



Government of the Netherlands

# THE VALUING WATER SURVEY: A GLOBAL SURVEY OF THE VALUES THAT SHAPE DECISION- MAKING ON WATER

By Christopher Schulz, Lukas Wolf, Julia Martin-Ortega, Klaus Glenk

Valuing  
Water  
Initiative



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By Christopher Schulz, Lukas Wolf, Julia Martin-Ortega, Klaus Glenk<sup>1</sup>

The way we value water influences the decisions that we take around its use and conservation. The value of water is often expressed in economic terms; for instance, the 1992 Dublin Principles recognised water as an economic good. 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 in which we grew up. 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.<sup>2</sup>

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 the underlying value basis.

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## 1. WHAT DID WE DO?

We developed and implemented the Valuing Water Survey, which was aimed at respondents with a professional interest in water. This includes people working in water utilities, WASH, flood and drought management or water policy and

governance, but also in related sectors such as investment and finance, where decisions about water are often taken. For an overview of respondent profiles, see Figure 1.

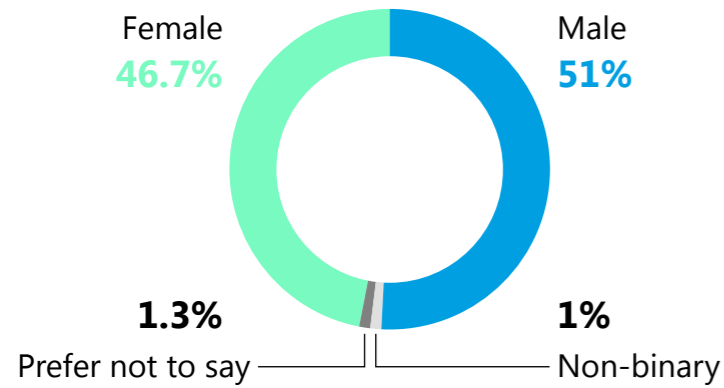
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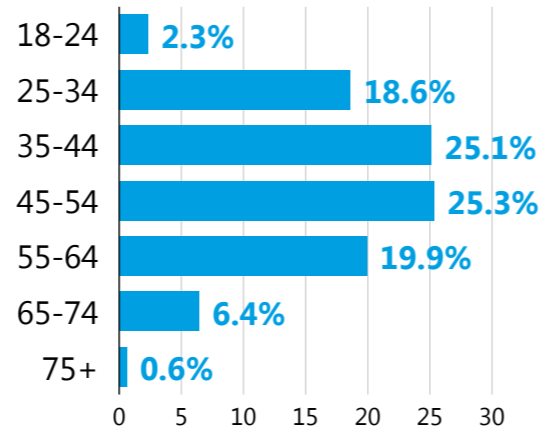
2 For a general introduction, see, e.g.: L. Steg, J.I.M. De Groot (2012): Environmental values. In: S. Clayton (ed.): The Oxford Handbook of Environmental and Conservation Psychology. Oxford University Press, Oxford, UK, pp. 81-92. <https://doi.org/10.1093/oxfordhb/9780199733026.013.0005>

FIGURE 1: Respondent characteristics

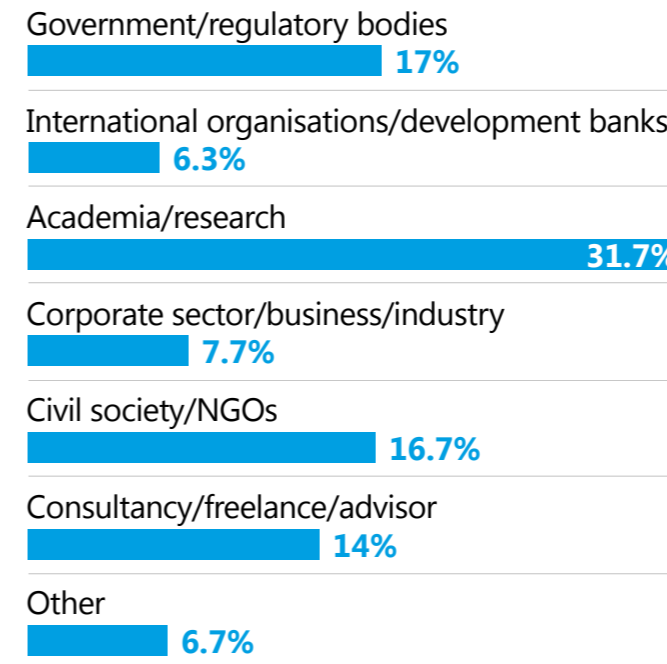
**GENDER**



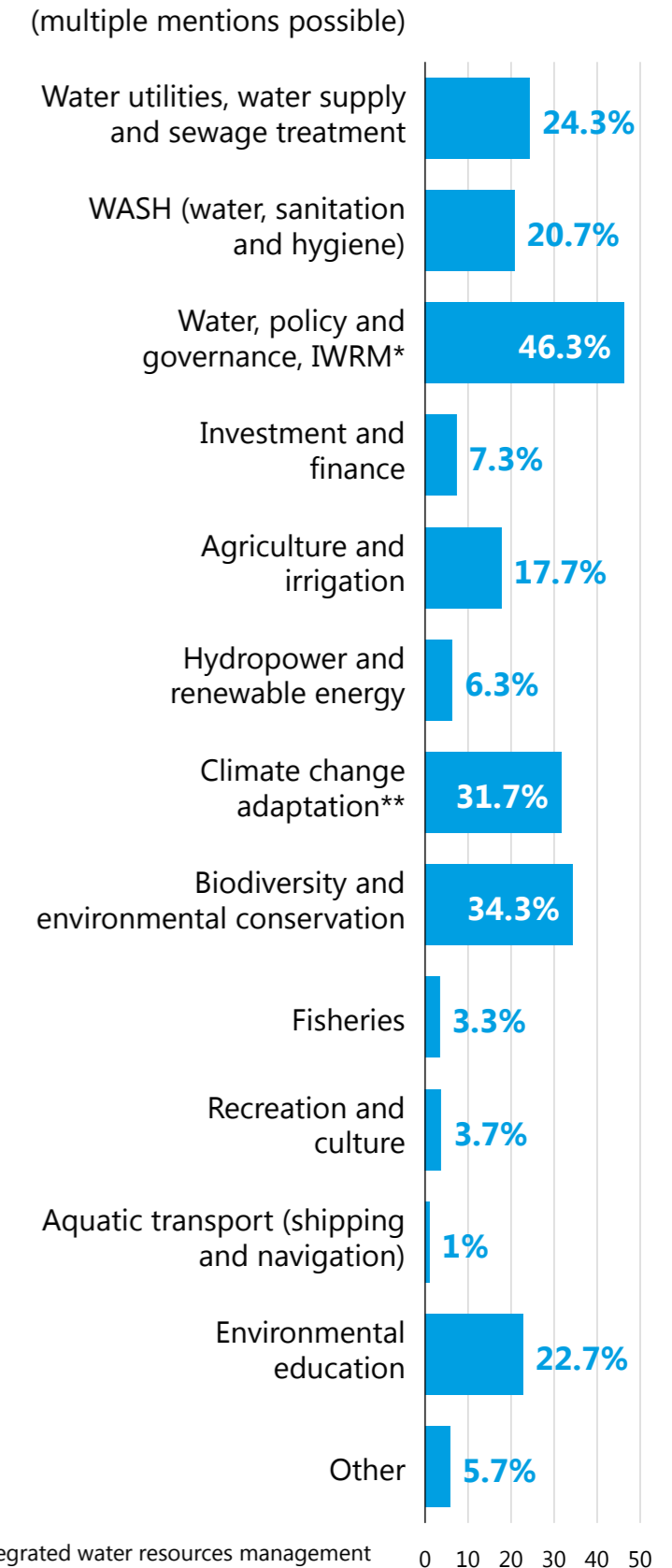
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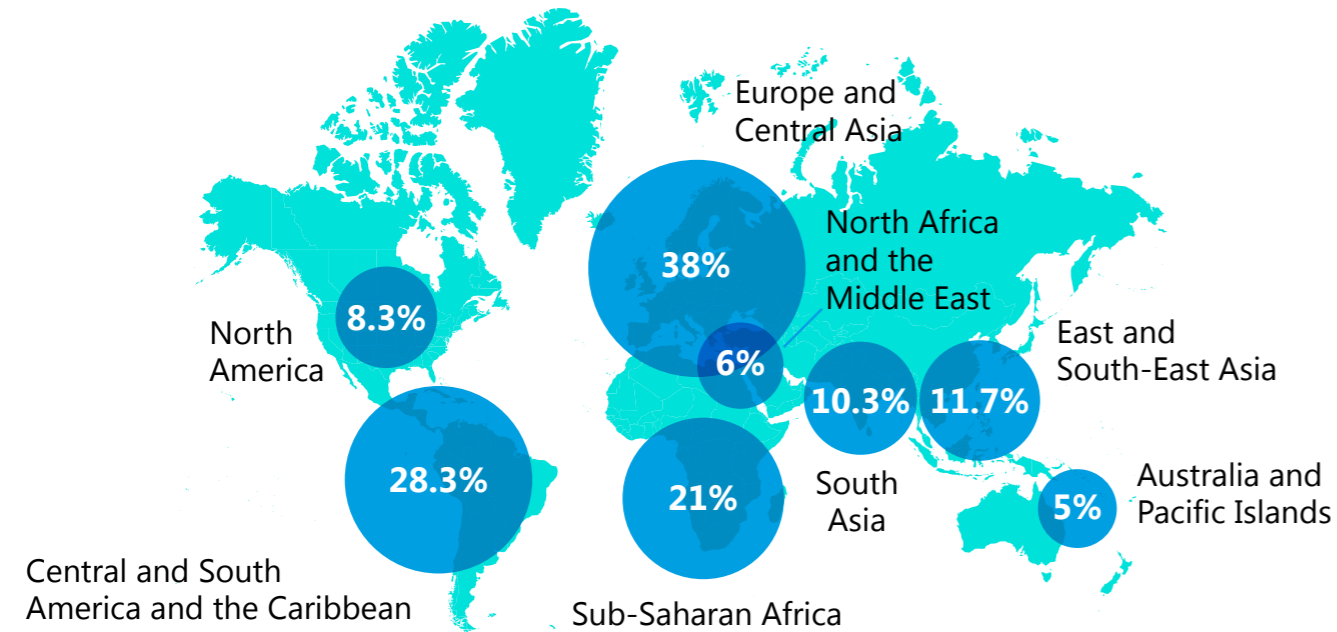
**SECTOR (TYPE)**



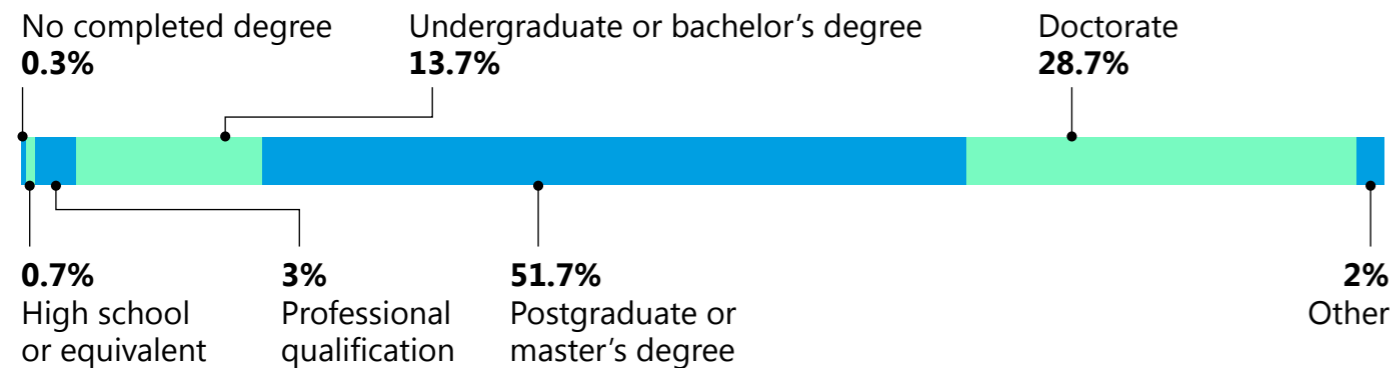
**WATER SECTOR**



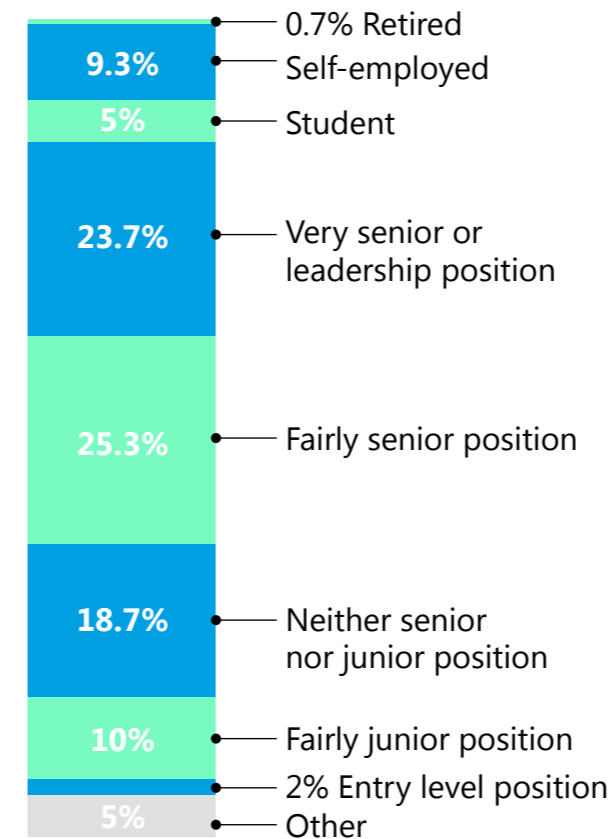
**WORLD REGIONS WORKED IN (MULTIPLE MENTIONS POSSIBLE)**



**FORMAL EDUCATION**

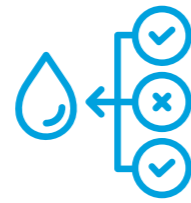


**ROLE IN ORGANISATION**



\*integrated water resources management  
\*\*including flood and drought management

The Valuing Water Survey represents the first attempt to study links between personal values and preferences for strategic dimensions of the global water governance agenda. This presumes that there are indeed commonalities that can be found across cultures, sectors, and locally specific scenarios for water management. This is possible through consideration of a relatively broad level of values which may demonstrate that concerns and patterns of interaction around water are, in fact, rather universal. It is also worth noting that this is the first survey of its kind based on the views of professional respondents, that is, people who are actively involved in decision-making about water as part of their work (while previous surveys were based on the views of citizens).



Second, we investigated *governance-related values*, that is, ideas about the general principles that govern how decisions about water should be taken.

Examples of such values are efficiency or effectiveness, equity and fairness. These are concepts that are of general appeal to most people, but equally they may also not be prioritised in the same way. To measure governance-related values, we considered 'economic efficiency (solutions that offer best value for money)', 'transparency (access to all information by all interested parties)', or 'social justice (prioritising the poor and marginalised)', among others.



Third, we measured people's personal or *fundamental values*, that is, general guiding principles for life that include, but go far beyond, decision-making

about water. Research has consistently shown that personal and professional decisions are often influenced by such fundamental values. Examples are seeking safety, being curious about new experiences, wanting to help others, or being seen as successful. These were measured with standardised statements that had been developed and tested by the social psychologist Shalom Schwartz over the course of several decades.<sup>5</sup>



The survey measured several kinds of personal values held by respondents.<sup>3</sup> First, we sought to understand people's perceptions of *water values*, that is, the importance that people assign to water resources. Water values are often expressed in economic, ecological, or cultural terms. All terms cover important values of water, but not everyone would prioritise them in the same way. For example, to measure water values, we included questions about uses or values of freshwater resources such as 'basis for agricultural production', 'places of beauty', or as 'habitats for aquatic animals and plants'.<sup>4</sup>

3 If you would like to know more about the theoretical framework that informed this survey, please consult: C. Schulz, J. Martin-Ortega, K. Glenk, A.A.R. Ioris (2017): The value base of water governance: A multi-disciplinary perspective. Ecological Economics 131: 241-249. <https://doi.org/10.1016/j.ecolecon.2016.09.009>.

4 These are also often classified as 'ecosystem services', see, e.g., J. Martin-Ortega, R.C. Ferrier, I.J. Gordon, S. Khan (eds.) (2015): Water Ecosystem Services: A Global Perspective. Cambridge University Press, Cambridge, UK.

5 S.H. Schwartz (1992): Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In: M.P. Zanna (ed.): Advances in Experimental Social Psychology (vol. 25), Academic Press, San Diego, CA, USA, pp. 1-65. [https://doi.org/10.1016/S0065-2601\(08\)60281-6](https://doi.org/10.1016/S0065-2601(08)60281-6); S.H. Schwartz, J. Cieciuch, M. Vecchione, E. Davidov, R. Fischer, C. Beierlein, A. Ramos, M. Verkasalo, J.-E. Lönnqvist, K. Demirutku, O. Dirilen-Gumus, M. Konty (2012): Refining the theory of basic individual values. Journal of Personality and Social Psychology 103(4): 663-688. <https://doi.org/10.1037/a0029393>.

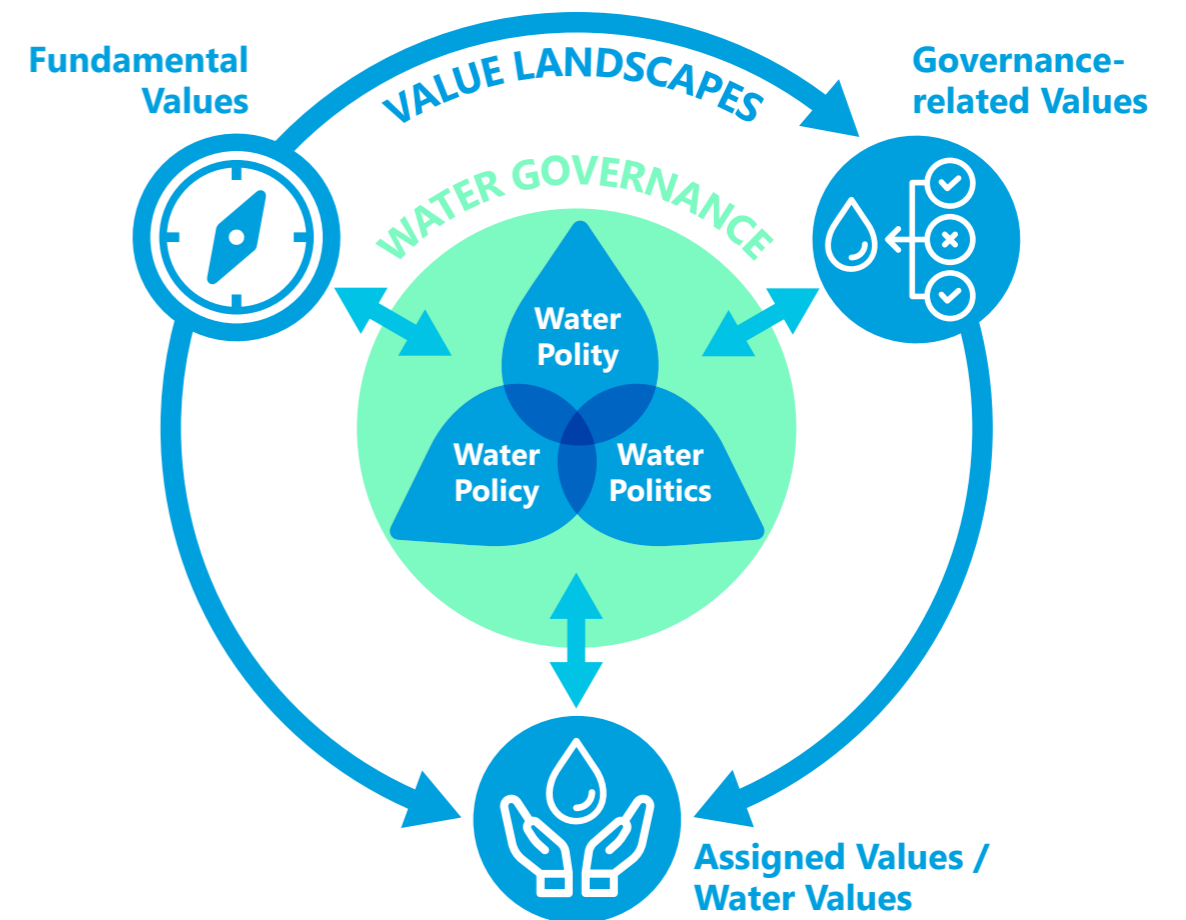
The conceptual framework used for the analysis is presented in Figure 1. Briefly, it suggests that the deeper level of fundamental values can influence both how we prioritise governance-related values and which values we assign to water (see arrows in Figure 2). The three types of values are thus closely linked. They shape what one may call value landscapes, as groups of values that people frequently connect in their mind."

All three types of values will have implications for what kind of water governance we would like to see. As a simple example, those who favour prioritising economic uses of water might often also prioritise different fundamental values and

governance-related values than those who do not. This may result in a water governance preference for prioritising agricultural uses of water over non-economic uses, for example (see arrows that connect both boxes).

At this point, it is worth clarifying what we mean by "water governance". Although there are many different definitions, we propose to define it as 'the instruments used to achieve a certain outcome' (water policy), the 'power play between different actors and organisations' (water politics), and the 'institutions in which decision-making takes place' (water polity).<sup>6</sup>

FIGURE 2: Different types of values and how they are linked with water policy and water governance



6 Note that this definition is inspired by this earlier work on 'governance': O. Treib, H. Bähr, G. Falkner (2007): Modes of governance: Towards a conceptual clarification. Journal of European Public Policy 14(1): 1-20. <https://doi.org/10.1080/135017606061071406>

Finally, in our survey we presented respondents with a series of strategic choices with regards to the global water governance agenda. The purpose here was to find out how professional respondents' broad personal values relate to concrete decisions about water policy, politics, and polity. The themes considered in the survey included prominent dilemmas in water management and governance that most professionals will recognise, but which have not been studied in the context of values: whether to provide positive incentives for good water governance, or whether to use command and control mechanisms and fines to achieve desired outcomes; whether to focus on engineering to solve hydrological problems or whether to prioritise nature-based solutions; whether to provide domestic water supply free of charge or whether to charge a fee, to name but a few.

## 2. WHY DID WE DO IT?

Interest in values of water has never been greater. The theme for the World Water Day 2021 was 'Valuing Water', which inspired water organisations around the world to reconsider how and why water matters and how decisions about water are taken. The groundwork for this was laid in 2018 when the United Nations and the World Bank-led High Level Panel on Water (HLPW) proposed five Valuing Water Principles. The first of these principles asks us to "recognise and embrace water's multiple values to different groups and interests in all decisions affecting water".

The Government of the Netherlands was one of the driving forces of this process, and the Netherlands' Prime Minister Rutte launched the 'Valuing Water Initiative' in 2019 at the

World Economic Forum, in direct response to the HLPW's five Valuing Water Principles (see Box 1). Although started by the Government, the Valuing Water Initiative now draws on the experience from a wide range of partners from Europe, Africa, Asia, as well as North and South America. This includes private sector organisations, NGOs, development banks, professional associations, research institutes, and many other governments.

To begin with, implementing the first HLPW Valuing Water Principle requires understanding what multiple values of water may be, who might hold them, and how they might affect decisions about water. Our global survey covers all of these questions, in a systematic way, supported by statistical analyses. In designing it, we made sure to use a broad definition of 'multiple values', that includes, but goes well beyond, understanding water solely in economic or monetary terms.

### BOX 1: The 5 Valuing Water Principles



**1** Recognize and embrace water's multiple values to different groups and interests in all decisions affecting water.



**2** Reconcile values and build trust – conduct all processes to reconcile values in ways that are equitable, transparent and inclusive.



**3** Protect the sources, including watersheds, rivers, aquifers, associated ecosystems, and used water flows for current and future generations.



**4** Educate to empower – promote education and awareness among all stakeholders about the intrinsic value of water and its essential role in all aspects of life.



**5** Invest and innovate – ensure adequate investment in institutions, infrastructure, information and innovation to realize the many benefits derived from water and reduce risks.

PICTURE CREDIT: ISTOCK



### 3. HOW DID WE DO IT?

The survey was available to respondents online, in seven languages (English, French, Spanish, Portuguese, Russian, Chinese, Arabic), between July and November 2021 and was disseminated widely to people with a professional interest in water. Of 488 responses in total, we analysed 300 complete responses with statistical techniques. The purpose of these techniques is to understand systematic relationships between values and/or water governance preferences.

For example, past research has shown that citizens who endorse self-enhancement values more strongly (that is, people who express greater concern for personal success, achievements), are more likely to favour water policies that will contribute to economic development (such as the construction of water infrastructure, including dams and waterways). Likewise, those who endorse self-transcendence values more (that is, people who express greater care for other people and the environment) have been shown to be more likely to favour water policies that will benefit environmental conservation, even if that means accepting reduced opportunities for economic development.<sup>7</sup>

Where policies to foster economic development or environmental conservation are in conflict, it is easiest to pinpoint the role of people's values (hence why much research focuses on scenarios with clear alternatives), but it is worth acknowledging that other scenarios exist where decision-makers manage or seek to reconcile these conflicting policy objectives.

Building on such insights, the Valuing Water Survey went one step beyond. The survey explored whether there are general patterns in how those with a professional interest in water (that is, not just members of the general public) value water and how they evaluate different strategic priorities for water governance (beyond the case of water infrastructure). This is important, because they are involved in decision-making about water, so understanding their values has real-world relevance for understanding current and future decisions about water.

### 4. WHAT DID WE FIND?

Findings of the Valuing Water Survey cluster into several areas. They capture the views of 300 respondents, with 40% residing in Europe, 20% in Central and South America and the Caribbean, around 10% in Sub-Saharan Africa, and around 10% in Asia (see Figure 1).



#### FINDING 1: Water values

Our respondents' water values can be categorised into three different types: the extent to which respondents prioritise the economy, culture, or the environment.

**Economic water values** refer to water as the basis for agricultural production, as a source of renewable energy (hydropower), as an asset for economic development, and, to a lesser extent, as sources of livelihoods to people in rural communities.

**Cultural water values** are about seeing water as a source of identity, considering waterbodies as sites of spirituality and cultural traditions, as places of beauty, and for recreation and leisure.

**Environmental water values** refer to waterbodies as habitats for aquatic animals and plants and suggest that their main purpose is to support natural environments.

These types of water values were determined via a statistical technique known as principal components analysis, which serves to establish the number of different perspectives that are present among survey respondents (in this case, three), and what they entail.<sup>8</sup>

Economic values



Environmental values



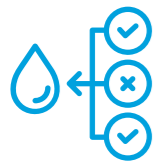
Cultural values



**PEOPLE TEND TO THINK ABOUT THE VALUE OF WATER IN TERMS OF CLUSTERS OF ECONOMIC VALUES, CULTURAL VALUES AND/OR ENVIRONMENTAL VALUES.**

7 C. Schulz, J. Martin-Ortega, K. Glenk (2018): Value landscapes and their impact on water policy preferences. *Global Environmental Change* 53: 209-224. <https://doi.org/10.1016/j.gloenvcha.2018.09.015>; C. Schulz, J. Martin-Ortega, K. Glenk (2019): Understanding public views on a dam construction boom: The role of values. *Water Resources Management* 33(14): 4687-4700. <https://doi.org/10.1007/s11269-019-02383-9>.

8 The same method was used for Finding 2 and Finding 3.



## FINDING 2: Governance-Related Values

When it comes to deciding which values and principles are important for achieving good water governance, there are two main perspectives: the first we may call the efficiency perspective, the second, we may call the social justice perspective.

This finding is noteworthy in so far as any number of perspectives could have been identified, but the survey results show that the divide is rather binary.

**A first type of governance-related values consists of those that focus on making water governance more efficient, competitive, and effective.** This efficiency perspective reflects a preference for solutions that offer best value for money, striving for optimisation and better performance, and giving priority to effectiveness,

that is, ensuring that targets and objectives are met. To a lesser degree, the values of simplicity, adaptability, and clarity are also part of this type.

**A second type of governance-related values involves concerns for social justice, that is prioritising the poor and marginalised, advancing gender equality, and caring about future generations' needs.** Respondents who prioritised these values also favoured stakeholder and citizen participation in water governance, cooperation, transparency and accountability. Overall, a very different set of priorities becomes evident. The only value that could reasonably be included in either type is clarity.

These findings are of particular interest, since there has been little previous research into governance-related values.



## SURVEY RESULTS SUGGEST THAT THERE ARE TWO PREDOMINANT PERSPECTIVES ABOUT WHICH VALUES MAY CHARACTERISE WATER GOVERNANCE: EFFICIENCY AND/OR SOCIAL JUSTICE

(BOTH INCORPORATE A BROAD SET OF CONSIDERATIONS, SEE APPENDIX/TABLE 3).

## FINDING 3: Archetypes or Strategic Priorities for the Global Water Governance Agenda

We found three archetypes, or conceptually contrasting perspectives on priorities for the global water governance agenda: focusing on mastering nature; working with nature; or on market-based water management.

**The first archetype favours mastering nature,** which involves prioritising engineering solutions, the construction of dams in the Global South, the expansion of irrigation capacity, investment in water supply infrastructure, and water treatment solutions to address pollution. Other preferences of this type include using financial incentives and improving environmental and social standards via corporate social responsibility.

**The second archetype revolves around working with nature.** Here the emphasis is placed on nature-based solutions for flood risk management, addressing water pollution issues through raising awareness and best land management

practices, reducing domestic water consumption, making irrigation more efficient, and focusing on water saving and energy saving technologies.

**The third archetype is centred on market-based water management** and thus has an entirely different focus. This implies favouring privatisation of water and sanitation utilities, payments for access to water among domestic users, and allocating water use rights through water markets. It is also associated with opposing public management or free access to water, resulting in a consistent perspective on water governance overall.

“Although the first two types seem conceptually related, all three were found through the same statistical technique (Principal Components Analysis) and can thus each be thought of as archetypes that capture a specific way of looking at water issues.



## RESPONDENTS IDENTIFIED THREE STRATEGIC PRIORITIES FOR THE GLOBAL WATER GOVERNANCE AGENDA: WORKING WITH NATURE, MASTERING NATURE, AND ADVANCING MARKET-BASED WATER MANAGEMENT

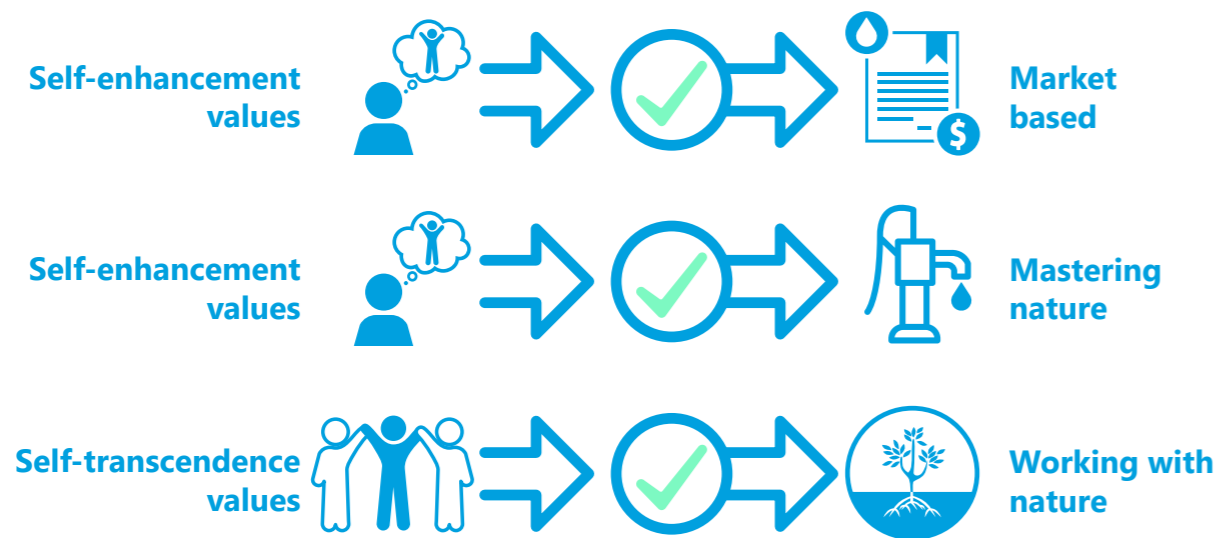
(SEE APPENDIX/TABLE 4 FOR DETAILS).

**FINDING 4: Fundamental Values are Linked with Archetypes or Preferences about Strategic Priorities**

Personal or fundamental values predict the extent to which respondents have a stronger preference for: mastering nature; working with nature; or market-based water management.

People differ with regards to how they prioritise self-transcendence vs. self-enhancement values (as described in section 3 above) and this prioritisation relates to their water governance preferences or archetypes that they

support. Those who care more about success, achievements, and power (and less about self-transcendence) are more likely to support market-based water management. They also show greater support for mastering nature, that is, active interventions to manage water through engineering, regulation, or financial incentives. Conversely, those who score higher on self-transcendence values are more likely to express support for working with nature.



**FINDING 5: Governance-Related Values are Linked with Archetypes or Preferences about Strategic Priorities**

Whether respondents have a preference for efficiency and competitiveness or for social justice, participation and transparency, is also linked with their views on mastering nature; working with nature; or market-based water management.

As described above, governance-related values may fall into two main types: either focusing on

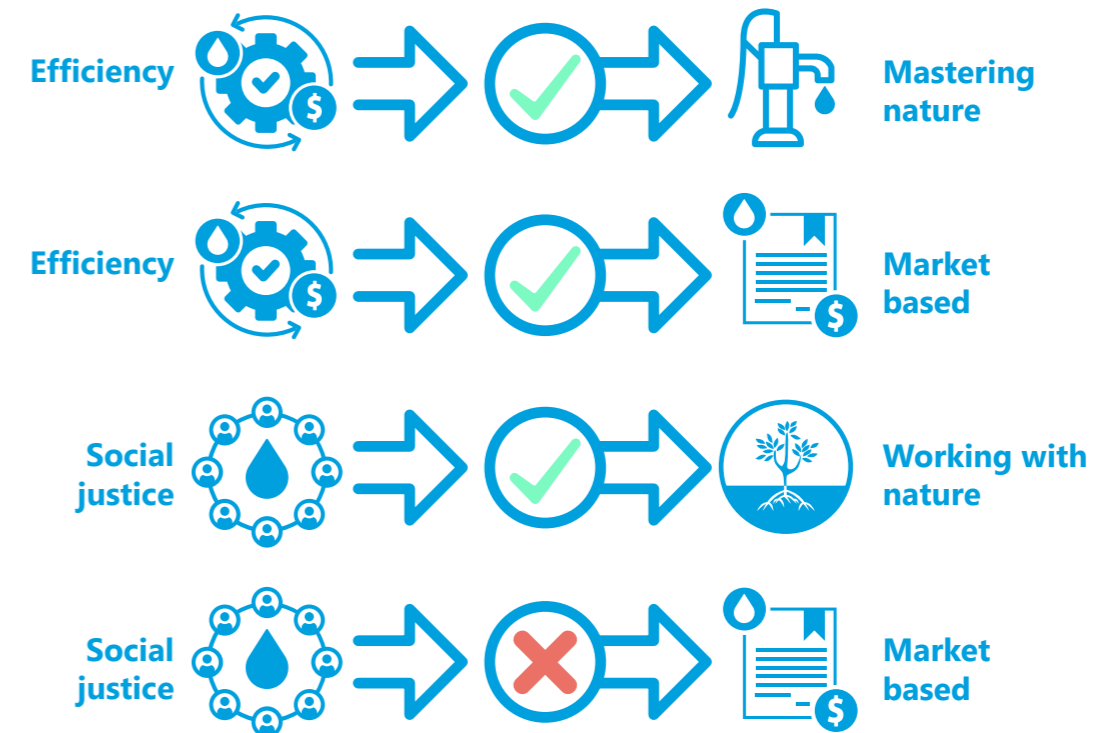
efficiency and competitiveness, or focusing on social justice, as well as participatory and transparent governance, though it is important to acknowledge that these types are not mutually exclusive.

The two main perspectives can also be linked to the three archetypes or water governance

preferences described above. Those who value efficiency and competitiveness are more likely to support mastering nature and market-based water management. Those who value social justice and participation are more likely to support working with nature and less likely

to support market-based water management.

These findings are a good example of how people’s values may be reflected in the kinds of water policy and governance they would like to see.



**FINDING 6: Water Values are Linked with Archetypes or Preferences about Strategic Priorities**

Different views on the importance of economic, cultural and environmental values of water are associated with different views on archetypes or strategic priorities for the global water governance agenda.

That one’s perspective on water values matters when it comes to preferences on water governance should not come as a surprise. Nevertheless, the survey resulted in interesting insights.

First, those who attribute greater importance to economic values of water are also more likely to support water policies that fall into the mastering nature category. Prioritising economic uses of water thus aligns with a desire to actively manage water through engineering and regulation interventions.

Second, those who rate economic water values highly and those who give lower importance

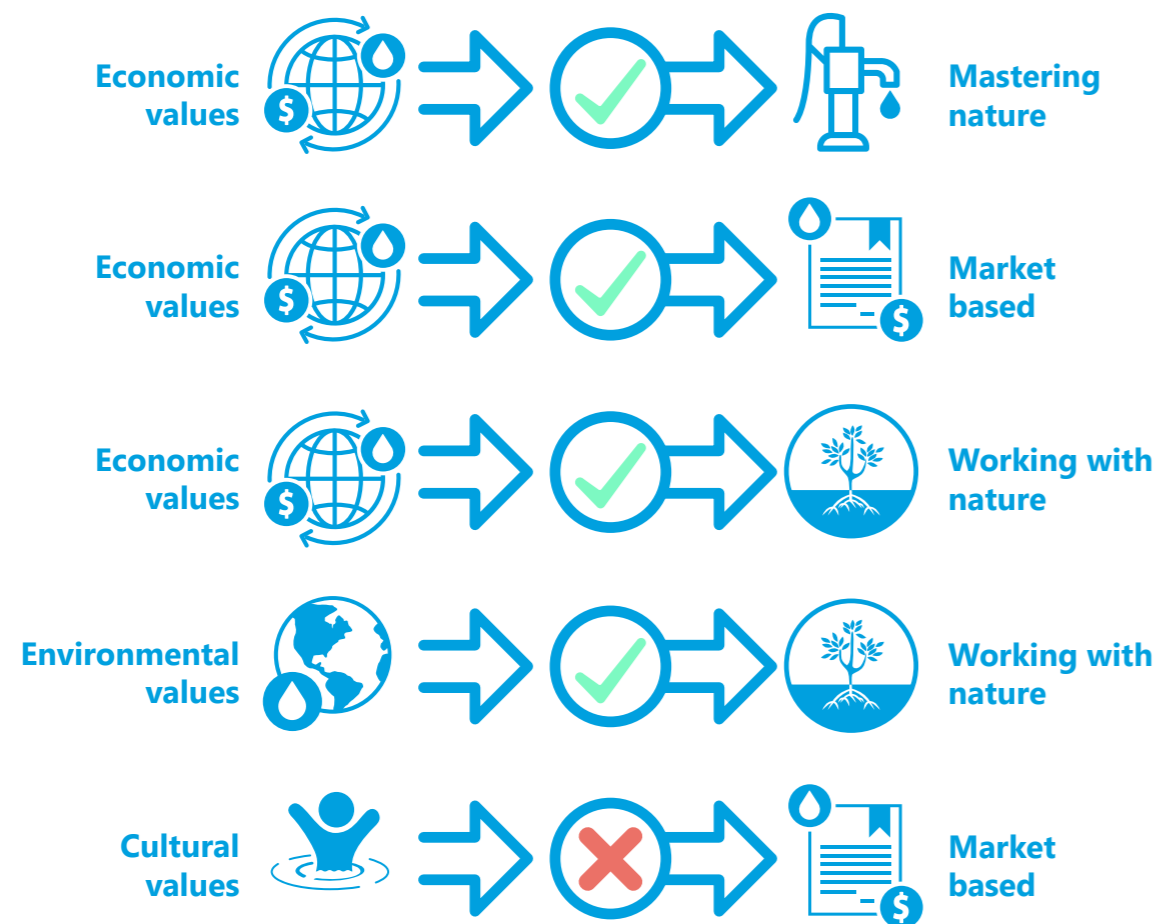


to cultural values are more likely to support market-based water management. This makes intuitive sense, since cultural values are most difficult or unlikely to be traded in markets, with the possible exception of recreational services.

Third, those who rate environmental values of water highly and those who rate economic values of water highly show greater support for working with nature policies. There is thus some nuance in how we should think of respondents who care about the economy. "There is thus a tendency that showing greater concern for economic values goes along with a preference for working with nature.

Preferences might also be linked with respondents' professional profiles (e.g., what kind of organisation they work for; which country they work in). Being able to investigate such relationships would require an even larger sample of respondents from all around the world and all types of professions. We have thus decided to keep the survey available until mid-2023 and may choose to provide a more detailed analysis in the future. **Please do continue to share the survey via this link with your colleagues.**

[https://bathpsychology.eu.qualtrics.com/jfe/form/SV\\_7VAX90JlwMzSR00](https://bathpsychology.eu.qualtrics.com/jfe/form/SV_7VAX90JlwMzSR00)



## 5. WHAT DOES IT ALL MEAN?

The HLPW asks us to "Recognize and embrace water's multiple values to different groups and interests in all decisions affecting water."

Above all, the survey sought to support the evidence base of what these multiple values are, and how decisions about water might be influenced by various types of values that people hold. The survey provides clear evidence that the global water community is united in their concern for water resources; but a systematic appreciation of how values play a role in water governance has thus far been missing. Beyond an overall consensus that water has value due to sustaining life on Earth, there are various perspectives on value, sometimes complementary, sometimes conflicting. This is something that a values lens on water can make visible.

Everyone working in the field will recognise the three main perspectives on the value of water (as cultural, economic, or environmental). Nevertheless, it is important to always consider whether these values are being addressed in decisions about water. One respondent suggested that this is not always the case, and that environmental values are sometimes not taken sufficiently seriously:

*"Life, as we know it, depends, above all, on water. That is, what happens to water, will be the destiny of life on the planet. For this reason, its value is incommensurable [...] Water is an inalienable heritage for all living beings, no one, no species or group of individuals should appropriate it, seeking to restrict its availability or impacting on its quality, especially if the integrity of future ecosystems of the planet were to be put at risk."*

But there is also a clear sense that valuing water goes beyond just ascribing a value to water. Another quote provided by a survey respondent captures this nicely:

*"In my view the way we see/value water is also an indicator of how we understand ourselves as persons. There is no life, including ours, without water. It is a fundamental part of the ingredients necessary to actualize our full potential as human beings."*

Our findings would support such a message. Valuing water goes beyond the immediate level of economic, cultural, and environmental values of water and includes broader principles such as efficiency or social justice (examples of governance-related values) or even the personal values of self-transcendence and self-enhancement (as examples of fundamental values), described as Finding 4.

Decision-makers about water thus need to be aware that there are multiple, sometimes contrasting expectations for water governance to address social concerns but also to be efficient and effective. Addressing different values is a perpetual challenge. Accounting for these differences while aiming to achieve a balanced basis for water governance requires negotiation. People's values do not change often; some would argue that values only change in generational timescales.<sup>9</sup> Taking diversity in people's values as a given, the challenge is to work towards making sure that policies resonate with a spectrum of values, for example through careful framing of outcomes.

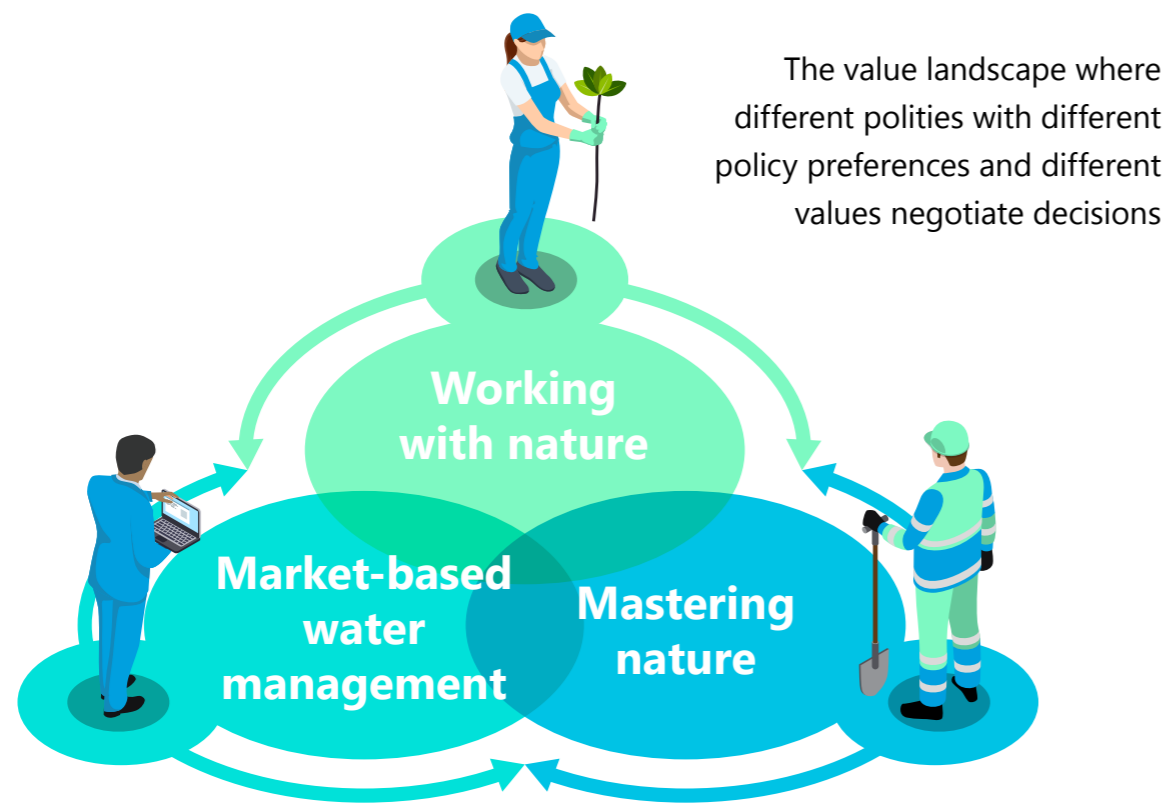
<sup>9</sup> M.J. Manfredo, J.T. Bruskotter, T.L. Teel, D. Fulton, S.H. Schwartz, R. Arlinghaus, S. Oishi, A.K. Uskul, K. Redford, S. Kitayama, L. Sullivan (2017): Why social values cannot be changed for the sake of conservation. *Conservation Biology* 31(4): 772-780. <https://doi.org/10.1111/cobi.12855>.

Our survey is the first to report how such different value perspectives are reflected in water governance, that is, in the ideas of mastering nature, working with nature, or using markets to govern decision-making about water. What is stated above regarding values is true for these policy positions as well; they cannot be fully reconciled. Ultimately, which policies will be realised, and which values will be reflected in them, remain political decisions. Nevertheless, it is important that those taking such decisions are aware that outcomes may not necessarily align with the values of people experiencing their impacts.

From this, at least two implications arise: first, it remains as important as ever to work towards greater participation, including of those who may have traditionally lacked the political influence to do so. Greater participation of politically

marginalised groups does not guarantee consideration of their values in water governance arrangements, but it can facilitate it. Judging from the findings of this survey (which is worth remembering, reflects the views of a large sample of people with a professional interest in water), good water governance should thus seek to achieve a balance between working with nature, mastering nature, and using market-based methods for managing water resources.

Second, there is a need for increased awareness that decisions about water are decisions about people's values. Put differently, people may care strongly about these decisions, since values are at the core of what creates our identities, and where possible, we prefer to act in accordance with them. It is thus paramount to make these values visible, communicate to others what they are, and ensure that policies reflect their diversity.



PICTURE: ISTOCK

### ACKNOWLEDGEMENTS

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## APPENDIX / OVERVIEW OF METHODS

### Water values



Water values were measured with ten items describing different uses or values of freshwater, rivers and lakes (see Table 1). Respondents indicated how important each water value is to them on a 9-point scale from -1 (opposed to my views), to 0 (not important), 3 (moderately important), 6 (very important), and 7 (of supreme importance). This response scale was adopted from the Schwartz Value Survey.

To understand the structure of water values, we conducted a principal components analysis with varimax rotation. We used the Kaiser's criterion and inspected the scree plot to determine the

number of components for each scale. Only items that had loadings of at least .40 on any of the components were considered.

For water values, the analysis suggested three factors that together explained 60.40% of the variance. Four items loaded on a cultural component, four items loaded on an economic component, and two items loaded on an environmental component. The cultural component explained 32.63% of the variance, the economic component explained 17.03% of the variance, and the environmental component explained 10.75% of the variance.

**TABLE 1. Component structure of water values as identified in principal components analysis.**

Water values	Cultural component	Economic component	Environmental component
Shaping our identity, who we are	.82		
Sites for spirituality and cultural traditions	.81		
Places of beauty	.68		
Places for recreation and leisure	.59		
Assets for economic development		.79	
Basis for agricultural production		.78	
Sources for renewable hydroelectric energy production		.73	
Sources of livelihoods to people in rural communities		.48	
Habitats for aquatic animals and plants			.85
Supporting natural environments			.80

**Note.** Scores reflect the loadings of each item on the respective component. All loadings of .40 or below are omitted.



### Governance-related values

We assessed governance-related values using 14 items that described principles for water governance and management (see Table 2). Again, respondents indicated how important each governance-related value is to them on the same 9-point scale as for water values.

We again conducted a principal components

analysis, which suggested two factors that together explained 43.66% of the variance. Eight items loaded on a social justice component and five items loaded on an efficiency component. The social justice component explained 32.22% of the variance and the efficiency component explained 11.45% of the variance. One additional item, clarity, loaded equally strong on both components and was excluded in subsequent analyses.

**TABLE 2. Component structure of governance-related values as identified in principal components analysis.**

Governance-related values	Social justice component	Efficiency component
Social justice (prioritising the poor and marginalised)	.74	
Gender equality (equal involvement of women and men in decision-making)	.70	
Intergenerational justice (prioritise future generations' needs)	.70	
Transparency (access to all information by all interested parties)	.60	
Stakeholder participation (all stakeholders can have a say)	.59	
Citizen participation (decisions about water reflect citizens' preferences)	.55	
Cooperation (working with others towards common goals)	.54	
Accountability (decision-makers can be held to account)	.48	
Competition (strive for optimisation and better performance)		.80
Economic efficiency (solutions that offer best value for money)		.75
Simplicity (simple rules and regulations)		.60
Effectiveness (ensuring that targets and objectives are met)		.59
Adaptability (swiftly adapt to new challenges and circumstances)		.48
Clarity (clear framework of rules and regulations)	.49	.47

**Note.** Scores reflect the loadings of each item on the respective component. All loadings of .40 or below are omitted.



### Personal or fundamental values

We drew on the well-established circumplex model of values, which has been supported in data from over 80 nations in varied

cross-sectional, longitudinal, and experimental paradigms.<sup>10</sup> Schwartz’s model defines values as life-guiding principles that transcend specific situations. The model proposes that values can be organised along two orthogonal motivational dimensions: self-transcendence versus self-enhancement and openness versus conservation. Self-transcendence values promote the welfare of others (e.g., values of helpfulness, responsibility), whereas self-enhancement values promote the self (e.g., power, achievement). Openness values promote intellectual and emotional

interests in uncertain directions (e.g., freedom, curiosity), whereas conservation values promote the status quo (e.g., tradition, security).

We assessed personal values using a shortened 21-item Schwartz Value Scale (Schwartz, 1992). The items included five self-transcendence values (e.g., “Helpfulness - helping family and friends”), four self-enhancement values (e.g., “Success - achieving one’s goals”), six openness values (e.g., “Curiosity - being interested in everything, exploring”), and six conservation values (“Social order - having a stable society”). Respondents indicated how important each value is to them personally on the same 9-point scale.

### Archetypes or strategic priorities for the global water governance agenda

Respondents evaluated 13 pairs of statements about water governance and policy, with statements in a pair addressing one broader issue (see Table 3). For example, one pair focusing on flood risk management consisted of the statements: “Flood risk management should focus on nature-based solutions”, and “Flood risk management should focus on civil engineering solutions”. No more than two pairs were shown on each page. Respondents answered all items on a 9-point scale from -4 (strongly disagree) to 0 (neither agree nor disagree) and +4 (strongly agree).

We again conducted a principal components analysis to understand consistent perspectives or preferences for the global water governance agenda, which one may call “archetypes”. Three such archetypes were found, that is, the principal components analysis suggested three factors that together explained 32.15% of the variance. Eight items loaded on a mastering nature component, five items loaded on a working with nature component, and five items loaded on a market-based water management component. Eight items had loadings below .40 and were excluded.

**TABLE 3.** Component structure of preferences for strategic priorities for the global water governance agenda as identified in principal components analysis.

Strategic priorities for the global water governance agenda	Archetypes		
	Mastering nature	Working with nature	Market-based water management
Irrigation capacity needs to be increased to safeguard agricultural production.	.69		
Strategies to improve water quality in rivers and lakes should prioritise improving water treatment technologies.	.60		
Flood risk management should focus on civil engineering solutions.	.59		
More dams need to be built to meet the growing demand for energy and water, particularly in the Global South.	.52		
Investment in water supply infrastructure should be the top priority to help reaching universal access to water.	.52		
Governments should prioritise innovation and development of new laws and regulations.	.50		
Voluntary and corporate social responsibility (CSR) initiatives should be prioritised to improve social and environmental standards.	.45		
Companies should receive financial incentives for reaching good water governance targets.	.44		
Companies should be fined if they obstruct reaching good water governance targets.			
Flood risk management should focus on nature-based solutions.		.62	
Energy saving and water saving technologies should be supported to minimise the need for new dams, particularly in the Global South.		.61	
Strategies to improve water quality in rivers and lakes should prioritise adoption of best management practices and increasing awareness.		.58	

<sup>10</sup> G.R. Maio (2016): The Psychology of Human Values. Routledge, London, UK. See also: Schwartz (1992) and Schwartz et al. (2012), cited above.

Strategic priorities for the global water governance agenda	Archetypes		
	Mastering nature	Working with nature	Market-based water management
Encouraging water users to conserve water should be the top priority to help reaching universal access to water.		.49	
Irrigation capacity must become more efficient to safeguard agricultural production.		.49	
Water-related decisions are best taken at the national level by a central agency.			
Water-related decisions are best taken at the most local level possible.			
Command and control mechanisms should be prioritised to improve social and environmental standards.			
Governments should prioritise enforcement and compliance with existing laws and regulations.			
Domestic users should be required to pay for access to water.			.73
Water supply and sanitation services should preferably be managed by private companies.			.67
Access to water for domestic use should always be free of charge.			-.66
Water supply and sanitation services should preferably be managed by public bodies.			-.59
Water use rights should be allocated through water markets.			.55
Water use rights should be allocated through public water licences.			
Water managers should make more use of local and indigenous knowledge when taking decisions.			
Water managers should make more use of science-based knowledge when taking decisions.			

**Note.** Scores reflect the loadings of each item on the respective component. Pairs of items are indicated in parentheses. All loadings of .40 or below are omitted.

### Links between fundamental values and preferences for the global water governance agenda / archetypes

We conducted regression analyses, each using one of the three archetypical preferences as the outcome (i.e., mastering nature; working with nature; market-based water management). Each analysis included the four higher-order personal values (i.e., self-transcendence, self-enhancement, openness, conservation) as simultaneous predictors. The results, including zero-order correlations, are shown in Table 4. Support for mastering nature was predicted by higher self-enhancement and conservation values, whereas self-transcendence and openness values were unrelated to this archetype. For working with nature, support was higher among respondents who gave higher importance to self-transcendence and conservation values, whereas self-enhancement and openness values showed no significant links with this archetype. Preference for market-based water management was predicted by higher self-enhancement values and lower self-transcendence values. Conservation and openness values were unrelated to this archetype.

**TABLE 4.** Correlations and regression weights of personal values predicting archetypes.

	r	p	β [95% CI]	p
<b>Mastering nature</b>				
Self-transcendence	.13	.021	-.05 [-.17, .07]	.385
Self-enhancement	.46	<.001	.33 [.22, .45]	<.001
Openness	.17	.003	.00 [-.12, .11]	.950
Conservation	.42	<.001	.29 [.17, .42]	<.001
Model			.27	<.001
<b>Working with nature</b>				
Self-transcendence	.34	<.001	.25 [.12, .39]	<.001
Self-enhancement	.03	.552	-.10 [-.23, .03]	.141
Openness	.11	.055	-.02 [-.14, .11]	.806
Conservation	.29	<.001	.22 [.08, .36]	.002
Model			.15	<.001
<b>Market-based</b>				
Self-transcendence	-.19	.001	-.27 [-.41, -.14]	<.001
Self-enhancement	.28	<.001	.26 [.13, .39]	<.001
Openness	.00	.988	-.01 [-.14, .11]	.850
Conservation	.10	.074	.12 [-.02, .26]	.092
Model			.14	<.001

**Note.** All four personal value types were simultaneously entered as predictors of each regression outcome.

**Links between water values and preferences for the global water governance agenda / archetypes**

We conducted similar regression analyses with the three types of water values (i.e., cultural, economic, environmental) predicting preferences for the three archetypes. The results, including zero-order correlations, are shown in Table 5. A preference for mastering nature was predicted by perceiving greater economic water values but was unrelated to cultural and environmental water values. Respondents who perceived

greater economic and environmental water values expressed greater preference for working with nature, whereas cultural water values were unrelated to this archetype. A preference for market-based water management was predicted by perceiving greater economic water values and lower cultural water values. Environmental water values were unrelated to this archetype.

**TABLE 5.** Correlations and regression weights of water values predicting archetypes.

	r	p	β [95% CI]	p
<b>Mastering nature</b>				
Cultural	.15	.007	.06 [-.05, .17]	.280
Economic	.48	<.001	.47 [.37, .57]	<.001
Environmental	.01	.809	-.07 [-.18, .04]	.202
Model			.23	<.001
<b>Working with nature</b>				
Cultural	.12	.038	-.02 [-.14, .10]	.714
Economic	.19	.001	.16 [.05, .27]	.006
Environmental	.27	<.001	.26 [.14, .38]	<.001
Model			.10	<.001
<b>Market-based</b>				
Cultural	-.16	.005	-.19 [-.32, -.07]	.003
Economic	.10	.099	.15 [.04, .27]	.011
Environmental	-.08	.179	-.02 [-.14, .10]	.728
Model			.05	.002

**Note.** All three water value types were simultaneously entered as predictors of each regression outcome.

**Links between governance-related values and preferences for the global water governance agenda / archetypes**

We conducted similar regression analyses including the two types of governance-related values (i.e., social justice and efficiency) as predictors of the three archetypes. The results, including zero-order correlations, are shown in Table 6. Efficiency, but not social justice, values predicted

support for mastering nature. Social justice, but not efficiency, values predicted preferences for working with nature. Finally, higher efficiency and lower social justice governance-related values predicted greater support for market-based water management.

**TABLE 6.** Correlations and regression weights of governance values predicting policy preferences.

	r	p	β [95% CI]	p
<b>Mastering nature</b>				
Social justice	.15	.008	.00 [-.12, .11]	.941
Efficiency	.38	<.001	.38 [.27, .50]	<.001
Model			.14	<.001
<b>Working with nature</b>				
Social justice	.36	<.001	.31 [.20, .43]	<.001
Efficiency	.23	<.001	.10 [-.01, .22]	.083
Model			.14	<.001
<b>Market-based</b>				
Social justice	-.15	.008	-.29 [-.41, -.17]	<.001
Efficiency	.21	<.001	.33 [.21, .45]	<.001
Model			.11	<.001

**Note.** Both governance-related values types were simultaneously entered as predictors of each regression outcome.

**Controlling for age and gender**

We tested whether the inclusion of participant age and gender (restricted to binary) as additional predictors would account for some of the variance explained by fundamental values, water

values, or governance-related values. All links between the different value types and preferences for archetypes were unchanged by the inclusion of participant age and gender.



The Valuing Water Initiative (VWI) calls for water to be prioritised in decision-making to ensure we can live in a sustainable water-secure world. VWI uses practical case studies to showcase the implementation of the UN/World Bank Valuing Water Principles in order to bring systemic change in the way water is valued in policy, practice, finance and behaviour and to inspire others to do the same. VWI was launched at the World Economic Forum in January 2019 by Dutch Prime Minister Mark Rutte. For more information please go to **[www.valuingwaterinitiative.org](http://www.valuingwaterinitiative.org)** and follow us on **Twitter, LinkedIn, Instagram** and **Facebook**.

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