

# Understanding the Value Base of Water Decision-Making

A Practitioners' Guide to the Value Landscapes Approach



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# 1. An Introduction to this Guide

## What is the Practitioners' Guide to the Value Landscapes Approach?

This is a guide to assist you in the application of the Value Landscapes Approach (VLA). This approach serves to identify the different kinds of values that are held by water users, managers, citizens, and stakeholders in a given geographical context and may help to better understand water management options, conflicts about water, and pathways for their resolution.

The guide forms part of the Valuing Water Initiative's toolbox for valuing water. The [Valuing Water Initiative](#) was launched by the Government of the Netherlands in 2019. It has now become a global network of partners from the private sector, NGOs, development banks, professional associations, research institutes, and many other governments. One of its major aims is to improve decision-making about water through better understanding water's multiple values to different groups.

## Who is this guide for?

This guide has been created for water management professionals, policy makers and academics with an interest in understanding the value base of water decision-making. This understanding can then be incorporated into specific water management plans, development cooperation programmes, and research activities. It may also inform water governance discussions and the role that values play in it more generally.

## Why apply the Value Landscapes Approach?

The way we value water influences the decisions that we take around its use, conservation, and management. The value of water is often expressed in economic terms; for instance, when carrying out cost-benefit analysis of water management interventions such as the building of a dam or an irrigation project. However, there is growing consensus that understanding the economic value of water is important but not sufficient. Valuing

water is a deeply personal matter, embedded in broader worldviews, and often influenced by the cultural and geographical context. Likewise, decision-making about water is often not just a rational process of weighing up costs and benefits but is influenced by our personal values.

How we value water has implications for the great water challenges of our times. Most people would agree that we need to work towards water security, consider the needs of humans and of the natural environment, and make drinking water accessible to all. However, the best or most accepted route towards such objectives is not always clear. To understand why people agree or disagree on certain policies and strategic questions, we need to investigate their underlying values.

This guide provides you with an overview of how to apply a theoretical valuation framework, the VLA, that has been specifically designed to capture multiple and broad values operating at different levels and the influence that they have in preferences for water management options. The VLA has been tested in various different contexts, with qualitative and quantitative techniques (see Boxes [1](#), [2](#) and [3](#) for examples).

## What is in this guide? And what is not?

In the next section ([Section 2](#)), we provide a brief theoretical outline of the VLA. Section 3 sets out the basis of what you need to consider before beginning a valuation using the VLA. Section 4 provides guidance on the application of the VLA, using qualitative ([4.1](#)) and quantitative ([4.2](#)) social science techniques.

It is important to note that this guide provides guidance specific to the application of the VLA but does not cover the basics of designing and implementing qualitative and quantitative social sciences research. For example, it makes reference to the use of questionnaires and qualitative interviews but does not provide a detailed account of specific aspects such as sampling, sample sizes or statistical analysis. It would be beyond the scope of this guide to cover such general topics that are the subject of many textbooks, which are available to those interested in applying the VLA but who have no or a limited social sciences research background. The [final section](#) provides some suggestions on how to make the most out of the results obtained from the application of the VLA.

**Box 1: Earlier work using the Value Landscapes Approach:**

**Valuing water in Brazil's Upper Paraguay River Basin**

The Value Landscapes Approach (VLA) emerged in a research project funded by the Scottish Government's Hydro Nation Programme between 2013 and 2017.

The VLA was originally developed to understand in how far people's values were linked to their water policy preferences, using a multi-disciplinary approach, drawing on insights from social psychology, economics, and philosophy (Schulz et al 2017a).

In a 'proof of concept', both qualitative and quantitative applications of the VLA were tested with stakeholders and citizens in Brazil's Upper Paraguay River Basin (Schulz et al 2017b, 2018).

In the qualitative application, 'value landscapes' were first empirically identified through in-depth interviews with stakeholders from various water-related sectors. The purpose of interviews was to understand how different stakeholders value water and how their values are linked with preferences for or against the construction of large water infrastructure (Schulz et al 2017b).

In the quantitative application, 1000+ members of the general public were interviewed using a close-ended survey questionnaire. Through statistical analysis, it was shown that respondents who favoured the construction of a waterway on the Paraguay River had different personal values than those who opposed the construction (Schulz et al 2018).

These findings suggest that water-related conflicts can be explained by differences in personal values among those on opposing sides. Though it is important to note that values do not just explain situations of conflict, but, much more commonly, explain why we agree with others.

The VLA has also been applied to understand preferences around managing dam impacts (Schulz et al 2019), and there have been multiple applications within the Valuing Water Initiative, with water decision-makers in Kenya and a global online survey (see [Box 2](#) and [Box 3](#)).

The Global Water Partnership have used the VLA to understand water governance scenarios in various countries, providing an overview in their toolbox for valuing water, <https://www.gwptoolbox.org/learn/iwrm-tools/valuing-water> (For further information see references provided in the bibliography at the end of this document.)

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## 2. The Theoretical Basis of the Value Landscapes Approach

The Value Landscapes Approach (VLA) is an interdisciplinary conceptual framework to guide the investigation of diverse values that are implicit in water governance. Its main objective is to understand how water governance may be shaped by people's values and vice versa, while clearly distinguishing between various types of values expressed by humans as established by several different disciplines (social psychology, economics, and philosophy).

Specifically, it suggests investigating three types of values: (i) **assigned / water values**, (ii) **governance-related values**, and (iii) **fundamental values**. The first type, 'assigned values', or 'water values', covers values assigned to external objects and natural resources, for example, the multiple uses and benefits from water, such as fish or drinking water, which may

be place-specific. This is a conception of 'values' that is typical, for example, in economics. The second type, 'governance-related values', covers idealised characteristics of governance, such as sustainability, social justice, or economic efficiency. These values are often the topic of studies of good water governance and governance principles more generally (e.g., Schulz 2019). The third type, 'fundamental values', has its roots in social psychology and refers to people's abstract goals, which they seek to realise across decision-making situations. Examples of fundamental values are receiving other people's admiration, leading a self-directed life, or searching for personal security. In the widely used Schwartz Value Theory (Schwartz 1996, 2012), these values are often categorised within the broader dimensions of self-enhancement and self-transcendence, as well as openness to change and conservation (of the status quo).

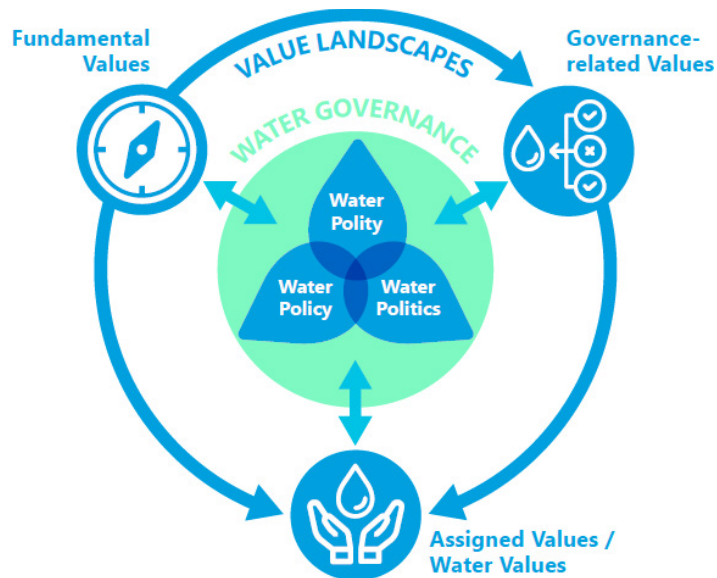


Figure 1: The Value Landscapes Approach (VLA) for analysing water governance: Conceptual overview

The VLA theorises that these groups of values are related to each other in a configuration (a value landscape, in the metaphor) that determines people’s preferences in water governance (see Figure 1 above). The VLA provides a structured answer to many calls to take values into account in water governance, by clarifying the various types of values that exist and how they may be related to concrete preferences among relevant stakeholders as well as members of the general public. This helps evaluating the political legitimacy of certain aspects of water governance through a comparison of values expressed by different stakeholder groups or members of the general public with values that are implicit in concrete water policy and governance issues.

The objectives of the VLA overlap with the objectives of the Valuing Water Initiative, which sponsored the compilation of this guide. Both seek to make the diversity of existing water values visible, and go beyond the narrow conception of an exclusively economic lens towards valuing water. Both also propose that addressing values has consequences for policy and practice. Applying this conceptual lens helps make visible which behaviours and policy choices are informed by values and clarifies pathways towards addressing a wider range of values; it also allows taking into account the values of a wider range of stakeholder groups.



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# 3. Getting started

## 3.1. What are you trying to achieve?

How will understanding the value base of water decision-making be useful for you as a water professional, practitioner or academic? Before engaging further with how to best implement the VLA to suit your purposes, it is important that you reflect on the main aims and motivations for applying the VLA.

Do you aim to learn about values in relation to specific water-related decisions? For example, practitioners may want to understand value positions in relation to projects affecting water resources, as a basis for participatory planning or consensus building that may accompany the project. Or, for example, an academic may wish to have a value-based foundation for understanding water discourses associated with a particular water challenge. Alternatively, your aim may be to learn about values held in relation to water, without having a particular project or water challenge in mind.

Whose values do you want to learn about? Is your interest in understanding water-related values focused on specific (sub-)populations, for example citizens of a particular location, or water professionals of a particular sector? How is your target population defined, for example via geographical boundaries, communities of interest, water management sectors, or simply strata of the population that share relevant characteristics (for example, living within a certain distance from a water body)? If you cast your net widely, values may be more diverse, and conversations more challenging. If you target a narrower population, their values may be more similar, but a VLA application may still result in useful and surprising insights.

Another important dimension to assist identification of the most suitable approach to VLA implementation is the type of information on water values that best matches your aims. Of course, you may want to revisit your initial thoughts after learning more about the benefits and limitations of qualitative and quantitative implementation of the VLA, detailed in [Section 4](#). But your initial thinking may be guided by questions such as: Do you need to assess

values held by a potentially large population and want to test statistical hypotheses about its water values? Or is it rather important for you to obtain a highly nuanced picture of value positions in relation to water decision-making by a variety of stakeholders? Depending on the answer to such questions, you may require quantitative, and possibly representative, information on values. Alternatively, you may want to focus on developing a deep understanding of value positions irrespective of their distribution within a population of interest, in which case qualitative information may be preferred.

There are good reasons why representative information can be important. For example, understanding majority positions and preferences about water governance can be important as signals for policy makers. In other situations, qualitative information on water values may be more useful for your needs. For example, having a deep understanding of values held by parties affected by water-related projects can be an important first step for conflict resolution.

In summary, a first step to VLA implementation is reflection on why learning about water values is important for you and your purposes, whose values you want to better understand, and whether your aims are best supported through quantified values and their relationships with decision-making, or in-depth qualitative information on value positions among relevant actors.

### **3.2. How many resources, time and skills do you have available?**

Having formed a clear vision about why applying the VLA can be useful for you, it is important to develop a realistic appraisal of constraints for

practical implementation. The most important factors to consider here are time and budget constraints, as well as skills available internally (i.e., that you have access to in your organisation) to assist in implementation. To a degree, time and skills constraints can be substituted through greater budget allocated to external support, and how important either of these factors is depends on the aims of a VLA study (see [Section 3.1](#)). This makes it impossible to give concrete and systematic guidance on suitability of quantitative and qualitative VLA approaches, further outlined in [Section 4](#).

Nevertheless, any decision on the implemented approach will need to be mindful of the resources available internally (within your organisation) and externally (through, for example, consultants and other service providers). For example, if information is needed quickly and with a relatively low budget about values held by stakeholders in relation to a water challenge, it would be important to have access to internal staff support with experience in stakeholder engagement and workshop facilitation, as well as qualitative data analysis. It would also be important to assess the availability of stakeholder contacts to facilitate recruitment for interviews and workshops. Yet, facilitation can also be done by external consultants and professional moderators. Independent of whether a facilitator is affiliated with your organisation or not, they will need to familiarise themselves with the VLA on behalf of the other participants.

If, however, quantified water values are important to you, a considerable budget may need to be set aside for collecting quantitative data in surveys, and to make the most out of your data, internal access to statistical analysis and data visualisation skills will be of great use. If results are needed quickly, closer

adaptations of existing VLA studies should be considered, while a longer time frame allows for larger modifications to enhance the usefulness of results to the identified aims. Of course, combinations of qualitative and quantitative approaches are possible and can be highly recommended in cases where time, budget and skills constraints are not pressing. This may, for example, apply to academic projects with appropriate budgeting over a mid-term time horizon.

It is also worth considering the scale of interest, which will have implications with regards to required resources, time, and skills. A common scale is the river basin, where various water users will have shared and/or conflicting interests and values. However, it is not the only relevant scale. The VLA can also be applied at the scale of an individual organisation, for a specific sector (e.g., farmers), or for citizens of a town, region, or country. The questions that are asked to elicit values can then more closely reflect the reality within the particular scale chosen. If the scale is an individual organisation, questions can be tailored to that particular organisation; if multiple stakeholder groups participate in a valuing water exercise, questions necessarily need to be relevant to all of them. This applies to both qualitative and quantitative applications (see [section 4](#)), but tailoring a quantitative application may be more resource-intensive, as survey statements may need to be developed and tested. There is also less flexibility to adapt them spontaneously, which is more readily possible in qualitative applications.

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# 4. Getting on with it

## 4.1. Qualitative applications

Qualitative applications of the VLA allow understanding the value of water and the values that guide decision-making about water in (qualitative) depth, that is, using participants' own words and detailed descriptions. In this sense, qualitative applications are very different to quantitative applications (see [section 4.2](#)), but equally valid and robust if done well. Here we list a series of considerations that may help you decide whether a qualitative exploration of values is the best method in a given context (beyond such practical issues as availability of time, resources, skills; see [section 3](#)).

### 4.1.1. What are the benefits of qualitative applications?

There are multiple benefits and purposes to qualitative applications of the VLA. First of all, qualitative applications allow understanding values in depth. People working in the water sector may feel that an in-depth appraisal of their values and the values they assign to water more appropriately and completely captures their views. A common

concern with survey-based approaches is that participants feel restricted in their ways of expression – a qualitative application avoids that issue. For example, participants can tell stories of why water matters to them, which are quite often related to multiple aspects of their lives, that are not reflected in standardised surveys. Some people may have chosen to work in the water sector, having witnessed, when they were younger, how their parents struggled to fetch water over long distances. Others may simply have joyful memories of swimming in rivers and lakes, and how it sensitised them to the importance of a clean water environment. Qualitative applications give room to such personal stories, as well as more in-depth explanations about why and how water (governance) matters to them. There is also the possibility to discuss values in additional categories as per the participants' preferences, for example, regarding the assigned value that water has for human health.

Second, qualitative applications allow tailoring a valuing water exercise to the desired level of specificity. Although most assigned values can be captured in the three main categories of economic, cultural, and environmental values, participants in a valuing water exercise

may prefer to discuss assigned values in more specific categories. Economic values can be sub-divided into agricultural, industrial, tourism-related, energy-related, transport-related, for example. Within the subset of agricultural values, one could further sub-divide, classifying values into types of agricultural produce (wheat, corn, soy, etc.), and so on. A qualitative application is sufficiently flexible for participants to decide which level of specificity is of interest to them. It does not impose a certain level of specificity a priori, as is required in quantitative approaches, where questions or survey statements cannot be modified for individual participants.

Besides going into greater levels of specificity, in qualitative applications, it is also possible to move towards categories that are broader than economic-cultural-environmental. Sometimes, participants express assigned values that align with two or even three of these categories simultaneously. For example, people may assign cultural and environmental values to water at once, when following cultural traditions to provide water to wildlife in need. Likewise, many livelihoods related to water (e.g., farming, cattle ranching) can be understood as of economic and cultural value simultaneously. A qualitative application is again sufficiently flexible to allow participants to express such multiple-category views, in a way that quantitative applications cannot easily accommodate them.

Third, qualitative applications can be more insightfully adapted to local geographical, cultural, political, and institutional conditions. Managing water in an arid or semi-arid context is necessarily different to managing water in a water abundant location. Although water managers still have broadly similar choices available to them (such as emphasising technological solutions or financial incentives), their values may play out in

different concrete 'tools.' A qualitative application can more easily accommodate geographical differences, placing greater emphasis on irrigation technologies in a water scarce context, and giving more weight to flood management in a water abundant place.

Likewise, the cultural, political, and institutional context matters. In a liberal country, values may be communicated in a different way than in a more conservative society. A qualitative application will allow participants to express themselves in a way that is appropriate within their cultural, political, and institutional context. Differences may also exist across institutions, with members of private sector institutions potentially using a different terminology or way of expressing themselves than those pertaining to government agencies, non-governmental, or academic institutions. These nuances can be better captured in qualitative applications.

Finally, while a qualitative application can be used by itself on its own merits, it can also serve as a preparation for a quantitative application, where the aim is to tailor these to specific demands or circumstances (see next section) or it can be part of a mixed methods approach, using both techniques simultaneously.

#### 4.1.2. How to do a qualitative application?

There are many different ways of implementing a qualitative application, many of which are part of the standard toolkit of social scientists, for example, semi-structured interviews, focus groups or moderated stakeholder workshops. In [Box 2](#), an example of a qualitative application of the VLA in a case in Kenya is provided, which is based on semi-structured interviews, held

separately with individual water professionals or water users, focusing on the scale of a river basin.

What all qualitative applications have in common is that they need to translate participants' statements into value categories. This is a task that needs to be either led or at least moderated by a person who has some familiarity with relevant conceptual frameworks for understanding values. In the Kenyan example, this translation was done by the interviewer. Likewise, prompting statements about values in interviews, focus groups, etc., requires some familiarity with a relevant conceptual framework. Below we provide advice on how to elicit the values of the VLA.

**Assigned values** are perhaps the easiest category of values to gather in qualitative applications, since these are values that all participants in such exercises would be familiar with. They are also the most intuitive value category for participants to understand. In short, assigned values are about the 'what' of water decision-making. Simply asking 'What value does water have to you?' or 'What importance does water have in this region?' may already be enough to prompt responses about assigned values. One way of classifying assigned values is to use the 'ecosystem services framework', but it is not the only one. We have used the categories of economic, cultural, and environmental values in the past, but other values may be added (e.g., health-related values), so long as they are about the **value of water**, not about broader principles for governance or decision-making.

Whether to remind participants of the categories of *economic*, *cultural*, and *environmental* within the wider assigned value category in a qualitative application, is a matter of judgement. If there is a risk of influencing participants by offering these categories, then it should be avoided;

this may be the case, e.g., where there is a great power imbalance between participant and the person 'collecting' statements on value, or where a participant feels too shy, intimidated, confused, rushed, etc. to think carefully about the importance of water. In other cases, reminding participants of the categories can be useful, simply to ensure that they have not simply forgotten to mention certain values. It can also be an option to introduce 'what-if' scenarios. 'What if a river stopped flowing, how would it impact the region?'; 'What if groundwater supplies dried up?' Answers will often clarify which values a participant assigns to water.

**Governance-related values** can be more challenging to elicit in qualitative applications, because they are less tangible than assigned values. Although almost everyone cares about governance-related values, not everyone has a terminology for them, or a way of relating them with decision-making about water. In principle, governance-related values are about the 'how' of decision-making. Is water governance efficient, fair, transparent, participatory? These values matter to most people, but they may not verbalise them in a qualitative approach and there is no one way to ask about governance-related values in general (this being one advantage of quantitative approaches, see next section). Some respondents may be able to answer a question such as 'what principles should water governance follow?', but most respondents would not have such a list of principles in mind, when consulted in a qualitative application.

In such cases, a more indirect technique is required. For example, moderators or interviewers can ask about common frustrations with water management in a certain context: such frustrations are often a response to governance-related values not being acted upon

in practice. Participants may complain about the inefficiency of decision-making, about the lack of participation, or the injustice of a certain decision. They may or may not use such words (i.e., *efficiency, participation, justice*), but a moderator or interviewer familiar with the conceptual approach can interpret responses accordingly. As with assigned values, it is a judgement to make whether to remind participants about governance-related values they have not mentioned, for the same reasons stated in the previous paragraph.

One option is to discuss water management challenges in an open-ended way first to try to understand frustrations and concerns (and thereby, approximate governance-related values), before moving to more narrow questions about specific governance-related values. Towards the end of a qualitative application (interview, focus group, or stakeholder workshop), one could directly ask about each of the governance-related values listed in the quantitative section (see next section), but it is important to note that this will not necessarily work in a qualitative application.

**Fundamental values** are the most difficult values to elicit through qualitative applications – so much so that a standardised tool has been developed for quantitative applications that has been used many thousands of times (see: Schwartz 2012), but no equivalent tool exists for qualitative applications. Most people would struggle to answer, if asked directly about fundamental values, or ‘desirable, transsituational goals, varying in importance, that serve as guiding principles in their lives’ (Schwartz 1996). Another challenge with qualitative applications for fundamental values is that participants struggle to see their direct relevance for water management. Unless participants belong to the negligible minority who is familiar

with social psychological value theories, the link between personal goals and decisions about water is not obvious.

These challenges mean that fundamental values are sometimes or often not elicited in qualitative applications. They could be incorporated in a context where participants are explicitly briefed about their importance, and where participants are particularly committed to the exercise (e.g., in a setting where all members of an organisation participate in a workshop, as opposed to a voluntary interview with an unfamiliar interviewer). In such cases, conversations could tackle ‘why’ questions: ‘Why have you chosen to work in the water sector?’; ‘Why do you or others favour certain water policies over others?’ Related to that: ‘What are the deeper motivations that lead to engagement in the water field?’; ‘What are the fundamental purposes of water management?’; ‘What links do you see between fundamental values, other kinds of values, and water governance?’ Security, benevolence, achievement, hedonism, as examples of fundamental values, can no doubt all be underlying fundamental values that influence decisions and attitudes about water, but it is difficult to establish this through qualitative applications.

Finally, it is worth acknowledging that not every participant in a qualitative application will mention every value. Often, the full value landscape might only emerge after synthesising insights from multiple participants. Respondents may have niche interests, on which they can contribute great depth, and may only provide superficial or no insights on other values. Thus, all qualitative applications benefit from having multiple participants. It is

again a case of judgement how many participants are required. A common rule of thumb is to stop consulting more participants if responses are becoming highly repetitive, with previous applications of the

conceptual framework using 20-30 participants.

**Box 2: An example of a qualitative application: Valuing water in the Ewaso Ng'iro River Basin of Northern Kenya**

In April 2022, we applied the VLA in the Ewaso Ng'iro River Basin, Northern Kenya, as part of a scoping exercise within the Valuing Water Initiative (Schulz et al 2022a).

20 water managers, water users, stakeholders, and researchers in the region were interviewed individually, discussing water values, water governance, and conflicts about water in the region.

The Ewaso Ng'iro River Basin is very large, covering much of the Northern portion of Kenya. Upstream areas see seasonal rainfall, are used for agriculture, and have several population centres. Downstream areas are significantly drier arid or semi-arid lands and are sparsely populated, mostly by pastoralist communities.

Interviews pointed to various value conflicts: on the level of assigned values, there were conflicts between several economic values (e.g., small-scale farming vs. large-scale commercial farming), as well as between economic, cultural, and environmental values. In the past, overuse of water for irrigation upstream has negatively impacted biodiversity and people living downstream, including many traditional cultural practices that require reliable water flows.

On the level of governance-related values, interviews showed a near universal concern for the value of effectiveness. However, major differences in opinion existed about whether to prioritise efficiency or social justice in water decision-making, with some respondents suggesting that meaningful citizen participation was not currently possible or prohibitively expensive, while others felt it was necessary to achieve social justice.

(A detailed report on this case is available on request from the Valuing Water Initiative.)

Just as important as preparing questions for a qualitative application (interview script, focus group plan, moderation protocol, etc.) is to have a suitable approach for the analysis of results. Thematic analysis using structured coding (guided by the types of values outlined in the VLA) can be a useful approach, and one which is commonly explained in qualitative analysis textbooks. This is particularly

important for academic research. Structured coding is only possible where qualitative information is available in written form (e.g., where interviews were recorded and transcribed). It is worth keeping in mind that both transcribing and coding are very time-consuming activities.



## 4.2. Quantitative applications

Like qualitative applications, quantitative applications of the VLA have many benefits and some limitations. We describe one example in Box 3, the Valuing Water Survey, which we conducted on behalf of the Valuing Water Initiative.

### 4.2.1. What are the benefits of quantitative applications?

First, quantitative applications predictably produce insights on the various types of values covered by the VLA in a standardised format (i.e., on **assigned**, **governance-related**, and **fundamental values**). Quantitative applications rely on pre-formulated survey items (a list of such survey items is provided in [Appendix 1](#)). This facilitates interpretation of results relative to qualitative approaches. For example, if participants use a quantitative scale and rate environmental values on average more highly than economic values, this provides a signal to decision makers to reflect carefully on the consequences of policies on environmental values. Long and context-specific stories about water management recorded in qualitative applications can be interesting and inspiring, but it may be difficult to ‘translate’ such qualitative insights into the language of values. In quantitative approaches, it may also be easier to understand and visualise how values in the VLA relate to each other. Cross-comparisons between quantified values can be easily made,

and associations between value components of the VLA can be revealed through hypothesis testing using appropriate statistical techniques.

If applied to a representative sample of a population of interest, a quantitative application of the VLA can provide useful evidence on the prevalence and distribution of certain values, and their relationship, in a given context. Specifically, through the use of close-ended survey statements and statistical analysis, one can more clearly demonstrate value priorities in a given population, including those about assigned values of water. Quantitative data can also be readily scrutinized to understand where views converge and differ, and to highlight majority positions in a population. If questions concern specific water policies in a quantitative survey, such information can be particularly useful to legitimate decision-making. Some decision-makers may also be more familiar, and perhaps favour quantitative evidence as a basis for decision-making (even if qualitative evidence is simply different, not less robust).

Another notable advantage of quantitative applications over qualitative ones is that they work particularly well with fundamental values, because these have been tested already for many years.<sup>1</sup> Although it is usually not immediately obvious to participants why they are being asked about their fundamental values (again, a full list is provided in the appendix), they rarely struggle to respond to a survey questionnaire on these values. This then allows the person leading the valuing water exercise to subsequently

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<sup>1</sup> See Schwartz (2012) for an overview of his social psychological theory of basic individual values, which has been applied thousands of times, and which suggests that all people share a set of basic values, independent of their culture, socio-economic status, gender, or age.

use responses without any issues. The same applies, to a lesser degree, to governance-related values. While their relevance to water governance is more obvious, being asked to rank or rate a list of governance-related values in a close-ended survey format is usually much easier for participants than to reflect on them in an open-ended, qualitative application.

Including more general principles in a survey such as fundamental values or governance-related values can also have educational benefits, and can be inspiring to participants. If there is scope to explain the theoretical reasoning behind the relevance of these values to water management (e.g., as part of a stakeholder workshop), it may often make participants reflect about the more fundamental purposes and workings of water governance. Most people working in water-related fields do not usually reflect about their work or decisions about water in such fundamental terms. Learning that many preferences and decisions can be traced back to fundamental values can thus be surprising and rewarding to participants, and may enable them to look at water governance from an entirely new perspective.

Finally, quantitative applications may facilitate identification of commonalities, since participants respond to standardised statements, rather than creating their own language to discuss water management. Designing statements that participants can agree with is a considerable challenge. In the appendix, we propose a series

of statements that have been tested and shown to work in our global online survey (see [Box 3](#)).<sup>2</sup> Where different participants do disagree about standardised statements about values, this may help them realise that the root cause of a water conflict can be due to different value priorities. This may not end a conflict, but at least, could lead to greater mutual understanding between opposing sides.

#### **4.2.2. How to do a quantitative application?**

Quantitative applications, by their very nature, are better suited to identify quantitative patterns. A broad range of research methods can be employed to analyse quantitative data, precisely in view of understanding in how far certain water policies are linked to values. Through the use of Principal Components Analysis (PCA) or combining Exploratory and Confirmatory Factor Analysis (EFA/CFA), it is possible to establish which survey items are together seen as coherent value categories. PCA was used, for example, to establish that survey respondents in a global online survey with professionals working in water-related sectors tended to classify assigned values in the three main categories of ‘economic’, ‘cultural’, and ‘environmental’. The same technique also established that ‘efficiency’ and ‘social justice’ were the two main consistent perspectives about good water governance.

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<sup>2</sup> That being said, we do not claim that this is the only or best possible format. Valuing water is still an emerging field, and many other statement formats could be used to operationalise value concepts.

Regression analyses can then be used to test whether preferences for certain policies are 'predicted' by certain values. For example, environmentally friendly policies tend to be 'predicted' by survey participants prioritising other-regarding (or self-transcendence) fundamental values, while those favouring economic development are prioritised by participants with more self-enhancing fundamental values (such as valuing power or achievement). More complex questions (e.g., how are fundamental, governance-related, and assigned values, linked with water policy

preferences all at once) require the use of more complex statistical methods, such as mediation analysis or structural equation modelling (SEM). It is also worth noting that if the purpose is generalisation of findings, such methods require relatively large sample sizes in the hundreds or above.

### **Box 3: An example of a quantitative application: the global Valuing Water Survey**

Over the course of 2021, we applied the VLA in a global online survey targeted at respondents with a professional interest in water, the 'Valuing Water Survey' (Schulz et al 2022b).

The survey aimed to understand links between respondents' fundamental, governance-related, and assigned / water values, as well as their preferences with regards to strategic priorities for the global water policy agenda.

In close coordination with colleagues from the Valuing Water Initiative, we drafted a questionnaire to measure both values and water policy preferences. These were then discussed with professionals from various sectors, in open-ended, qualitative interviews, known as 'cognitive interviews', to ensure that survey statements in the questionnaire were unambiguous and readily understandable to them.

Survey questions were written in broad and general terms, to be sure that respondents with many different backgrounds could participate. Following further revisions after the cognitive interviews, we allowed a small sample of professionals to take the survey independently online, in a pilot study. Following analysis of responses and further feedback left by participants of the online pilot survey, we made final changes to our online survey, then translated it into all UN languages and Portuguese, to allow participants from around the world to participate.

A link to the survey was then disseminated via our professional networks to reach relevant participants. Of a larger number of responses, we analysed 300 complete and valid responses with statistical techniques (principal components analysis, regression analyses, mediation analyses).

Among many other findings, we found that two value perspectives predominate at the level of governance-related values: efficiency and social justice.

We also identified three ‘archetypical’ perspectives on how to design water policy, with the first involving managing water through civil engineering interventions and incentives (‘mastering nature’), the second involving management primarily through payments and charges (‘market-based water management’), and the third involving ecosystem services and nature-based solutions to reduce human impacts on water sources (‘working with nature’). Survey participants’ fundamental, governance-related, and assigned values predicted their preferences for each of these three archetypes, suggesting that much of water management is indeed driven by the various values held by professionals in the sector. (A detailed report on this case is available from the Valuing Water Initiative.)

**Assigned values** can be measured with many different survey items / statements. No widely accepted standardised questionnaire has been developed yet that would apply across all water management contexts. One way of measuring assigned values is presented in the appendix, but it may also be possible to adapt these statements to a local context or specific question of interest. Conceptualising assigned values as ‘water ecosystem services’ (cf. Martin-Ortega et al 2015) may also be helpful, where a list of ecosystem services has been established for the area of interest, and can be used as the basis for the development of survey items. Broadly speaking, cultural, economic, ecological, social and health-related values may all matter, but it is a case of judgement which of these to include in a quantitative application. Where the emphasis is on identifying different and contrasting preferences, it may be legitimate to exclude near universally accepted values such as water’s value for sustaining human life. Where the emphasis is on completeness, such assigned values may be included as well.

**Governance-related values** can also be measured with many different survey items or statements. As with assigned values, no widely accepted standardised questionnaire has been developed thus far. The appendix includes one set

of statements that has been shown to be useful in our global online survey, but that does not mean that it is the only possible way to measure governance-related values. It may be possible to include a larger number of statements, or different values not listed here. This may result in somewhat different findings.

**Fundamental values** can be measured with the survey items proposed by Schwartz and colleagues (see appendix, although Schwartz and others have proposed different types of questionnaires for different purposes). While a fully standardised questionnaire is available to measure these values, it is worth noting that other researchers have proposed different conceptualisations of fundamental values, and that the Schwartz Value Survey is one among multiple options, albeit, an extremely popular and well-tested one.

All quantitative applications of the VLA have in common that data analysis can be completed in comparatively less time than is required for qualitative applications. Where absolute or relative frequency are of interest, these can be assessed instantaneously. Some practitioners have adapted the VLA so that participants in a stakeholder workshop are asked to respond to survey questions via a web page while taking part in a moderated, interactive session. Responses to

survey questions are then shown live on a screen visible to all, providing immediate feedback on the popularity of certain values among workshop participants, and allowing a moderator to comment on the implications of these value preferences. More complex analyses (regression analyses, structural equation models) will require more time, but will still be much faster to do than qualitative analyses using manual coding of text or transcripts.

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# Getting the most out of it

Valuing water has many different meanings to different people. Some may associate valuing water with quite technical approaches, such as water pricing, where one may need to determine a price, or monetary value, for the sale of water on the market. Many others, however, associate valuing water with more personal experiences and questions, for example, their personal motivations as to why they have decided to work in the water sector in the first place.

The VLA is an emerging approach for valuing water, tested and applied in very different contexts around the world, and with very different methods and purposes that aims to incorporate these multiple understandings: the personal value basis for valuing water, the values that guide decision-making about water, and the value(s) that water itself has to people.

Such insights can be useful for informing decisions about water. For example, our research in Brazil, conducted in 2016, suggested that pro-environmental values were more dominant than pro-economic values within the general population, and that these values informed citizens' preferences to minimise the impact of physical water infrastructure on the Pantanal

wetland, even at the cost of economic benefits. This may also point to a disconnect between the values of elite decision-makers and those of their citizens and more marginalised groups in society.

Our global online survey with water professionals, conducted in 2021, resulted in the identification of three value-based general preferences for water policy, or archetypes. We summarised these with the three labels of 'mastering nature', 'working with nature', or using 'market-based water management'. Many of us will recognise these archetypal preferences from our work in the water sector, but we may not have been aware that they can be traced to people's most personal values.

A water management approach that contains elements of all three archetypes can best claim to be based on values, and is most likely to be perceived as well-balanced: while the current popularity of nature-based solutions may fill an earlier gap in water management, it cannot be the only approach to tackle water challenges. All kinds of values have a role to play in the decisions we take to address the water challenges of our times.

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# Resources

## ***On the Value Landscapes Approach***

Schulz, C., J. Martin-Ortega, K. Glenk, and A.A.R. Ioris, 2017a. The value base of water governance: A multi-disciplinary perspective. *Ecological Economics* 131: 241–249. <http://doi.org/10.1016/j.ecolecon.2016.09.009>

Schulz, C., J. Martin-Ortega, A.A.R. Ioris, and K. Glenk, 2017b. Applying a ‘Value Landscapes Approach’ to conflicts in water governance: The case of the Paraguay-Paraná Waterway. *Ecological Economics* 138: 47–55. <http://doi.org/10.1016/j.ecolecon.2017.03.033>

Schulz, C., J. Martin-Ortega, and K. Glenk, 2018. Value landscapes and their impact on public water policy preferences. *Global Environmental Change* 53: 209–224. <http://doi.org/10.1016/j.gloenvcha.2018.09.015>

Schulz, C., 2019. Governance-related values as dimensions of good water governance. *Wiley Interdisciplinary Reviews: Water* 6(1): art. e1322. <http://doi.org/10.1002/wat2.1322>

Schulz, C., J. Martin-Ortega, and K. Glenk, 2019. Understanding public views on a dam construction boom: The role of values. *Water Resources Management* 33(14): 4687–4700. <http://doi.org/10.1007/s11269-019-02383-9>

Schulz, C., Martin-Ortega, J., and Glenk, K., 2022a. *Valuing Water in the Ewaso Ngiro River Basin*. The Hague: Valuing Water Initiative.

Schulz, C., L. Wolf, J. Martin-Ortega, and K. Glenk, 2022b. *The Valuing Water Survey: A Global Survey of the Values that Shape Decision-Making on Water*. The Hague: Valuing Water Initiative. <https://valuingwaterinitiative.org/wp-content/uploads/2022/07/VWI-Water-Survey.pdf>

Olvera-Hernández, S., Mesa-Jurado, M.A., Novo, P., Martin-Ortega, J., Walsh, A., Holmes, G., and Borch, A., 2022. Forum Theatre as a mechanism to explore representation of local people’s values in environmental governance: A case of study from Chiapas, Mexico. *People and Nature*. <http://doi.org/10.1002/pan3.10420>

### ***On the Schwartz Theory of Basic Individual Values***

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, Mahwah: Lawrence Erlbaum Associates, 1-24.

Schwartz, S.H. (2012): An overview of the Schwartz Theory of Basic Values. *Online Readings in Psychology and Culture* 2(1): 11. <https://doi.org/10.9707/2307-0919.1116>

### ***On water ecosystem services***

Martin-Ortega, J., Ferrier, Robert C., Gordon, I.J., and Shahbaz, K. (2015): *Water Ecosystem Services: A Global Perspective*. Paris: UNESCO.



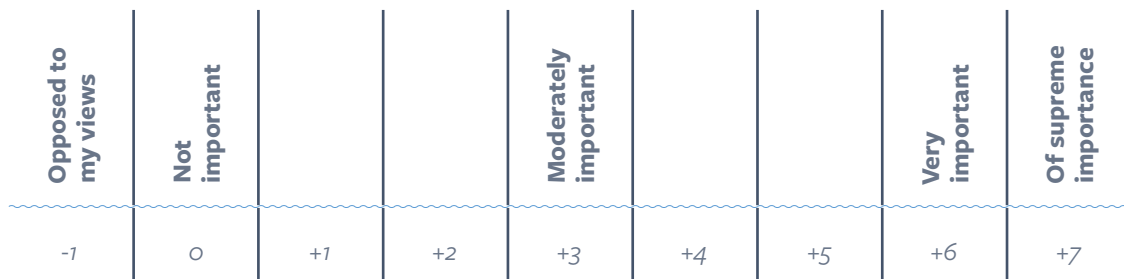
# Appendix 1: Valuing Water Survey questionnaire

Below we provide the survey items that were used in the Valuing Water Survey questionnaire's on values and water policy preferences, as an example for a quantitative application of the VLA (findings from this survey are described in Schulz et al 2022b).

To measure **assigned values / water values**:

*In the following, you will see **10 different uses or values of freshwater resources, rivers and lakes**. Please indicate how important you find each of these uses or values. Think about your own perspective, what matters to you personally.*

**Try to distinguish as much as possible between the views by using a wide range of numbers on the scale.**



- A1 Assets for economic development
- A2 Sources for renewable hydroelectric energy production
- A3 Basis for agricultural production
- A4 Places of beauty
- A5 Shaping our identity, who we are
- A6 Sites for spirituality and cultural traditions
- A7 Habitats for aquatic animals and plants
- A8 Sources of livelihoods to people in rural communities
- A9 Supporting natural environments
- A10 Places for recreation and leisure

To measure **governance-related values**:

In the following, you will see **14 principles for water governance and management**. Please indicate how important each principle is to you or if the principle opposes your views.

**Try to distinguish as much as possible between the views by using a wide range of numbers on the scale.**

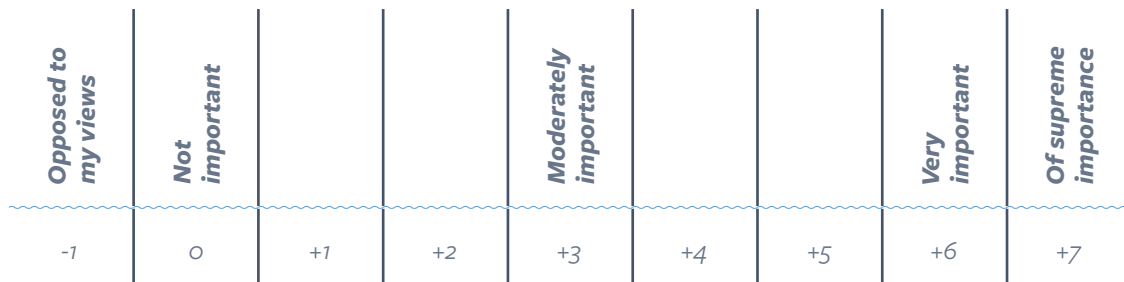


- B1 Economic efficiency (solutions that offer best value for money)
- B2 Clarity (clear framework of rules and regulations)
- B3 Competition (strive for optimisation and better performance)
- B4 Simplicity (simple rules and regulations)
- B5 Adaptability (swiftly adapt to new challenges and circumstances)
- B6 Social justice (prioritising the poor and marginalised)
- B7 Gender equality (equal involvement of women and men in decision-making)
- B8 Intergenerational justice (prioritise future generations' needs)
- B9 Stakeholder participation (all stakeholders can have a say)
- B10 Citizen participation (decisions about water reflect citizens' preferences)
- B11 Accountability (decision-makers can be held to account)
- B12 Transparency (access to all information by all interested parties)
- B13 Effectiveness (ensuring that targets and objectives are met)
- B14 Cooperation (working with others towards common goals)

To measure **fundamental values**:

In the following task you will be presented with a list of values. Please indicate how important each value is to you as a guiding principle in your life or if the value opposes your views.

**Try to distinguish as much as possible between the values by using a wide range of numbers on the scale.**

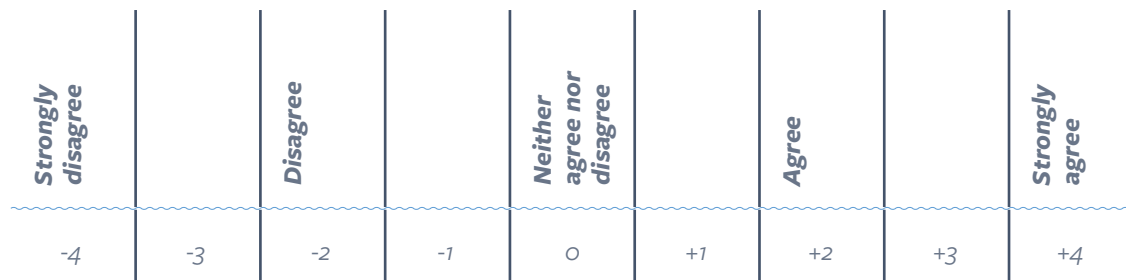


- C1 Protecting the environment (from destruction or pollution)
- C2 Broadmindedness (being tolerant of different ideas and beliefs)
- C3 Social justice (correcting injustice, protecting society's weak and vulnerable)
- C4 Helpfulness (helping family and friends)
- C5 Honesty (being genuine, sincere)
- C6 Social power (having control over others, being dominant)
- C7 Wealth (having material possessions, money)
- C8 Success (achieving one's goals)
- C9 Ambition (being hard-working, aspiring)
- C10 Curiosity (being interested in everything, exploring)
- C11 Freedom (forming own opinions, making own decisions)
- C12 A varied life (filled with challenge, novelty and change)
- C13 An exciting life (having stimulating experiences)
- C14 Pleasure (fulfilling one's desires)
- C15 Enjoying life (enjoying food, leisure etc.)
- C16 Accepting my portion in life (accepting life's circumstances)
- C17 Respect for tradition (maintaining customs of one's family or culture)
- C18 Honouring of parents and elders (showing respect)
- C19 Obedience (following rules, meeting obligations)
- C20 Social order (having a stable society)
- C21 Family security (living in secure surroundings)

To measure **water policy preferences**:

We will now show you 13 pairs of statements about water policy. Please indicate how much you agree or disagree with each statement.

**Again, try to distinguish as much as possible between the statements by using a wide range of numbers on the scale.**



*D1\_1 Flood risk management should focus on nature-based solutions.*

*D1\_2 Flood risk management should focus on civil engineering solutions.*

*D2\_1 Strategies to improve water quality in rivers and lakes should prioritise improving water treatment technologies.*

*D2\_2 Strategies to improve water quality in rivers and lakes should prioritise adoption of best management practices and increasing awareness.*

*D3\_1 Encouraging water users to conserve water should be the top priority to help reaching universal access to water.*

*D3\_2 Investment in water supply infrastructure should be the top priority to help reaching universal access to water.*

*D4\_1 Water supply and sanitation services should preferably be managed by private companies.*

*D4\_2 Water supply and sanitation services should preferably be managed by public bodies.*

*D5\_1 Domestic users should be required to pay for access to water.*

*D5\_2 Access to water for domestic use should always be free of charge.*

*D6\_1 Water use rights should be allocated through water markets.*

*D6\_2 Water use rights should be allocated through public water licences.*

*D7\_1 Water-related decisions are best taken at the national level by a central agency.*

*D7\_2 Water-related decisions are best taken at the most local level possible.*

*D8\_1 Irrigation capacity needs to be increased to safeguard agricultural production.*

*D8\_2 Irrigation capacity must become more efficient to safeguard agricultural production.*

*D9\_1 More dams need to be built to meet the growing demand for energy and water, particularly in the Global South.*

*D9\_2 Energy saving and water saving technologies should be supported to minimise the need for new dams, particularly in the Global South.*

*D10\_1 Companies should receive financial incentives for reaching good water governance targets.*

*D10\_2 Companies should be fined if they obstruct reaching good water governance targets.*

*D11\_1 Voluntary and corporate social responsibility (CSR) initiatives should be prioritised to improve social and environmental standards.*

*D11\_2 Command and control mechanisms should be prioritised to improve social and environmental standards.*

*D12\_1 Governments should prioritise enforcement and compliance with existing laws and regulations.*

*D12\_2 Governments should prioritise innovation and development of new laws and regulations.*

*D13\_1 Water managers should make more use of local and indigenous knowledge when taking decisions.*

*D13\_2 Water managers should make more use of science-based knowledge when taking decisions.*





