoring high on one value scale could be problematic in the wrong context. Efficiency, for example, could be seen as undesirable if characterising a process of natural destruction.

3.3. Psychology

Values are important in social psychology and environmental psychology. There is also significant overlap with sociology and political science (Dietz et al., 2005). 'Value' in psychology generally refers to 'held values' (Lockwood, 1999), defined as "desirable, transsituational goals, varying in importance, that serve as guiding principles in people's lives" (Schwartz, 1996: 2). As such, held values may influence preferences or attitudes, which in turn determine how people assign value to certain objects or settings (Brown, 1984).

Many psychologists and sociologists thus view values as independent variables that have some causal effect on people's preferences and on individual valuation processes (Hitlin and Piliavin, 2004). Over time, this simple model has been refined. One such example is Stern et al.'s (1999) 'Value-Belief-Norm Theory' of social movement support, applied to environmental activism. In this model, values determine environmentally friendly behaviour, mediated by beliefs and norms.

Another theory widely applied to explain environmentally friendly behaviour is the 'Theory of Planned Behaviour' (Ajzen, 1991). An individual's behaviour is closely determined by his/her intentions. These intentions, in turn, are determined by attitudes towards the behaviour, subjective norms and perceived behavioural control. While values are not an element of the original theoretical model, it has sometimes been adapted to include them (see, e.g. De Groot and Steg, 2007). Moreover, one could assume that subjective norms are a consequence of personal values as in the Value-Belief-Norm Theory. This appears to be a matter of how 'deep' one wants to trace causal chains of people's behaviour in their personality. As values are situated at a more fundamental level, they have less predictive power than behavioural intentions.

Empirical research in environmental psychology often aims at explaining environmentally friendly behaviour through a causal chain or cognitive hierarchy from values to attitudes and behaviour (Homer and Kahle, 1988). According to the most recent literature, there are four types of values that determine environmentally relevant beliefs, preferences, and actions, namely 'hedonic', 'egoistic', 'altruistic', and 'biospheric' values (Steg et al., 2014). Correlations between certain value clusters and behavioural patterns, beliefs or preferences are investigated. The social psychologist Shalom Schwartz developed the 'Theory of Integrated Value Systems' (Schwartz, 1992, 1996). It assumes that individuals adhere to different value systems that are composed of ten individual values organised in a circular structure according to two basic dimensions ('openness to change' vs. 'conservation' and 'self-enhancement' vs. 'self-transcendence'). Schwartz (1996) states that values only affect individual behaviour when a decision causes a conflict between values and a trade-off is required, i.e., multiple values cannot be addressed simultaneously.

The strong empirical focus within psychology means that measurement techniques have developed over a long time. Several standardised tools are readily available that measure, for example, the ten values of the Theory of Integrated Value Systems with 56 survey items (Schwartz, 1992) or the four dimensions or value clusters of the same theory with 12 survey items (Stern et al., 1998). Environmental psychology tends to have a strong tendency towards quantitative methods and its concern with the statistical validation of certain measurement tools appears to be rooted in a postpositivist epistemology (Creswell, 2009).

3.4. Human Geography and Political Ecology

Values are not a key concept in human geography. However, a long tradition of studying human-environment interactions in human geography justifies taking geographical literature on values into account. The most distinguishing feature is probably the emphasis on the historical and geographical specificities of values. Sr. Buttner (1974), for example, in a review of "values in geography", mentions that definitions of value may differ within different cultures. Ioris (2011: 872), in turn, defines values as "dynamic assessments of worthiness that emerge out of socioecological interactions and the continuous interplay between demands and opportunities", lining human geography in the list of disciplines that deal with assigned values, rather than held values. He also introduces the concept of 'water value positionality', which is to be understood as a combination of the different meanings or use values of water (including more abstract uses, such as religious meanings), expressed by different stakeholder groups in a specific time and location.

Both concepts ('positionalities' and 'values') are highly adaptable to local contexts, open and flexible. In fact, Ioris (ibid.) argues that values should be defined according to concrete experiences and actual reality, rather than according to preconceived theoretical constructs, such as ecosystem services. Furthermore, geographers place a strong emphasis on the multi-dimensionality of values, which may be material, symbolic, socio-economic, etc. Therefore, they are often very critical of monetary valuation and tend to follow philosophers in the idea that there are inherent or intrinsic values in nature (Harvey, 1996). Studying cultural values of landscapes, Stephenson (2008) proposes that these are dynamic interactions between forms (such as the existence of a river), practices (such as fishing) and relationships (such as the aesthetic appreciation of a landscape), encompassing both human and non-human dimensions, as well as their present and history. Many geographers also draw attention to the fact that valuation processes are often highly politicised, i.e., they represent a struggle between different groups of society (Ioris, 2011; Upton, 2014).¹

This is also one of the central claims of political ecology, which is significantly rooted in human geography. Political ecology can have an important role in analysing valuation conflicts. Where different actors disagree on environmental values and valuation methods, it is a political decision which values will be given priority (Bryant, 1998). Another common approach to values in human geography consists in a critique of contemporary environmental governance by pointing out the focus on exchange values of nature as opposed to use values, following classical economics and Marxist theory (see, e.g. Robertson and Wainwright, 2013). Unlike use values, exchange values are typically expressed in monetary terms and are not necessarily indicators of the concrete usefulness of an object or product (Kallis et al., 2013). The prioritisation of exchange values is considered to be a result of processes of 'commodification' or the creation of new markets in areas that were previously non-marketed (Gómez-Baggethun and Ruiz-Pérez, 2011).

¹ There are many different types of geography which differ in their approach towards values, e.g. cultural or historical geography, but will not be discussed in depth here.

4. Linking Values and Water Governance – A Conceptual Framework

The central argument of this paper is that studying values enhances the understanding of water governance, and vice versa: water governance can reveal something about the values of actors involved. As discussed above, there is a diverse literature and contrasting epistemology of both values and governance. However, studies concerned with linking these fields are less common. Amongst these are studies trying to understand the effect of religious values on water governance, for example in Islamic countries, where religion, law, and governance are often closely related (see e.g. Foltz, 2002 on water governance in Iran). Water ethics is another field that deals with the connection between values and water governance (Groenfeldt and Schmidt, 2013). Ethical principles that have been identified may serve as guidance in water governance (e.g. Liu et al., 2011).

Political ecologists routinely connect values and governance, but their work is focused heavily on a critique of capitalism and is thus mostly concerned with issues of social justice and equity, rather than values in general (e.g. Kallis et al., 2013). Finally, many ecological economists are very aware of the plurality of value standards and related 'languages of valuation' (Martinez-Alier, 2002). Yet, the concept of languages of valuation is very fuzzy and stands for many different things, including institutions, values, cultural traditions, and valuation methods. Multi-criteria analyses are often used in case studies that aim at incorporating multiple values (e.g., Munda, 2004; Scolobig et al., 2008). Such multi-criteria evaluations are usually designed to inform concrete policy decisions and focus on different values of the environment or ecosystem services, rather than personal or social values as understood in psychology.

Finally, there are also a number of studies which investigate the link between values and water governance from an interdisciplinary perspective. Glenk and Fischer (2010) combined insights from social psychology and environmental economics to study preferences for certain water management strategies among the Scottish public, which are in a cognitive hierarchy model related back to fundamental values such as 'self-transcendence/conservation' and 'self-enhancement', but also governance-related values such as 'sustainability', 'solidarity', and 'efficiency'. Several Australian researchers have explored the implications of indigenous water values for water governance and how these may or may not be compatible with 'Western' notions of water values and water management, e.g. focusing on water variability (Gibbs, 2010), water markets (Nikolakis et al., 2013) or social justice (Jackson and Barber, 2013). Further interdisciplinary research has tried to understand the role of social values in the context of uncertainty and long-term planning in water management (Syme, 2014) as well as for risk management (Daniell et al., 2008). Finally, Syme and Hatfield-Dodds (2007) reviewed how understanding and engaging the public's values may improve water management, discussing both values attached to water (environmental, social, economic values) as well as values related to governance itself (fairness, equity).

Any water governance issue, but especially conflicts around water governance can be interpreted as conflicts of values between different stakeholders. In Glenk and Fischer's (2010) case study, members of the public who valued solidarity also had a stronger preference for a council insurance as a measure of coping with a climate-change-induced increase in flood risk that spreads the financial burden across society. Other water governance issues, such as dam building, pollution, water charges, and fishing, are conceivably equally characterised by the value systems of stakeholders involved in these issues. The idea of studying values to understand governance is not new. However, while some studies are conducted from a monodisciplinary theoretical base (see e.g. Hermans et al. (2006) for a study which explains conflicts in terms of economic values of water or Groenfeldt and Schmidt (2013) for a perspective from ethics), others have a very broad and inclusive understanding that would benefit from some systematisation. Presenting the general public's thinking on water values and attitudes around

water, Hatfield-Dodds et al. (2006/2007: 46) for example suggest that: "[t]here is a strong element of public good thinking, acknowledgement of environmental rights, and support for the efficient use of water for Australia's overall wellbeing" thus including very different value concepts such as efficiency or environmental values of water.

The first step in value-based studies of governance should be to clarify the understanding of values. It should be especially fruitful to take an interdisciplinary perspective, i.e. integrating theory and methods from multiple disciplines and crossing boundaries between these (Tress et al., 2004). In some cases, epistemological differences may pose barriers to an interdisciplinary dialogue, e.g. between human geographers and environmental psychologists, but eventually it is a choice of the individual researcher to either overcome these or risk ignoring information relevant to a comprehensive investigation of real-world issues. Water governance is an ideal field to study different dimensions of value, because it inherently requires dealing with competing opinions and perspectives. Investigations are not only of academic interest. Liu et al. (2011), for example, suggest that a transformation of human water ethics and related values may be a more efficient solution to water governance problems than regulation.

The following paragraphs present a new conceptual framework that could serve as a theoretical foundation for the analysis of the multiple links between values and water governance (Fig. 1). The different components of the framework are introduced first, followed by a characterisation of the relationships between these.

The framework considers water governance from an analytical perspective as described at the beginning of this paper as being composed of the elements of politics, policy and polity (see also Treib et al., 2007). These elements of water governance are related with three different value categories distilled from the previously discussed disciplines. The concept of fundamental values is taken from social and environmental psychology. It encompasses abstract transsituational goals, such as universalism, benevolence, conformity, tradition, security, power, achievement, hedonism, stimulation and self-direction, as introduced by Schwartz (1992, 1996). Alternative frameworks that have a similar understanding of values have been developed e.g. in the context of the World Values Survey which gives a central position to the contrast between survival values and self-expression values as well as between traditional values and secular-rational values (Inglehart, 2006). The concept of governance-related values is less well-established, but is based on work of Glenk and Fischer (2010) and normative work on governance in several disciplines, including human geography, political ecology, and policy studies (see e.g. Lockwood et al., 2010). Examples are solidarity, efficiency, sustainability, transparency, legitimacy, social justice and other idealised characteristics of water governance. These properties are expressed as desirable by individuals and groups with regard to water governance or governance in general. Assigned values, or water values, are those values that humans ascribe to water, thus incorporating the perspective of environmental and ecological economics, environmental philosophy, as well as human geography. Assigned values of water make reference to the uses of water, such as for drinking, sanitation, recreation, navigation, irrigation, biodiversity, fishing, aesthetics, cultural purposes, and more.

There are commonalities but also important differences between all three categories of values. Most importantly, they differ in the locus of values, i.e. where the valuing person locates the values in question. Assigned values are located in an external object, which for the purpose of this article are water resources of any kind. Values reside in a river, for example, because it is used for navigation, because it can be used for irrigation and domestic use, or for recreational activity. The river can also be the locus of aesthetic values that only exist as long as the river exists. Assigned values are therefore often context-dependent, and the context may include physical features of the local geography.

Fundamental values are located inside people, either individuals or groups. People are looking to realise them in different situations and they can therefore guide their behaviour. Because of their abstract and

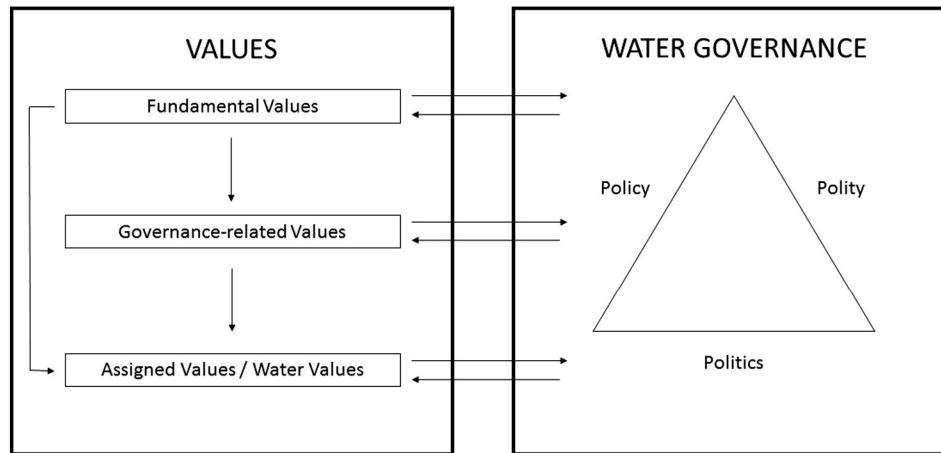


Fig. 1. Values and water governance: a conceptual framework.

universal nature, they are activated in many decision-making contexts, not only in relation to water governance. Crucially, they exist even if a person or group is unable to realise them in a concrete action. In a theoretical example, a powerful politician may decide to build a dam, even if a few villages will be flooded, if power and achievement rank higher in his personal set of values than universalism and benevolence.² The villagers, in turn, may prioritise the values of tradition, security and benevolence, and would thus oppose the building of a dam. The external factor of a power imbalance between the politician and the villagers would, however, prevent the villagers from realising their held fundamental values.

The primary locus of governance-related values is, as the name indicates, in the elements of water governance, which can be processes, institutions, and interpersonal or intrasocietal relations. A river basin committee is a good example of a manifestation of values, i.e. it could be the result of people's desire to achieve participation and democratic legitimacy in water governance. Power relations and interactions between different stakeholders may be seen as the result of certain values as well, for example of solidarity or equity, in a situation where relations are characterised by a desire among all stakeholders to achieve water governance outcomes that benefit everyone. Certain policy instruments, such as water charges, could be interpreted as the result of the governance-related value of efficiency. Therefore, like assigned values, governance-related values are located externally in objects and processes. Similarly to fundamental values, they can at the same time be located in people, for example if a group of people has a strong desire for social justice, even if they cannot act upon it. This is why governance-related values occupy a middle position between fundamental values and assigned values (Fig. 1). They are not as universal as fundamental values – one may value transparency and participation in governance, but not necessarily in all arenas of life – but they are also not as concrete and easily located in an external object (i.e. water resources) as are assigned values.

The arrows in the figure represent influence on another component or a theoretical relationship between components. Fundamental values of a person or a group influence their decisions within governance, thus possibly affecting politics, policy and polity of water governance as a whole. A person or society that values power and achievement very highly may strive to optimise the efficiency of water governance serving the elites, above all, and may have less consideration for distributional or negative environmental impacts. This example also shows that a

causal pathway from fundamental values to water governance may be via governance-related values.

Water governance can also influence people's values, for example if water markets have a negative impact on people's moral values (Falk and Szech, 2013). In a context of water politics that is dominated by few powerful players, for example, many people may have a desire for more public participation and democratic legitimacy (as examples of governance-related values). While water governance cannot eliminate people's fundamental values, it can have an impact on the prioritisation amongst fundamental values. Fundamental values are rather universal, making them relevant for both the formulation of governance-related values and assigned values. Additionally, they influence concrete decision-making in water governance.

To illustrate how the theoretical remarks made in the previous paragraphs could apply in reality, we have replaced the general value and governance categories with their concrete counterparts in Figs. 2 and 3 (see below). These are of course highly simplified and stereotypical examples, but nevertheless serve the purpose of demonstrating what may be the value base in a concrete water governance context and how both interact.

All value categories can be related to the three governance dimensions of polity, politics and policy in similar ways. A fishing council (as an example of polity) may be the result of the presence of fishing as an assigned value in a particular area. This assigned value may be connected to politics in the sense that those valuing water for fishing are less powerful than those valuing water for irrigation and agriculture, therefore shaping power relations between different stakeholders. Fishing as an assigned value would likely result in the creation of fishing policies, for example seasonal fishing restrictions. It is straightforward to develop similar examples for relationships between governance-related and fundamental values with polity, politics and policy.

The conceptual framework is characterised by three characteristic features: First, it assumes a strong interconnectedness between water governance and values, which influence each other in both directions. Second, it rests on the idea that there is a hierarchy of different value categories. Fundamental values may influence governance-related values and assigned values, but not vice versa. It is conceivable that over time assigned values of the water environment may impact on governance-related values and fundamental values, irrespective of water governance, but we believe that the conditions for such long-term change to occur would need to be understood better and would only apply under very limited specific circumstances. Third, the conceptual framework is based on the idea of value pluralism (see previous discussion within environmental philosophy and ecological economics), although from an analytical, rather than normative perspective. Value pluralism is seen as an empirical reality that can be studied, similar to the way in which psychologists study multiple fundamental values. In

² Universalism is defined by the goals of: "understanding, appreciation, tolerance, and protection for the welfare of all people and for nature" (Schwartz, 1996: 3). Benevolence is defined by the goals of: "preserving and enhancing the welfare of those with whom one is in frequent personal contact (the 'in-group')" (ibid.).

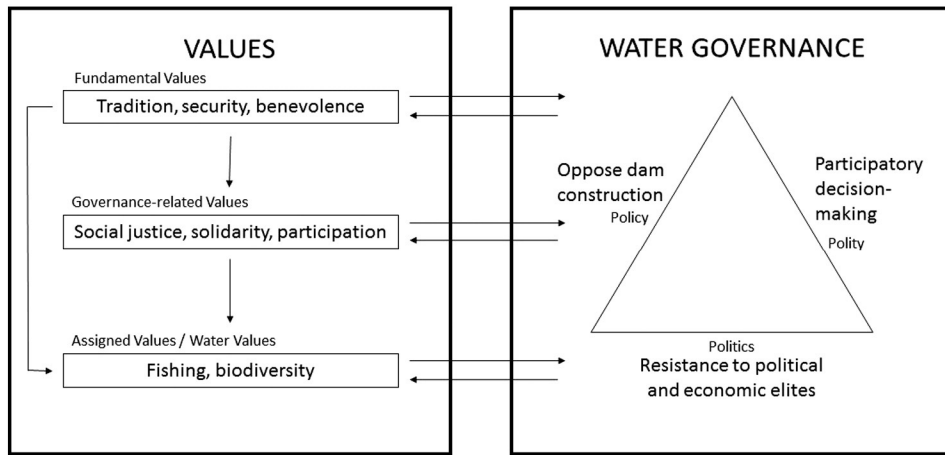


Fig. 2. Hypothetical example of the value landscape of a villager fighting a dam construction.

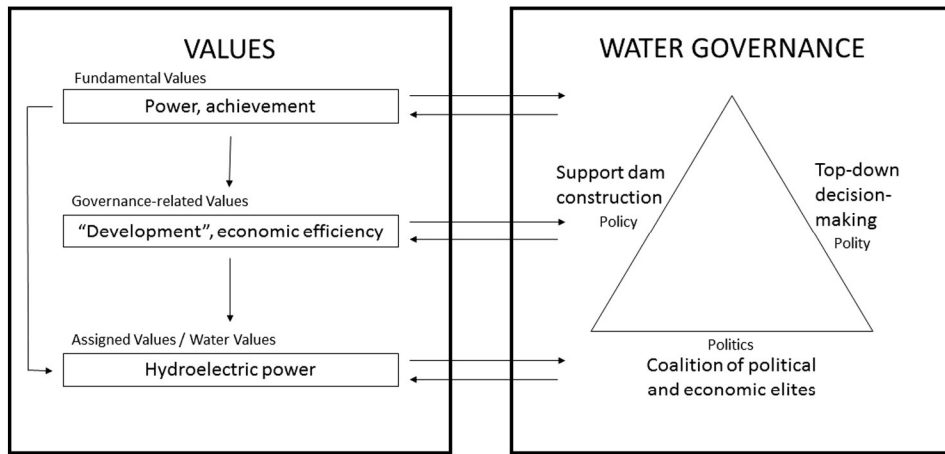


Fig. 3. Hypothetical example of the value landscape of a powerful politician wanting to build a dam.

practice, this means that no attempt is made to 'translate' values into one single category or measurement unit, as is being done for example in studies that apply monetary valuation methods.

If we were to try identifying all existing values and elements of water governance in a certain location, the result would be a highly complex network of relations. Conceptualising social phenomena as networks in which causality can go both ways has become a well-established research strategy in the social sciences, especially in sociology and political science, under the label of 'network analysis'. Many political scientists have analysed governance generally using network analytical techniques (see Schneider, 2005 for a list of studies). The conceptual framework presented in this paper can therefore serve as a theoretical foundation for empirical studies that use these techniques.

The hierarchical organisation of value categories relates to discussions about intrinsic and instrumental values in philosophy. If instrumental values always need to be related to an underlying intrinsic value,³ then this creates a hierarchy of different value categories from instrumental values that are often more concrete to the more abstract intrinsic value. For example, if someone ascribes aesthetic value to a lake, this assigned value may be seen as an instrumental value that has its origin in the more abstract intrinsic value of pleasure (which we may also call hedonism as in Schwartz' theory of universal value systems). Some people may disagree and claim that the aesthetic value of a

lake is an intrinsic value that needs to be protected regardless of whether it brings pleasure to people (arguably a theoretical position that would be difficult to defend in practice).

However, for the purposes of the present conceptual framework, it does not matter whether we consider certain values to be intrinsic or instrumental, and the question whether the environment has an intrinsic value or not is irrelevant, because it concerns questions in moral and environmental philosophy that can never have a definite answer. The framework is instead to be seen as an analytical tool that helps to understand water governance, and searching for hierarchical relations between values can be useful in this context.

Due to its interdisciplinary perspective, the conceptual framework connects especially well to ecological economics, which is by definition an 'interdisciplinary discipline', with origins in fields as diverse as economics, ecology, environmental ethics, political theory and social psychology (Spash, 1999). Furthermore, ecological economics was first established as an alternative to mainstream environmental economics due to its emphasis on the incommensurability of values and value pluralism (Martinez-Alier et al., 1998), one of the defining features of our conceptual framework. The study of values has always been at the centre of ecological economics. Our conceptual framework thus aims at connecting with these roots, which have historically included some elements from social psychology (Spash, 1999). We also believe that our conceptual framework could be helpful to enhance studies of ecosystem services to understand not just what aspects of water resources people value, but also why they value them. The way people assign values to

³ This follows one particular interpretation of 'intrinsic value', see the previous section on values in philosophy for more information.

water and how they evaluate water governance in their area may be influenced by their fundamental and governance-related values. Research in ecological economics itself is often based on normative (fundamental and governance-related) values, such as sustainability, and it may be helpful to enhance our awareness of these. Furthermore, we see important connections with policy-oriented literature, since within our conceptual framework values and ecosystem services are not studied in isolation, but in relation to the different elements of water governance. There is an emerging interest in the concept of water ecosystem services in the policy arena (Martin-Ortega et al., 2015), and such literature could benefit from thinking more systematically about the implications of different types of values for water governance.

5. Conclusion

This paper outlines the complex relationships between values and water governance, and proposes a novel conceptual framework that integrates insights from various disciplines, including psychology, economics, philosophy, and geography. The conceptual framework considers different value categories in a possible hierarchical relationship. Fundamental values represent abstract goals that people wish to realise across different situations, such as hedonism or security. Governance-related values describe perceived ideal characteristics of water governance, such as transparency, participation or sustainability. These values are taken from normative work on water governance. Assigned values, or water values (with regard to water governance), are located in water resources. Assigned values are often categorised in ecosystem services-based frameworks and as such could serve as an entry point that connects research in ecological economics with further value dimensions as outlined in the conceptual framework. All three value categories influence water governance in one way or another, and abstract and universal fundamental values may influence the formation of governance-related and assigned values. Equally, concrete water governance situations may also affect people's values, for example where a recent flooding incident activates people's desire for security. Water governance is understood to comprise the entirety of water policy, politics, and polity.

Knowledge of the interrelationships between values and water governance can be used to facilitate the resolution of water governance issues. It can contribute to understanding and possibly mitigating any conflicts that may arise between water governance actors. Thinking about the values involved can help to identify what matters most for conflicting parties and solutions could be tailored that consider the relevant values of the actors involved. If there are strong differences at the level of fundamental values or governance-related values, conflicts should be expected to be more difficult to resolve as disagreements may arise over a number of concrete decisions. Moreover, governments should strive to address as many values as possible, if they desire to have democratic legitimacy (which is itself a normative governance-related value).

Knowing the local 'value landscape' can reveal much about political power distribution and democratic legitimacy of water governance. Water governance as a normative concept is based on the idea that all relevant stakeholders should be able to participate in water management processes. If the values present among stakeholders are identified and compared with the values that are addressed by actual water governance, a decision can be made on whether water governance is biased towards the interests of influential stakeholders or whether it truly reflects people's values and desires.

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References

- Ajzen, I., 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes* vol. 50, pp. 179–211.
- Anand, N., 2011. Pressure: the PoliTechnics of water supply in Mumbai. *Cultural Anthropology* vol. 26(4), pp. 542–564.
- Bateman, I.J., Carson, R.T., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Özdemiroğlu, E., Pearce, D.W., Sugden, R., Swanson, J., 2002. *Economic Valuation with Stated Preference Techniques: A Manual*. Edward Elgar Publishing, Cheltenham, UK/Northampton, MA.
- Benson, D., Gain, A.K., Rouillard, J.J., 2015. Water governance in a comparative perspective: from IWRM to a 'nexus' approach? *Water Alternatives* vol. 8(1), pp. 756–773.
- Brady, E., 2003. *Aesthetics of the Natural Environment*. Edinburgh University Press, Edinburgh.
- Brown, T.C., 1984. The concept of value in resource allocation. *Land Economics* vol. 60(3), pp. 231–246.
- Bryant, R.L., 1998. Power, knowledge and political ecology in the third world: a review. *Progress in Physical Geography* vol. 22(1), pp. 79–94.
- Budds, J., McGranahan, G., 2003. Are the debates on water privatization missing the point? Experiences from Africa, Asia and Latin America. *Environment & Urbanization* vol. 15(2), pp. 87–114.
- Bustamante, R., Crespo, C., Walnycki, A.M., 2012. seeing through the concept of water as a human right in Bolivia. In: Sultana, F., Loftus, A. (Eds.), *The Right to Water: Politics, Governance and Social Struggles*. Earthscan, Abingdon, UK & New York, USA, pp. 223–240.
- Buttimer Sr., A., 1974. *Values in Geography*, Commission on College Geography, Resource Paper No. 24. Association of American Geographers, Washington D.C.
- Castro, J.E., 2007. Water governance in the twentieth-first century. *Ambiente & Sociedade* vol. 10(2), pp. 97–118.
- Chan, K.M.A., Satterfield, T., Goldstein, J., 2012. Rethinking ecosystem services to better address and navigate cultural values. *Ecological Economics* vol. 74, pp. 8–18.
- Creswell, J.W., 2009. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 3rd ed. SAGE, London.
- Daniell, K.A., Coad, P., Ferrand, N., White, I., Jones, N., Guise, K., Marvell, C., Burn, S., Perez, P., 2008. Participatory values-based risk management for the water sector. In: Lambert, M., Daniell, T.M., Leonard, M. (Eds.), *Proceedings of Water Down Under 2008*. Engineers Australia & Causal Productions, Modbury, South Australia, pp. 969–981.
- De Groot, J., Steg, L., 2007. General beliefs and the theory of planned behavior: the role of environmental concerns in the TPB. *Journal of Applied Social Psychology* vol. 37(8), pp. 1817–1836.
- Dietz, T., Fitzgerald, A., Shwom, R., 2005. Environmental values. *Annual Review of Environment and Resources* vol. 30, pp. 335–372.
- Falk, A., Szech, N., 2013. Morals and markets. *Science* vol. 340, pp. 707–711.
- Foltz, R.C., 2002. Iran's water crisis: cultural, political, and ethical dimensions. *Journal of Agricultural and Environmental Ethics* vol. 15, pp. 357–380.
- Furlong, K., Bakker, K., 2010. The contradictions in 'alternative' service delivery: governance, business models, and sustainability in municipal water supply. *Environment and Planning C: Government and Policy* vol. 28, pp. 349–368.
- Gibbs, L.M., 2010. "A beautiful soaking rain": environmental value and water beyond eurocentrism. *Environment and Planning D: Society and Space* vol. 28, pp. 363–378.
- Glenk, K., Fischer, A., 2010. Insurance, prevention or just wait and see? Public preferences for water management strategies in the context of climate change. *Ecological Economics* vol. 69(11), pp. 2279–2291.
- Gómez-Baggethun, E., Ruiz-Pérez, M., 2011. Economic valuation and the commodification of ecosystem services. *Progress in Physical Geography* vol. 35(5), pp. 613–628.
- Gómez-Baggethun, E., de Groot, R., Lomas, P.L., Montes, C., 2010. The history of ecosystem services in economic theory and practice: from early notions to markets and payment schemes. *Ecological Economics* vol. 69, pp. 1209–1218.
- Groenfeldt, D., Schmidt, J.J., 2013. Ethics and water governance. *Ecology and Society* vol. 18(1), p. 14.
- Hajer, M., 2003. Policy without polity? Policy analysis and the institutional void. *Policy Sciences* vol. 36, pp. 175–195.
- Harvey, D., 1996. *Justice, Nature and the Geography of Difference*. Blackwell Publishers, Cambridge, MA.
- Hatfield-Dodds, S., Syme, G., Leitch, A., 2006/2007. Improving Australian water management: the contribution of social values research and community engagement. *Reform* 89, pp. 44–48 (issue).
- Héritier, A., 2002. New modes of governance in Europe: policy-making without legislating? In: Héritier, A. (Ed.), *Common Goods: Reinventing European and International Governance*. Rowman & Littlefield, Lanham, pp. 185–206.
- Hermans, L.M., Kadigi, R.M.J., Mahoo, H.F., van Halsema, G.E., 2006. Conflict analysis and value-focused thinking to aid resolution of water conflicts in the Mkoji sub-catchment, Tanzania. In: Perret, S., Farolfi, S., Hassan, R. (Eds.), *Water Governance for Sustainable Development*. Earthscan, London & Sterling, VA, pp. 149–165.
- Hill, M., 2013. Climate Change and Water Governance: Adaptive Capacity in Chile and Switzerland. *Advances in Global Change Research* 54. Springer, Heidelberg.
- Hitlin, S., Piliavin, J.A., 2004. Values: reviving a dormant concept. *Annual Review of Sociology* vol. 30, pp. 359–393.
- Homer, P.M., Kahle, L.R., 1988. A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology* vol. 54(4), pp. 638–646.

- Inglehart, R., 2006. Mapping global values. *Comparative Sociology* vol. 5(2–3), pp. 115–136.
- Ioris, A.A.R., 2011. Values, meanings, and positionalities: the controversial valuation of water in Rio de Janeiro. *Environment and Planning C: Government and Policy* vol. 29, pp. 872–888.
- Ioris, A.A.R., 2012. Scarcity, neoliberalism and the 'water business' in Lima, Peru. *Human Geography* vol. 5(2), pp. 93–105.
- Ioris, A.A.R., 2014. Environmental governance at the core of statecraft: unresolved questions and inbuilt tensions. *Geography Compass* vol. 8/9, pp. 641–652.
- Jackson, S., Barber, M., 2013. Recognition of indigenous water values in Australia's Northern Territory: current progress and ongoing challenges for social justice in water planning. *Planning Theory & Practice* vol. 14(4), pp. 435–454.
- Kallis, G., Gómez-Baggethun, E., Zografos, C., 2013. To value or not to value? That is not the question. *Ecological Economics* vol. 94, pp. 97–105.
- Kovel, J., 2014. Ecosocialism as a human phenomenon. *Capitalism Nature Socialism* vol. 25(1), pp. 10–23.
- Light, A., 2002. Contemporary environmental ethics: from metaethics to public philosophy. *Metaphilosophy* vol. 33(4), pp. 426–449.
- Liu, J., Dorjderem, A., Fu, J., Lei, X., Liu, H., Macer, D., Qiao, Q., Sun, A., Tachiyama, K., Yu, L., Zheng, Y., 2011. Water Ethics and Water Resource Management, Ethics and Climate Change in Asia and the Pacific (ECCAP) Project, Working Group 14 Report. UNESCO, Bangkok.
- Lockwood, M., 1997. Integrated value theory for natural areas. *Ecological Economics* vol. 20, pp. 83–93.
- Lockwood, M., 1999. Humans valuing nature: synthesising insights from philosophy, psychology and economics. *Environmental Values* vol. 8, pp. 381–401.
- Lockwood, M., Davidson, J., Curtis, A., Stratford, E., Griffith, R., 2010. Governance principles for natural resource management. *Society & Natural Resources* vol. 23(10), pp. 986–1001.
- MA = Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-Being: A Framework for Assessment*. Island Press, Washington, D.C.
- Mankiw, N.G., Taylor, M.P., 2006. *Economics*. Thomson Learning, London.
- Martinez-Alier, J., 2002. *The Environmentalism of the Poor: A Study of Ecological Conflicts and Valuation*. Edward Elgar, Cheltenham, UK/Northampton, MA.
- Martinez-Alier, J., Munda, G., O'Neill, J., 1998. Weak comparability of values as a foundation for ecological economics. *Ecological Economics* vol. 26, pp. 277–286.
- Martin-Ortega, J., Ferrier, R.C., Gordon, I.J., Khan, S., 2015. *Water Ecosystem Services: A Global Perspective*. Cambridge University Press, Cambridge.
- McCauley, D.J., 2006. Selling out on nature. *Nature* vol. 443, pp. 27–28.
- McDonald, H.P., 2004. *John Dewey and Environmental Philosophy*. State University of New York Press, Albany.
- McShane, K., 2007. Why environmental ethics shouldn't give up on intrinsic value. *Environmental Ethics* vol. 29, pp. 43–61.
- Morito, B., 2003. Intrinsic value: a modern albatross for the ecological approach. *Environmental Values* vol. 12, pp. 317–336.
- Munda, G., 2004. Social multi-criteria evaluation: methodological foundations and operational consequences. *European Journal of Operational Research* vol. 158, pp. 662–677.
- Næss, A., 1984. A defence of the deep ecology movement. *Environmental Ethics* vol. 6(3), pp. 265–270.
- Nikolakis, W.D., Quentin Grafton, R., To, H., 2013. Indigenous values and water markets: survey insights from northern Australia. *Journal of Hydrology* vol. 500, pp. 12–20.
- O'Neill, J., 1992. The varieties of intrinsic value. *The Monist* vol. 75(2), pp. 119–137.
- O'Neill, J., 1993. *Ecology, Policy and Politics: Human Well-Being and the Natural World*. Routledge, London.
- O'Neill, J., Spash, C.L., 2000. *Conceptions of Value in Environmental Decision-Making, Environmental Valuation in Europe, Policy Research Brief No. 4*. Cambridge Research for the Environment, Cambridge.
- O'Neill, J., Holland, A., Light, A., 2008. *Environmental Values*. Routledge, London/New York.
- OECD, 2013. *OECD Water Governance Initiative: Terms of Reference* (online: OECD).
- Pearce, D.W., Turner, R.K., 1990. *Economics of Natural Resources and the Environment*. Harvester Wheatsheaf, Hemel Hempstead, UK.
- Robertson, M.M., Wainwright, J.D., 2013. The value of nature to the state. *Annals of the Association of American Geographers* vol. 103(4), pp. 890–905.
- Schneider, V., 2005. *Redes de políticas públicas e a condução de Sociedades Complexas*. *Civitas* vol. 5(1), pp. 29–58.
- Schwartz, S.H., 1992. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology* vol. 25, pp. 1–65.
- Schwartz, S., 1996. Value priorities and behavior: applying a theory of integrated value systems. In: Seligman, C., Olson, J.M., Zanna, M.P. (Eds.), *The Psychology of Values: The Ontario Symposium* vol. 8. Lawrence Erlbaum Associates, Mahwah, NJ, pp. 1–24.
- Scolobig, A., Castán Broto, V., Zabala, A., 2008. Integrating multiple perspectives in social multicriteria evaluation of flood-mitigation alternatives: the case of Malborghetto-Valbruna. *Environment and Planning C: Government and Policy* vol. 26, pp. 1143–1161.
- Spash, C., 1999. The development of environmental thinking in economics. *Environmental Values* vol. 8(4), pp. 413–435.
- Steg, L., Perlaviciute, G., van der Werff, E., Lurvink, J., 2014. The significance of hedonic values for environmentally relevant attitudes, preferences, and actions. *Environment and Behavior* vol. 46(2), pp. 163–192.
- Stephenson, J., 2008. The cultural values model: an integrated approach to values in landscapes. *Landscape and Urban Planning* vol. 84, pp. 127–139.
- Stern, P.C., Dietz, T., Guagnano, G.A., 1998. A brief inventory of values. *Educational and Psychological Measurement* vol. 58, pp. 984–1001.
- Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A., Kalof, L., 1999. A value-belief-norm theory of support for social movements: the case of environmentalism. *Research in Human Ecology* vol. 6(2), pp. 81–97.
- Swyngedouw, E., 2005. Governance innovation and the citizen: the Janus face of governance-beyond-the-state. *Urban Studies* vol. 42(11), pp. 1991–2006.
- Syme, G.J., 2014. Acceptable risk and social values: struggling with uncertainty in Australian water allocation. *Stochastic Environmental Research and Risk Assessment* vol. 28(1), pp. 113–121.
- Syme, G.J., Hatfield-Dodds, S., 2007. The role of communication and attitudes research in the evolution of effective resource management arrangements. In: Dovers, S., Hussey, K., Connell, D. (Eds.), *Delivering the National Water Initiative: Understanding the Social and Industry Dimensions*. CSIRO Press, Melbourne, pp. 11–22.
- Tortajada, C., 2010. Water governance: some critical issues. *Water Resources Development* vol. 26(2), pp. 297–307.
- Treib, O., Bähr, H., Falkner, G., 2007. Modes of governance: towards a conceptual clarification. *Journal of European Public Policy* vol. 14(1), pp. 1–20.
- Tress, G., Tress, B., Fry, G., 2004. Clarifying integrative research concepts in landscape ecology. *Landscape Ecology* vol. 20, pp. 479–493.
- Turner, R.K., Pearce, D., Bateman, I., 1994. *Environmental Economics: An Elementary Introduction*. Harvester Wheatsheaf, Hemel Hempstead, UK.
- UNDP, 2004. *Water Governance for Poverty Reduction: Key Issues and the UNDP Response to Millennium Development Goals*. United Nations Development Programme, New York.
- Upton, C., 2014. Communities, culture and commodification: Mongolia's new resource politics. *Inner Asia* vol. 16, pp. 252–274.
- van den Brandeler, F., Hordijk, M., von Schönfeld, K., Sydenstricker-Neto, J., 2014. Decentralization, participation and deliberation in water governance: a case study of the implications for Guarulhos, Brazil. *Environment & Urbanization* vol. 26(2), pp. 489–504.
- Walker, G., 2014. Water scarcity in England and Wales as a failure of (meta) governance. *Water Alternatives* vol. 7(2), pp. 388–413.