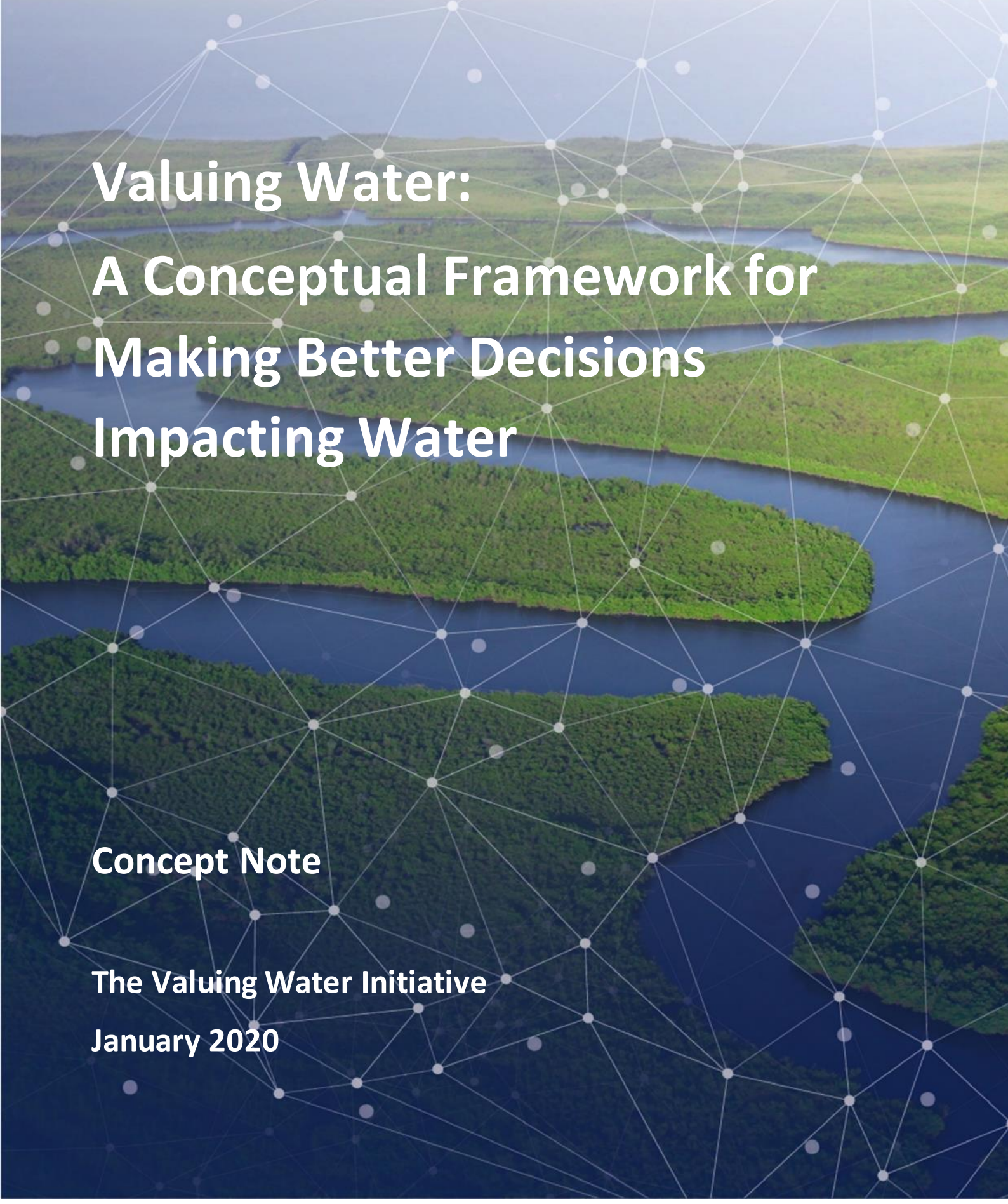


Valuing Water: A Conceptual Framework for Making Better Decisions Impacting Water

Concept Note

The Valuing Water Initiative

January 2020

NewForesight creating shared opportunities

NYENRODE BUSINESS UNIVERSITEIT

WAGENINGEN UNIVERSITY & RESEARCH

Government of the Netherlands

Table of Contents

1. The pursuit to value water

Better decisions impacting Water

In July 2018, the UN's High-Level Political Forum concluded that the world was off-track to meet the sustainable development goal on water and sanitation (SDG6). Current systems of water use, water allocation, water service allocation and water risk distribution were recognized as unsustainable. In response, the High-Level Panel on Water (HLPW) highlighted the need to understand, value, and manage water better. It defined five principles to value water better (Figure 1) and triggered the establishment of the Valuing Water Initiative (VWI) to demonstrate how to put these in practice and motivate the world to join in this endeavor.

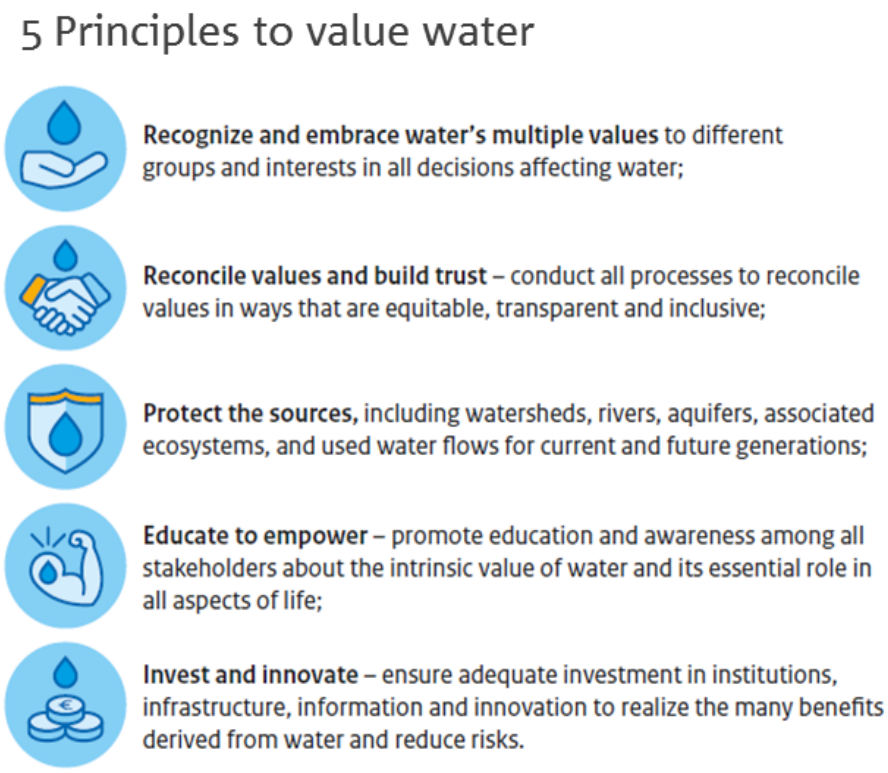
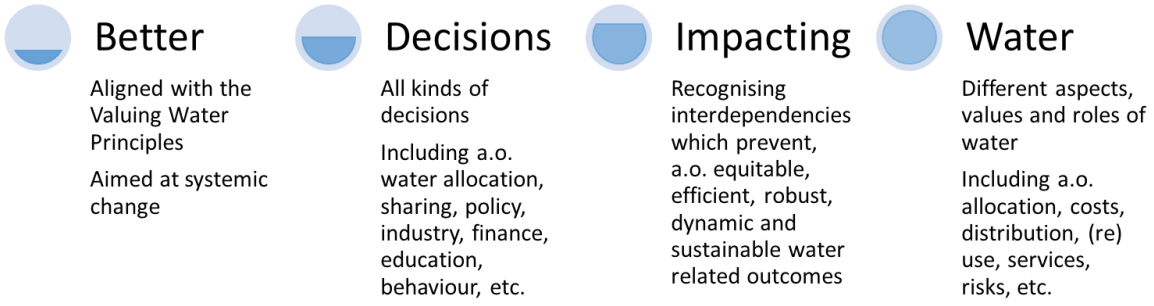


Figure 1: The 5 High Level Panel on Water Principles to value water better

The Initiative desires for there to be ***better decisions impacting water***, throughout the world.



Many variations of how to do this have already surfaced over the years, and it is of utmost importance that this concept note be recognized as building on, rather than replacing, these variations. For VWI, a framework

for making better decisions impacting water starts with the guidance of the five Principles, as well as the awareness that societal norms, systems, and behavior around the way we (as individuals, governments, companies) value water must change as current practices are unsustainable. The framework proposed in the following pages, therefore, embodies two key dimensions, which together inform the overall approach of the Valuing Water Initiative:

1. Operationalization of the Valuing Water Principles to determine the value of water in a system, and
2. Systemic change strategy to transform the system so that it achieves and reinforces better valuing of water.

Reading this concept note

This concept note is based on knowledge and theories developed by a diverse consulting team of water professionals and systemic change experts and has been further informed by input gathered during the Valuing Water Initiative 2019 Workshop, November 19-20. Its content is organized as follows:

- *Chapter 2* begins with the foundational call for valuing water and the challenges that manifest in its practical application. The chapter lays out the implications of these challenges and offers a knowledge base and tool for giving common understanding to the value of water.
- *Chapter 3* introduces the first dimension of a framework for valuing water, in which the value of water is determined through a three-step, high-level method of applying the Valuing Water Principles.
- *Chapter 4* continues the framework with a systemic change theory, originally developed in the agriculture sector. The theory incorporates system dynamics and derives effective interventions towards systemic change for different stakeholders involved. Ultimately, this second dimension of the framework connects with the first to achieve better decisions impacting water through system transformation.
- *Annex 1* applies the framework of better decisions impacting water to the case of Bangladesh to explore what systemic thinking means in a real-world scenario of valuing water.
- *Annexes 2-4* provide additional reading material.

2. Values: a comparison of apples and oranges

Idea behind valuing water and its practical challenges

It is first important to acknowledge the fundamental assumption that informs the relevance for this framework on valuing water. Foundationally, it is understood that water has multiple uses and that each of these uses are attributed with a different worth according to different users. While the water resource remains singular, its perceived function(s) and complimentary importance(s) are numerous. The general idea, and necessity, of valuing water is then to identify the worth of water in its numerous, competing uses. Effective valuation supports more transparent and better-informed decision-making on water allocations and uses, as water often possesses common-pool characteristics and is confronted by the related issues of overuse and pollution[1]. The wide variety of water uses and contexts shapes stakeholders' attitudes, which are often expressed as social and cultural values. These values need to be understood as they determine preferences about how water can and may be used. In theory, valuing water is useful in decision-making because it offers a structured and transparent mechanism that supports an inclusive stakeholder water resources management process. In practice, the effort proves to be like finding consensus in a large-scale comparison of apples and oranges.

There are several practical challenges and associated risks of valuing water that arguably hinder the application of the HLWP's Principles of valuing water in practice. The following are four of these challenges and their implications.

1. Values are subjective and change over time

Indeed, values of water are extremely context-specific, and circumstances and priorities shift. They vary by region, stakeholder and over time, and are difficult to quantify precisely because different stakeholders conceptualize and describe them differently. This means that valuing water cannot be perceived as an objective or neutral way to put a value on water. Moreover, values are unstable, with variability due not only to shifting political priorities, but also to changes in demand and availability, linked, for example, to climate change and economic development.

2. Not all values can be expressed as a single unit

The productive value of water is often expressed in monetary terms. This aspect generally receives the most political interest because economic development is considered most important and may occur at the expense of environmental and social values. The risk is that water will be allocated to uses with the highest production values, bypassing other key criteria. The challenge is to foster equity in access and ensure that, in addition to productive values, non- monetary and non-economic values of water are considered. An inclusive valuation framework should be comprehensive and encompass problems of economy, ecology and society at different geographical scales. As valuation frameworks are seldom comprehensive, multi-objective decision-making is often based on partial values.

The economic value of water can only be as great as the benefits to society one is willing to forgo. Thus, an ecological oriented framework might yield a high monetary value for coastal mangroves (as the TEV of coastal protection against tsunamis may be considerable); yet, when offset against the potential benefits of cheap food supply to urban centers (i.e. avoidance of the costs of food riots), the economic balance may easily change or be nullified. Rather than trying to commensurate these diverse services into one valorization value,

1 Ostrom, E. *Governing the Commons: The Evolution of Institutions for Collective Action*. New York: Cambridge University Press. 1990.

we see more merit in a structured approach that is geared towards making explicit these dispersed values of water to society, and account for them explicitly in a weighted decision.

3. Commensurability of values can be completed

The values of water reside in a number of dimensions, spanning the economic, cultural, spiritual, emotional, aesthetic and environmental. These are not all measurable by the same standard, which poses a challenge. It is furthermore unclear how these values can best be articulated – for example, in monetary terms or in political preferences or in some other metric – and whether they could be made commensurable. Expressing all value components in a common unit, such as monetary amounts, puts unnecessary limitations on valuation. However, some social objectives may be considered paramount regardless of the virtual monetary value assigned to them.

Valuing water needs to bring together explicitly the public and private values of water. Bringing these together using a common denominator, typology or methodology is difficult because they are intrinsically different in value and scale. From a policy perspective, this is not necessary – as long as both are explicitly accounted for and weighted on their merit, they can be used to guide explicit decision-making and negotiated priority-setting.

Commensuration is a political act, as it transforms the categories people use into values and represents what is meaningful to them. It redefines the terms of the debate. Thus, valuing water is ultimately a political process, even when done as 'scientifically' or as 'rationally' as possible. People's behavior and responses to (dis)incentives are at the center of this challenge.

This implies that the key role of valuing water lies not so much in its numerical assessment as in the process it offers to engage stakeholders across different perspectives and interests of water use. Water valuation can play a key role in making explicit the trade-offs intrinsic to decision-making and priority-setting; especially, when it concerns societal needs. Safeguarding public values are ultimately political processes and political decisions. Valuing water cannot absolve policy or society from the responsibility of this task – what it can do is provide a framework to make explicit both the public and the private values.

As public and private values of water are intrinsically different in value and scale, it is difficult to bring economic values and societal needs together using a common denominator, typology or methodology (as commensuration is a political act). From a policy perspective, this is not necessary – as long as both are explicitly accounted for and weighted on their merit, they can guide explicit decision-making and negotiated priority-setting. Such a framework can be used to compare the scores of different development strategies on a number of criteria, such as food security, food sovereignty, equity and environmental impact.

4. Externalities in time and space complicate valuation

It is difficult to account for all externalities at the various scales, due in part to the global interlinked economy. Assessments of potential impacts on third parties, such as social externalities and the impact of water use on ecosystems and other geographical areas, are often lacking, which means that the values derived are often imperfect. Though all water is used locally, impacts cascade across geographies.

Regarding the global interlinked economy, people around the world share and exchange water directly and indirectly through natural hydrological systems and through, for example, the global food trade (i.e. virtual water). It is a challenge to link the urgency expressed at the global level to local action and achieve the scale of effort required, especially since agricultural and trade policy as well as geopolitics often determines what is produced where. The world has struggled to find an appropriate structure for managing the resource. This occurs because water has the attributes of a public good (non-excludability and non-rivalry) and is most possibly a common property resource. This has led people to think of water as a 'wicked problem'.

These practical challenges have implications for how values can be factored into decision-making. Because values are often subjective and change over time, it is important that decision regimes be adjustable to reflect shifting priorities and physical circumstances as well as the outcomes of new negotiations at the least cost to society. When there are various unintended consequences of water use, market-clearing water prices and water markets can play only a limited role in water resource allocation. Water markets can operate within the realm of private goods without unintended consequences, but not across the realm of public benefits. The latter require safeguarding through explicit and targeted regulation. This would imply that water markets can only operate within a tightly regulated trade-space, in which public values are secured through regulatory rules. Water markets are only desirable if their outcomes do not conflict with underlying value systems. This means they must take adequate account of, for example, ecosystem needs and social externalities, such as stranded populations and reductions in return flows. This is generally not the case.

3. A three-stage process to operationalize the Valuing Water Principles

Referencing policy and practice against the HLPW Principles

In recognition of the abovementioned challenges of valuing water, this framework for better decisions impacting water first addresses the need to determine the value of water, upon which decision-making is based. In this conceptual framework, it is suggested that the value of water be determined through the operationalizing of the five Valuing Water Principles.

An approach that can be used to make trade-offs between marginal changes that may well result from altering the system in any way – physically, economically or from a socio-political perspective – explicit, is outlined below. This evaluation process is based on the concept of opportunity cost: where the value of any element is determined and measured by what one is willing to give up to get it.

It should be noted that this process of identifying values can be used for both diagnostic and prescriptive purposes. Once the values are known, they can be used to diagnose the system, informing decision-makers of what may be wrong with the system, where it is going wrong, who might be impacting it, when it might have gone wrong, etc. Knowledge of the values can also be employed in assessing the curative abilities of different proposals. Thus, knowing and reconciling different values plays an important informative role in the process of systemic change. The process of determining these values is based on the five Principles specified by the HLPW.

Stage 1: Identifying whose values are at sake

First, by undertaking an informed stakeholder analysis to determine whose values are at stake it will become clear who should be involved in the process of determining (phase 2) and reconciling the various values of water (phase 3). It is an 'informed process' because a positivist approach is desired, one where the values are determined from changes in the physical or governance structures of an existing water body. To do that, the interested stakeholders need to be identified and recruited into the process. Thus, Principles 3 and 5 (see Annex 1 for reference) are important in this process of stakeholder assessment, along with the need to build trust (Principle 2). The mapping of the power and interest space is a core element of this phase.

By using a scatter diagram the power of each stakeholder group can be aligned with the interest each stakeholder has in each scenario. In other words, each scenario is represented in a separate scatter diagram, with the power revealed on the vertical axis and the interest on the horizontal axis. Thus for each identified scenario, the relationship between each stakeholder's power and interest is shown (see Figure 2).

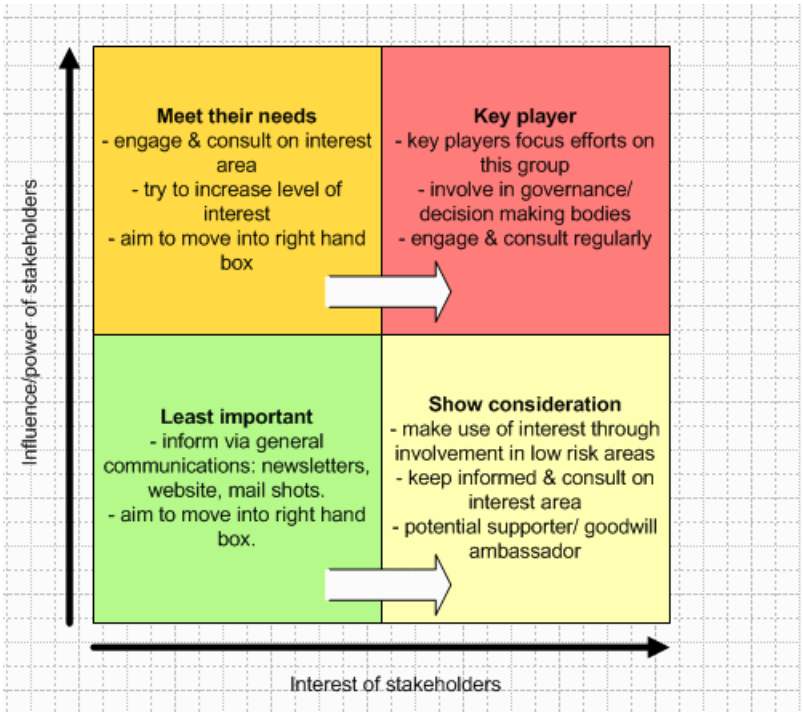


Figure 2: Measuring Power and Interest. A segregation of which stakeholders (Source: http://stakeholdermap.com/stakeholder-analysis.html)

Stage 2: Determining which values are at stake

Second, the process of discovering the various values of water relies on knowing which values are at stake from the perspective of what impact changes will have socially, environmentally and economically. To this end, values are explicit from the process and dependent on the size and scope of the proposed change. It must be recognized by all that changes to a water system will change the economic, social and environmental standing jointly. Thus, Principles 1 and 4 are important in this process of discovery. In this process, it is necessary to map the different values of different stakeholder groups. This can be done in a quantitative (BCA, EIA, SIA) as well as in a qualitative manner (by value surveys).

Stage 3: Reconciling the tradeoffs between values

Third, there is a need to negotiate the trade-offs between the different values derived from the social, economic and environmental discovery processes (Principle 2). The key values from phase 2 need to be summarized and compared and put to the stakeholder group. While some will be positive, many other impacts and the values of these changes will be negatively correlated with one another. Comparing the size of two negatively correlated impacts reveals the opportunity costs of trade-offs, as it shows how much one has to give up to get a positive outcome. By a process of simulation it may then be possible to establish the limits stakeholders are willing to accept with a change. This improved process will build trust among all stakeholders (Principle 2).

How the five Valuing Water Principles can lead to better valuing of water

The five Valuing Water Principles are incorporated in the proposed methods above, and exist in different components. This section makes explicit how each of the five Principles (see Figure 1) is expressed in the three stage procedure.

The first principle involves reconciling and embracing multiple values to different groups in all decisions. People need to recognize and understand that a body of water means different things to different people. Hence, they value that body of water differently. Any change, however big or small to a body of water, will affect the values of any and all the people who have an interest in the water body. When changes to a water body are proposed, those seeking change need to recognize that others may value the water body differently. To not recognize these alternative views on the water body's value will lead to a degree of resistance to the suggested change. To overcome this resistance, those proposing a change need a process for incorporating these different values. An inclusive stakeholder process (Stage 1 above) that does not exclude any perspectives on the value of water is consistent with this principle.

The second principle, that of reconciling values and building trust, builds on the first principle. Because each stakeholder values a water body differently a process is needed to establish and record these different values. The stakeholder groups (Stage 1) are established to build the trust amongst all those who gain some value from the water body. Openly discussing how they derive their value from it provides all with an understanding of what is involved. Then, and only then, comes the process of quantifying the values. This involves gathering information (Stage 2) on each value held. The implicit and realistic assumption is that different bodies of water hold different levels of value to each stakeholder. A pristine water body, for example, will hold more value to an environmentalist than a polluted one. The distinctions between different values for different water bodies and quantifying those differences, is incorporated in the second stage of the process. Those differences (all measured in units and terms of how each stakeholder values the water body) make explicit the differences between each individual and sets up the basis for reconciling each value (Stage 3).

The third principle, protecting the source, is a recognition that in many assessments of a proposed change the boundaries imposed within the analysis are usually very limited. For instance, a proposal to improve the efficient use of water from an irrigation canal will usually only involve the water derived from the canal, and not the pressures this may place on the river that the water in the canal is sourced from. Other examples, such as those that involve taking water from an aquifer, are more pressing in this regard but rarely included in an assessment. Regardless of the change, all changes will involve some alteration of the original sources of the water involved. These sources need to be acknowledged first (in Stage 1 of the process at stakeholder meetings), its changes recorded in the valuation process (Stage 2) and ultimately their values reconciled (in Stage 3).

The three stages of the valuation process are all about educating and empowering stakeholders on the intrinsic value of water; the fourth principle. The stakeholder process (Stage 1) is an application of a process of empowerment. At this juncture it is important to recognize that different stakeholder processes can lead to different levels of empowerment. A limited and exclusive grouping, one based on existing power structures, will not lead to the empowerment of the general populous. It will not lead to the full and complete valuation of the value of a body of water. Only an inclusive grouping of stakeholders, one that is truly representative of all of those who have some view of the value of water, can lead to a better understanding of its true and intrinsic value. The process of recording (Stage 2) and reconciling values (Stage 3) is one of educating those affected by a change. Nothing can be hidden in an open and transparent stakeholder process. Furthermore, during the investigation process (Stage 2) there needs to be some recognition of the market failures that affect the values of water. These are the externalities that so many talk about. However, there is more to this than just the externalities. Those who participate in the process need to understand and be educated on the public good nature of water, how monopolization occurs, the problems of asymmetric information and the poor provision of property rights that affect all water systems. All these elements will affect the determination of the values people place on water (Stage 2).

The fifth Principle, investing and innovating to ensure adequate investment in all aspects of a water body, is built around the three stages presented above. To invest and innovate in a water body implies that some change is being proposed that will alter the values people hold for the water body. The aim in setting up a stakeholder group (Stage 1), determining which values are at stake (Stage 2) and reconciling those values (Stage 3) all revolve around making a change. That change will involve some innovation and investment if it is to succeed. Setting up a stakeholder group to deliberate over the value of a water body alone has no place in this process. The process of change, and representing that in terms of the values of those affected by a change, is at the heart of this proposed approach. Knowing the value of water helps diagnose the problems and assists in the process of suggesting a cure; all of which then leads to investment and innovation.

4. Changing the systems that produce unsustainable outcomes

Better decision-making though leveraging multiple water values in four loops and four phases

The preceding chapter has provided the first dimension of the framework for better decisions impacting water. It establishes common, inclusive language around the value of water based on the Valuing Water Principles, and contributes inclusive insight on the water-related landscape, or system, and establishes guidelines for accurate system transformation. With this piece of the puzzle, we are given direction and understanding of what better decisions may look like. We still miss, however, a strategy for how to achieve making these better decisions consistently – particularly when it seems the system is fixed to return unsustainable outputs.

The reality is that while many initiatives taken over the years to shift toward the sustainable management of water use have been successful at project scale, few have had a large systemic impact and many have not proven sustainable in the long-term. The systems (policies, incentives, governance) that produce unsustainable practices are often much bigger and more difficult to change than a project's sphere of influence. As a result, many projects produce only minor and often temporary changes in the status quo, at best.

This second dimension of the framework introduces a systemic change theory and links this theory to valuing water as outlined in the previous chapter. [2] With input from the first piece of the framework, this next piece provides a generic model that can help map and understand the 'rules of the game' that create unsustainable outcomes (see Step 1-4 below, and Figure 3). In addition, the systemic change theory provides an overview of what transformation of systems tends to look like when successful, in four distinct phases (Step 5, Figure 3), and provides an overview of what needs to be done and by whom in each of the phases to drive the transition to a more sustainable outcome (Step 6, Figure 3).

This theory builds on extensive work that has been done on systemic change, has its origins in the food sector, and has previously been applied to different issues in different sectors, such as the financial, gold and agricultural sectors. A summary overview of the approach is described in Figure 3. The steps below provide guidance on how to apply this framework in practice and link to the framework described in Chapter 3. These steps are further explored in a case study in Chapter 5.

Step 1: Define your system – Whose values are at stake?

Step 2: Determine the problem – What values are at stake?

Step 3: Evaluate what needs to be achieved – How should the values be reconciled?

Step 4: Map the current system dynamics – What leads to unsustainable collective behavior?

Step 5: Discuss the maturity of the initiatives and solutions so far – What initiatives are currently being rolled out and how do they contribute to systemic change?

Step 6: Use the stakeholder matrix to decide what needs to be done – Who can or should do what to drive systemic change?

[2] L. Simons, A. Nijhof, et al., *Changing The Game*, in preparation. The concepts presented in this paper are a summary of those included in the book, and applied to the water context.

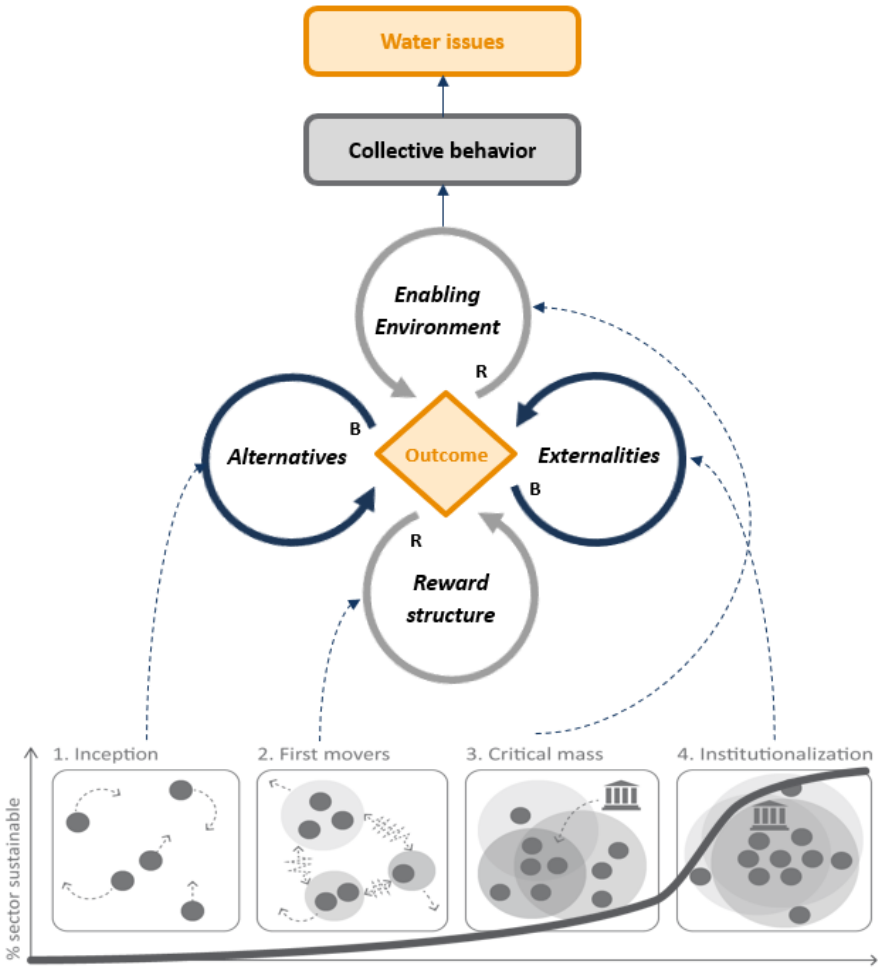


Figure 3: A model for understanding and changing the system leading to unsustainable collective behavior and water issues (Source: Simons and Nijhof et al., Changing the Game, in preparation).

Systems thinking

Feedback loops

The language of systems thinking involves loops. Loops are a series or chain of 'cause and effect' relations that influence each other. One cause leads to an effect, and that effect becomes the cause to lead to another effect, leading to another effect, and so forth. Usually there are different 'cause and effect' loops at play at the same time and influencing each other. The interaction between different loops drives system behavior. Different loops can reinforce each other or balance each other out.

Reinforcing loops (R) are those where the 'cause and effect' relations lead to continuous stronger growth (positive or negative). They lead to a continuous and increasing amplification of effects or phenomena. Or the other way around, they leads to phenomena or effects continuously decreasing. The result of reinforcing loops when left unaltered is always explosion or collapse of the whole system. Balancing loops (B), on the other hand, stabilize systems over time.

Complex problems often stem from a system that for some reason has become unbalanced. This unbalance is a result of the balancing loops having lost control over the reinforcing loops. In practice, this means short term self-optimizing behavior from the actors starts to get rewarded, while the results of their actions are not felt by them, hurt others and may eventually lead to the collapse of an entire system.

When a common good like a water supply needs protection, it cannot be expected that the self-optimizing actors will take care of it by themselves, as by default they lack a systems perspective and have limited individual influence. There must be an authority that acts above and on behalf of the individual actors to set and enforce rules. This authority could be a government or could take the shape of collective action and self-regulation. Common interests need to be protected against the behavior of self-optimizing actors by enforcing rules that lead to more beneficial system loops. When there is an absence of authority, when the authority fails to set and enforce the rules, or when the authority benefits from the misuse of the common good, it will often intensify the self-serving race to the bottom between actors that want to achieve short-term gains. In such cases, everyone will take as much as possible out of the public resource pool, as quickly as possible before someone else does and there is nothing left. It is this system dynamic that causes issues around water quality, safety and accessibility.

Applying systems thinking

Based on all the elements discussed so far there are four 'cause and effect' loops we can distinguish within sectors or systems that all influence one another. Each loop in itself contributes to the situation, but it is the combination of all loops that creates the complexity and causes problems to persist. For the purpose of explaining the model, it is sufficient here describe the outcome that we want to analyze as an 'unsustainable system'.

Alternatives loop – Are sustainable alternatives available and conditions for change in place?

The first loop is a balancing loop (B) that is often lacking from the system; it is the loop which provides alternatives or conditions for change. This loop answers the questions: Are alternatives for the current behavior available, and are the conditions in place to use those alternatives? This loop will have the desired balancing effect when actors in the enabling environment and the market see alternatives to their default behavior and are able and willing to choose those alternatives.

Reward structure loop – What behavior is rewarded by the system?

The second loop is the reinforcing (R) loop of the reward structure. The dynamics of a system consist of self-optimizing actors that together form a system of supply and demand of goods and services. The reward structure loop asks the question: What behavior is the system rewarding? By understanding these incentives we can determine what drives the dominant collective behavior in the system and understand the (unsustainable) consequences of that behavior.

Externalities loop – Are the negative consequences felt by the ones who are causing them?

The third loop is a balancing loop (B) that is either not in place or is not functioning properly and therefore further drives the undesirable outcome. This loop asks the question: Who feels the negative consequences of the dynamics in the reward structure and enabling environment loops, and when? This loop will only have the desired balancing effect when the same actors benefiting from the reward structure and enabling environment dynamics also feel the negative consequences in the short term.

Enabling environment loop – What are the structures that support, strengthen or fail to correct the outcome?

The last loop that contributes to the outcome of an unsustainable system is the reinforcing loop (R) of the enabling environment. This loop answers the question: What are the underlying structures that support, strengthen or fail to correct the outcome? The cycle starts with asking what governments are benefitting from or are trying to achieve. Benefits for governments might include, for example, re-election or an increase in employment, tax revenues, investments in the country, maintaining competitive advantages for certain industries, or satisfying lobbying organizations. With these benefits in mind, governments may create an enabling environment or regime that preserves or strengthens those benefits in rules, policies, institutions, tax and financial structures, infrastructure, educational systems and media. As a result, unsustainable behavior

in the enabling environment or 'reward structure' loops is strengthened or fails to be corrected. For example, in the case of water issues, the incentive structure of the relevant authorities and legislation would need to be understood, including identifying the barriers for changing water policies.

The reward structure and enabling environment loops help us understand how the system leads to an unsustainable outcome. The externalities loop explains why the system doesn't correct itself, since actors causing the outcomes don't feel the negative consequences of their behavior. The alternatives loop explains why it is so hard to change the default behavior, as alternatives are often either unavailable or unfeasible if the conditions for using them are not in place.

In combination, the four loops comprise a model that can help map and understand the 'rules of the game' that create unsustainable outcomes in a system.

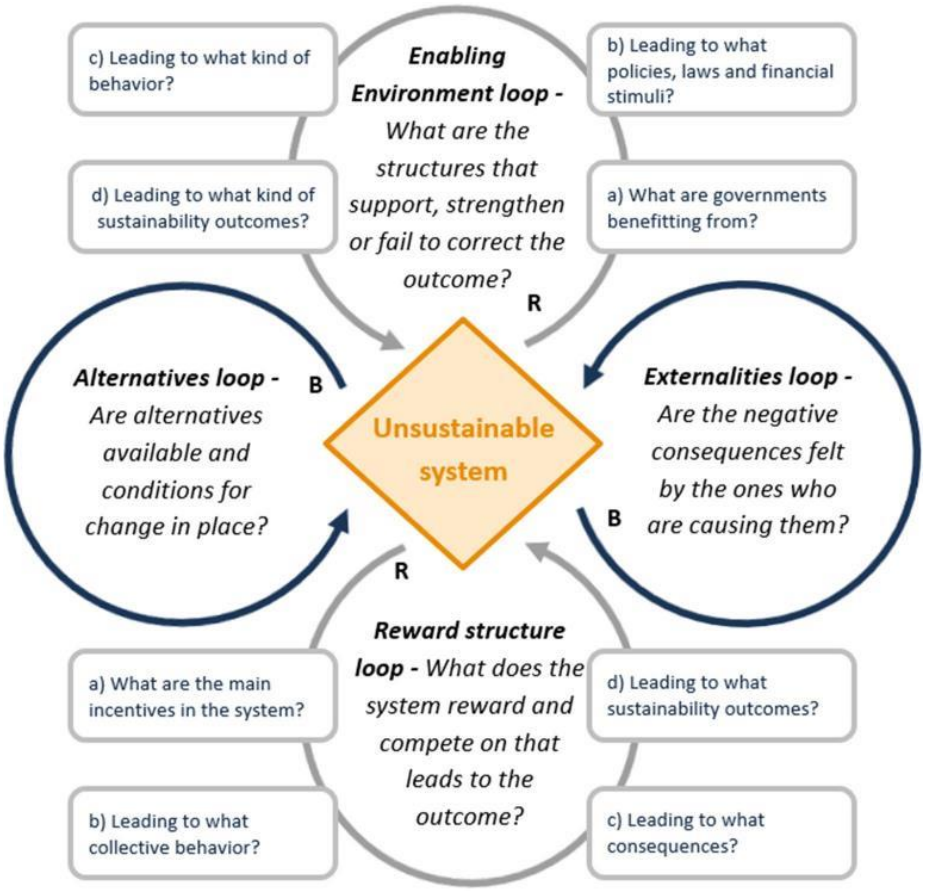


Figure 4: The four reinforcing loops leading to an unsustainable system (Source: Simons and Nijhof et al., Changing the Game, in preparation).

Individual actors are not to blame for a failing system, nor can the system be changed by individual actors; changing the rules of the game is ultimately always a collaborative effort. The next section introduces a potential way of managing collaborative efforts to change the system.

Questions to guide application of theory to practical scenario:

- What unsustainable behavior leads to the water issues in the scenario you are looking at?
- What is the reward or incentive for that behavior?
- What is the structure that keeps that behavior in place?
- Are the negative consequences felt by the actors causing them?
- What is the preferred alternative behavior and is it viable?

Changing the System

The previous section introduced a way of analyzing the system leading to unsustainable outcomes, which builds an understanding that is needed for driving change of that system. This section gives a simplified overview of what transformation of systems tends to look like when successful, in four distinct phases. After looking at these transformation phases and which feedback loops they influence, we will look at what needs to be done by whom in each of the phases to drive the transition to a more sustainable outcome.

The Four Phase of Systemic Change

Changing or transforming a system is a slow and reactive process, which needs to be managed in an educated and adaptive way. The change happens in four distinct phases and the desired management of the change and beneficial stakeholder roles will differ per phase. As each phase passes, the necessary elements and conditions are gradually put in place to change the dynamics and intersections of the four system loops that were discussed in the previous section. And if the four system loops are changed, the outcome will ultimately be different.

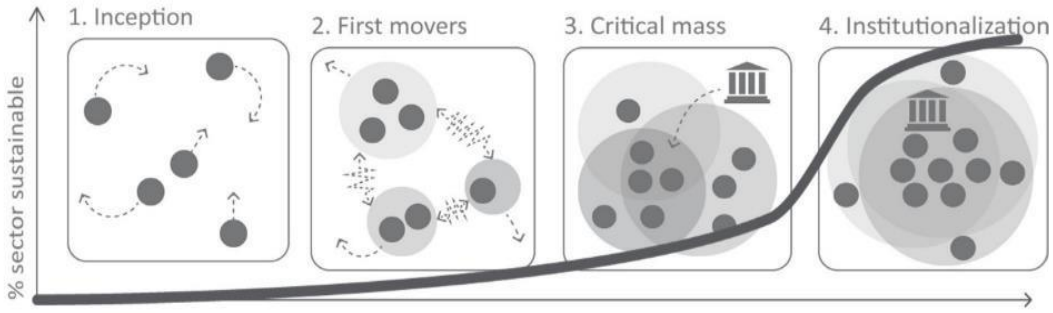


Figure 5: The Four Phases of systemic change (Source: Simons and Nijhof et al., Changing the Game, in preparation)

These are the four phases of systemic change.

Phase I: Inception

How it starts: This phase starts most often with a major crisis that raises general awareness in the sector about the problem. The initial response is usually one of denial and of playing down the problem and the wish to continue with business as usual.

The emerging behavior: Campaigners use the crisis to put pressure on industry and government by naming and shaming. Frontrunners start high-profile, mediagenic and isolated projects and pilots. Over time the number of actors that still deny the problem decreases. Many subsidy schemes and donor funds are made available. Doing anything is considered more important than doing nothing. Hundreds, if not thousands of isolated projects are implemented. However, projects never fail and never scale.

The end state of the phase: The sector is more receptive that indeed there is a problem and through the projects possible viable and actionable alternatives have been created that can be used as part of solving the problem.

The system loop it influences: Phase I of systemic change influences the alternatives system loop .

Success factors for this phase: The impact of the initial shock of the major crisis that started the transition can be leveraged by campaigns. The campaigns can increase and sustain an overall feeling of urgency and can apply continuous pressure on actors to do something. In addition it is beneficial to reward those who acknowledge the problem and try to address it and for to punish those who deny the problem and continue business as usual. Learnings from the many projects should be captured as quickly as possible and a start can be made with the next phase.

Phase II: Competitive Advantage

How it starts: The problem is evidently persistent and the pressure is increasingly felt by government and industry. Awareness that projects alone won't solve the problem is increasing.

The new behavior: First movers use the viable alternatives from the phase I pilots to their competitive advantage as they absorb first mover cost and risks. Second and third movers are pressured to follow suit but will differentiate their actions, to try and reap whatever competitive advantage they still can. Competition on the solution leads to higher commitments, innovation and to differentiated solutions.

The end state of this phase: Businesses will be competing on sustainable business models. There will be confusion in the system on what to do next with growing frustration that the problem is not solved despite all efforts. Claims of greenwashing will be made, while the marketing value of current sustainability work is decreasing, though its costs are increasing. Efforts clearly need to be scaled up and require changes in the enabling environment, for which collaboration is needed. In the meantime the problem will persist.

The system loop it influences: Phase II influences the reward structure system loop.

Success factors for this phase: The market starts to compete on sustainability, which drives innovation and ambition in the industry's sustainability efforts. The competition can be further incentivized by rewarding first movers, penalizing laggards and providing a clear image of what the desired outcome looks like.

Phase III: Non-competitive collaboration

How it starts: After competition in phase II, a critical mass of actors is ready for non-competitive collaboration through coalitions and platforms.

The new behavior: A critical mass of actors from different stakeholder groups is keen to try a different approach. The problem is persistent and even worsening, so solutions need to be of larger scale as well. Actors increasingly realize a collaborative systems approach is needed. New business models have been designed, and are ready to scale up. Resistance and lobbying against the plans for change increases as laggards are concerned about the new status quo and their positions. Former allies like NGOs and standard setting organizations can also become resistant if they begin to feel irrelevant.

The system loop it influences: Phase III addresses the enabling environment system loop. By working together with all stakeholders, a more supportive enabling context can be created that facilitates the uptake of the new practices.

Success factors of this phase: Multi-stakeholder collaboration under well organized and managed platforms with ample resources. Commitment and trust. Resistance to pressure from counter-lobby.

Phase IV Institutionalization

How it starts: The sector is ready for change. Laggards need to come on board and a level playing needs to be created.

The new behavior: A critical mass of actors from different stakeholder groups is ready for the future and will also benefit from it. Creating a level playing field has become a market opportunity. Political leadership at this stage is crucial as choices will have to be made and the anti-lobby needs to be resisted. This phase reached the tipping point in the system.

The end state of this phase: A new normal has been created. The systemic change cycle has been completed. A new cycle may have already begun on different issues.

The system loop it influences: Phase IV addresses ultimately the externalities system loop, or consequences not felt by those who are causing the problems. Institutionalization is making the new practice the new normal and with that putting consequences on those who are not acting accordingly be it financial consequences or legal, compliance, or permit consequences.

Success factors of this phase: Well organized lobby in favor of change. Political leadership, political leadership, political leadership.

Stakeholders and their roles in each Transformation Phase

Effective management of system transformation processes involves ensuring the right stakeholders are taking the right actions in each phase. This creates the right circumstances so that individual actors with opposing, short term self-interests, are willing and able to work together more to find shared solutions to shared problems. In every phase of system transformation there are specific patterns of behavior from different stakeholders that fit with the dynamics of that particular phase. In the description of the phases, we already mentioned the roles of the different actors that fit with the dynamics of that phase. And for each phase this is different.

Note: the overview below is not exclusive. In different systems and geographies the relevant stakeholder groups may differ. For example, in the context of water issues, consumer/civil society groups may need to be added, along with intergovernmental and multilateral organizations like the EU and UN. The roles these actors can, and should, play would need to be understood and defined for a complete analysis.

Questions to guide application of theory to practical scenario:

- What are the important stakeholder groups in the system relevant to scenario you are considering?
- Stakeholders often know what the right thing is they should do. What are the reasons they do not act accordingly?
- What is the role of governments? What are the reasons they are not acting forcefully?
- What is the role of private sector? What are reasons private sector actors act in different

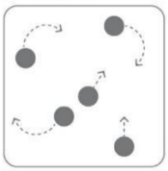
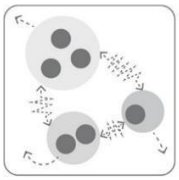
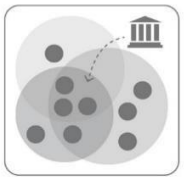
	1. Inception	2. First movers	3. Critical mass	4. Institutionalization
				
Government	Provide subsidies	Source sustainable	Influence behavior of consumers	Establish a financial plan for phase out
Industry	Stop denying the issue	Differentiate by introducing new business models and labels	Communicate a non-competitive agenda	Comply with legislation
NGOs	Be involved in projects	Naming and shaming of laggards	Join platforms	Shift attention to new issues
Financial Institutions	Apply negative screening to end relationships with high-risk clients	Provide financial benefits for sustainable business models	Reserve capital for the new normal	Exclude unwilling clients, also outside the jurisdiction
Research Institutions	Flag urgency of an issue	Showcase good practices in education and research	Be objective in studying the arguments for and against a new normal	Provide overview of different policy instruments

Figure 6: Roles of stakeholders in different phases (see Annex 4 for full version)

5. Conclusion

What has just been presented is an informed, yet non-exhaustive, framework for making better decisions impacting water.

The framework constitutes two dimensions: the operationalizing of the Five Valuing Water Principles to determine the valuing of water, and the transformation of sectors and systems through a systemic change strategy to enable and reward decisions that value water.

VWI maintains that water-related decisions require an inclusive language for the multiple values of water. It also believes there is merit in zooming out and using the systemic change framework presented to understand and embrace the reality of the systems where water is not being valued, as well as to see that new valuing practices can be institutionalized. This is an iterative draft that represents the first attempt to integrate these pieces in a framework for sustainable water use, and it remains a dynamic exercise.

Understanding and being transparent about what is needed (also from outside the water sector and policy makers, etc.) and what cannot be changed in certain systems will help tremendously in the expectations, risk analysis and forecasts of the impacts of not valuing water. Likewise, it is necessary to continue motivating all actors to participate in bringing the systemic change we envision, as it is only with such collective action that our systems can support valuing water, sustainably.

These are the ideas represented in this conceptual framework. We turn back to you, our partners in valuing water, to consider and communicate: does this thinking help you to make better decisions impacting water?

Annex 1 – Application of the framework to the case of Bangladesh

The framework constitutes two dimensions: the operationalizing of the Five Valuing Water Principles to determine the valuing of water, and the transformation of sectors and systems through systemic change strategy to enable and reward decisions that value water.

In order to illustrate how the framework for making better decisions impacting water may work in practice, this section introduces the case of Bangladesh. This case has been selected as according to The Global Risks Report 2016 by the World Economic Forum, failure of climate change mitigation and adaptation and water crises rank among the top three impactful risks for developing nations like Bangladesh. Furthermore, it is a case that shows the possibility of clear action towards systemic change in relation to water. The structure of this analysis is based on eight steps, of which six are outlined below, linked to the approach described earlier.

Step 1: Define your system – Whose values are at stake?

Step 2: Determine the problem – What values are at stake?

Step 3: Evaluate what needs to be achieved – How should the values be reconciled?

Step 4: Map the current system dynamics – What leads to unsustainable collective behavior?

Step 5: Discuss the maturity of the initiatives and solutions so far – What initiatives are currently being rolled out and how do they contribute to systemic change?

Step 6: Use the stakeholder matrix to decide what needs to be done – Who can or should do what to drive systemic change?

Please note that this approach, in combination with the Valuing Water Principles, is new and hasn't yet been applied to a real world project or case yet. This case study is intended to illustrate what such an approach could look like, but by no means provides an exhaustive picture of the situation in Bangladesh. A full analysis should take a broader look and include more factors, such as climate change and the role of civil society.

Step 1 & 2: Determining the System and the problem: Main sustainability issues in relation to water in Bangladesh

There are many sustainability issues with respect to the use of water in Bangladesh. What are the main issues that are relevant to the topic at hand?

- First of all, three big Asian rivers – the Ganges, Brahmaputra and Meghna – shape the landscape and make it a fertile country for food production. However, **river and coastal flooding** is a major problem.
- A second challenge is that water infrastructure has struggled to keep up with the rapid pace of urbanization. For example, the capital Dhaka increased in size from 500,000 in 1970 to more than 25 million in 2017. At present, five million of the **165 million people living in Bangladesh lack access to safe drinking water and 85 million lack improved sanitation**.
- A third issue is that in the Dhaka region, the **groundwater level** shrinks every year by about 10 centimeters and even two meters per year in the Northern region of Dhaka. Many people, services, and companies depend on groundwater, and groundwater has important environmental and social functions.
- Furthermore, **water pollution** also affects biodiversity in rivers and the potential to use river water

for other purposes [3].

Note these are just some of the challenges linked to water in Bangladesh. Although all are relevant, and in many ways interconnected, this case is focused on the challenge of **groundwater depletion**.

What are the biggest drivers *of groundwater depletion?*

Textile factories are the largest contributors to the cluster's water scarcity as well as pollution challenges[4]. The washing-dyeing factories are the second biggest polluter in the country, consuming 1,500 billion liters of groundwater annually and contaminating surface water through inadequate effluent treatment, negatively affecting the lives of nearly 12 million people. Studies undertaken in the Northern region of Dhaka – the capital of Bangladesh – reveal that the wet textile factories are the largest consumers of freshwater. Together, the wet and dry processes in the textile industry account for 93% of the freshwater consumption in the Norther region in Dhaka. See also Figure A1 below for an illustration[5]. The Ready-Made Garment sector is by far the biggest industry in Bangladesh.

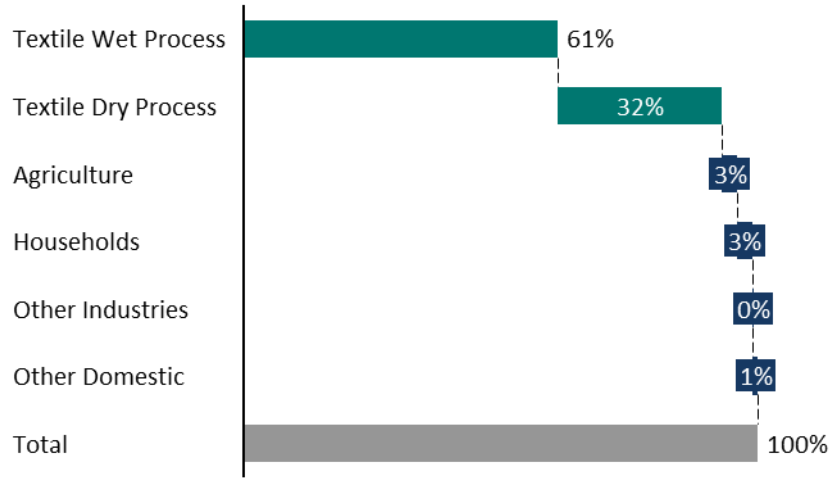


Figure A1: Annual fresh water consumption of the Konabari cluster in percentages (source: Water Footprint Assessment Report).

Determining who should sit around the table: Establishing a stakeholder group

While deciding that a problem exists and resolving it are two very different procedures, both can be resolved by the same group of people: a group of stakeholders, all of whom value water in some way. It matters little whether they view the problems differently, or have different solutions to the perceived problems; only that they value in some way the water body under investigation. To do this there is a need to establish a stakeholder group of those interested in and affected by the problems that beset a water body and include those who are in a position to influence the outcomes of any change in the water body.

Setting up stakeholder groups and conducting a stake holder analysis is not difficult. The composition of the group should be 'representative in view only'. In other words, the myriad different views and values people

[3] Prio report (2013), *Water Scarcity in Bangladesh; Transboundary Rivers, Conflict and Cooperation*, PRIO report 1-2013

[4] https://www.textilepact.net/about-us/what-is-pact.html

[5] https://www.textilepact.net/focus-areas/operating-environment/water-footprint.html

have on a water body need to be heard. To do that they need a seat at the stakeholders' table. What should not occur is representation by power of numbers or vested interests. To do so would entail the most powerful having the loudest voice and/or the tyranny of the majority. A stakeholder group needs to be inclusive, rather than exclusive. It needs to be a body established to discover the value of water and the impacts that changes may well have on all the values held. It needs to evaluate and diagnose problems and drive cures, all using the information embodied in the values expressed about the body of water.

Establishing stakeholder groups is not about getting an accepted measure or proposal 'across the line' or getting a view about a water resource accepted. It is a process of discovery, where the outcomes may well lead to a known outcome, but that outcome is only derived from the process of discovering the values people hold for water. It is through this inclusive stakeholder process that the different values can be embraced and opposing views heard, thus both empowering and embracing, while educating. Thus, the best results can be derived from a group who have widely differing views. Choosing a group of like-minded people, and/or those who hold the same vested interests as everybody else, will lead to inferior solutions and a poorer valuation of the water body in question.

Step 3: Evaluating what needs to be achieved

In a sustainable future the depletion of groundwater should be stopped and, even better, altered to ensure long-term availability of water, both for people and the environment (Principle 3). Furthermore, access to groundwater should be organized in such a way that it allows for the values of different groups (Principle 1), including an appreciation of these different values by all stakeholders involved (Principle 4). And to sustain this situation for the future, it is crucial that the process leading to this situation is transparent and inclusive (Principle 2) and builds the institutions needed to make this the new normal (Principle 5). Developing such a vision of the future is crucial because it functions as a benchmark to see whether interventions are creating change in the right direction and whether the strategy developed is all-encompassing in relation to all five principles. An established representative stakeholder group needs to be nourished with information. Ultimately that information gets translated into the values each member of the stakeholder group holds for water, and these values are then reconciled between them.

At this point, it is a good idea to determine the metrics on what is considered to be of value from a water resource. Ask, does that include the economic returns from industries, the material welfare of the people, the quality of the water, the depth of the groundwater, the ecosystem services produced from the river, the housing needs of people, etc.? It is possible that all these things are valuable to know, but it is reasonable to ask whether they can they be ordered and restricted into a manageable number. Only then is it necessary to ask how each of the measures chosen as important can be measured. Knowledge of each of these issues should come from those who were identified in the stakeholder analysis (Principle 4) and would add to the transparency of the process (Principle 2).

Gathering the information

While some idea of the current incentive structure is known, more knowledge is needed. You need to know how each of the chosen metrics are affected within the current set up. If it is monetary returns, then they are well known from the analysis presented directly above. But what about the environmental and social influences that are affected by the current situation? Without this overarching view of the physical, economic, social and environmental impacts of the current situation, it would be impossible to allow for the values of different groups (i.e. Principle 1 would not be followed).

Reconciling values

The metrics allow policy makers to evaluate each initiative, gauging how some initiatives affect some elements of the value of water more than others. It should be acknowledged that trade-offs between different metrics will result. Therefore, for instance, an initiative to improve groundwater levels may well improve environmental metrics, but reduce the social and economic returns of the stakeholders. In this case, it should be asked how much the stakeholders are willing to sacrifice from a social and economic perspective to gain an environmental improvement. Furthermore, provided the same measures are used across all initiatives, which initiative has the most beneficial returns and/or the least detrimental impacts?

Why knowing the values is important for the Principles

The valuation process outlined within the process of systemic change aids the decision-making process, satisfying Principle 1 (recognition of multiple values) and Principle 2 (reconciling values in a way that builds trust). In addition, the process itself educates and empowers stakeholders (Principle 4) and provides a sound basis upon which initiatives can be evaluated for investment process (Principle 5). The worth in protecting the source (Principle 3) can also be evaluated in terms of all the other values that are placed on the water. This all occurs because the values that stakeholders place on water are explicitly stated and agreed to. It allows for a refinement of initiatives where gains and losses are accounted for using a common set of metrics.

Knowledge of the value individuals place on different aspects of a body of water should be used throughout what follows to determine the costs of current behaviors and the benefits of future actions. Valuation of water is the guide that informs the whole process because…

System change requires direction.

It is the values people place on a body of water and how they change in light of a proposed change that should direct the overall process of systemic change. Values are the indicators that will inform the process that follows.

Step 4: Map the current system loops

Understanding a system may seem a complicated exercise, but once when you know the questions you need to answer for each of the system loops it becomes quite easy (see Figure A2).

- **Alternatives.** There are some technologies available to carry out dry and wet processing in textile production. However, many textile managers don't know about them and they require an additional investment and knowledge for implementation.
- **Rewards.** The use of water is hardly a cost to producers and reducing it doesn't bring advantages. Instead, they are rewarded for shortening production cycles (fast fashion) and lowering their cost price (water is an externality for them). Rewards exist for good practices through e.g. certification, but only for some, depending on the motivation and investments buyers (i.e. fashion brands) are willing to enable.
- **Enabling environment.** Taxing factories is a major source of income for government agencies in Bangladesh, and further limitations (and higher costs) may influence Bangladesh's competitive position in the ready-made garment industry. They have an interest in maintaining the status quo. Limited regulations exist.
- **Externalities.** Many groups are facing the consequences, such as other parts of the government that need to invest in new water holes to supplement the supply of drinking water, which increases costs

of water supply and reduces security of access to safe drinking water and sanitation[6]. There are also numerous other externalities to take into consideration such as saltwater intrusion, arsenic contamination, subsidence and water availability for agriculture in the dry season. Climate change will likely further increase pressure on water resources in Bangladesh[7].

Figure A2: Summary of different system loops for the challenge of depletion of ground water in Dhaka.

Step 5: Discuss the maturity of the initiatives and solutions so far

What are the main initiatives being executed so far? How far has the transformation towards a sustainable future progressed so far? In other words, in what phase is the situation in Dhaka at present?

- The Water PaCT is a main initiative to try to reverse the depletion of ground water. It is an initiative of 13 global textile brands, the non-governmental organization Solidaridad and several governments (including the Netherlands and Bangladesh). So far 200 textile factories have joined and PaCT achieved water savings of 21.6 billion liter/year, wastewater avoided of 18.8 billion liter/year and factory savings of US $16.3 million/year[8]. This initiative has the characteristics of **Phase III: Non-Competitive Collaboration.**

[6] Mair, J. (2012), *Building Inclusive Markets in Rural Bangladesh: How Intermediaries Work Institutional Voids*, Academy of Management Journal Vol. 55, No. 4, doi.org/10.5465/amj.2010.0627.

[7] Biemans, Speelman et al. (2013) *Future water resources for food production in five South Asian river basins and potential of adaptation options – a modelling study* Science of the Total Environment 468-469

[8] https://www.textilepact.net/about-us/what-is-pact.html

- However, the ready-made garment industry has about 4,000 factories, so most factories are not yet part of PaCT. For them, the current situation is at best in **Phase II: Competition**, meaning that certain investments in water treatment results in a competitive advantage. For this, the globally recognized LEED certification for green buildings is important. It is a way for factories to show that they have invested in energy and environmental design, including treatment of water and therefore it is a tool for brands that want to source sustainably. Particularly in the upper segment of the ready-made garment sector, certification is an important qualifier to get an order.
- However, for most factories the current situation is characterized as **Phase I: Inception** – the awareness that there is an issue in relation to water is there and results in many small projects and pilots.

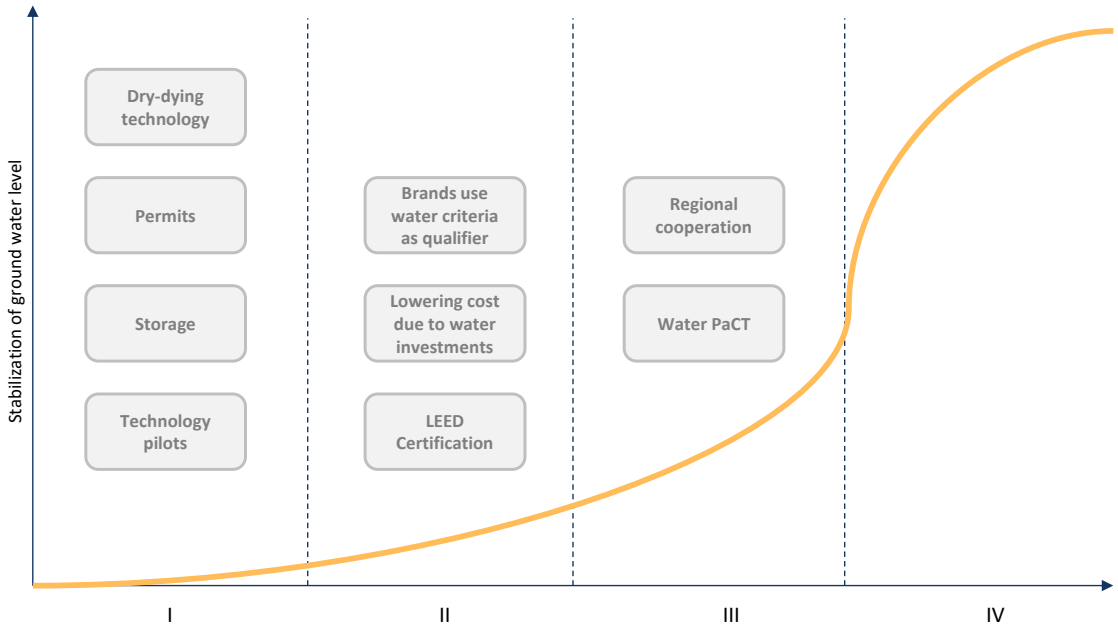


Figure A3: The different solution initiatives in the Dhaka case plotted on the S-curve (Simons and Nijhof et al., Changing the Game, in preparation)

Step 6: Use the stakeholder matrix to decide what needs to be done

Knowing what phase the current situation is in gives direction to what initiatives are effective for each of the stakeholders involved. A strategy that would only focus on partnerships like PaCT would be detached from the reality that most textile companies operate in. Therefore initiatives and strategies will have to be targeted on the different stages the stakeholders are in.

What would be needed for those in Phase I?

According to the stakeholder matrix, it is crucial in Phase I that a dominant actor starts communicating a vision that in the long term there is no place for textile factories who are still causing depletion of groundwater. At present, this vision is still missing but it could be either the **government of Bangladesh** or the **textile association BGMEA** who starts communicating it. Furthermore, **financial institutions** have an important role because companies need investment capital to change their textile process to a closed loop process. Based on the pioneering work of PaCT we now know that this results in a good return on investment, but many textile

directors lack this knowledge. That's where **banks** can step in and provide loans on the condition that it is invested in making the factories future ready.

Furthermore, a part of the market is already competing on improved use of water. What is needed to stimulate them to continue on this path and make others join this movement in Phase II?

According to the stakeholder matrix, the role of **launching customers** is crucial. The SER covenant of textiles is one example. The SER covenant is an agreement that all major brands selling clothes in the Netherlands are applying sustainable sourcing principles and are transparent about the progress they make every year (building upon Principle 1 and 2 of the Valuing Water Principles). This is an important shift because it moves the option of investing in water as an option (Phase I) to whether or not you will have business in the future (Phase II). However, the Netherlands accounts just for 2% of Bangladesh's exports. That's why cooperation with other countries is crucial as well and that's where embassies fulfil a crucial role.

It would be a missed opportunity if the strategy would not support those frontrunners who already work together in a partnership in Phase III, like the PaCT initiative. What do those actors need to create more impact?

They are lobbying towards **the government** in Bangladesh and the BGMEA to make this the new normal. That helps to stimulate them to make a statement about the vision they have for the future of Bangladesh (see comments in relation to Phase I). However, those frontrunners **need more backup** because – as was shown in the system loops at step 4 – there are many interests to maintain the status quo. According to the stakeholder matrix, both **knowledge institutes and governments** can provide crucial support for these frontrunners. For example the statement from the EU that they are considering changing the low-tax status of Bangladesh if they don't step up their efforts in relation to improving social and environmental practices fits well in this dynamic.

Annex 2 – The Valuing Water Initiative

The Valuing Water Initiative (VWI) aims get to the systemic core of the wicked water challenges. Addressing that core is essential as without it systemic change is unlikely to happen. In order to give direction to systemic change in relation to the use of water, the High-Level Panel on Water (HLPW) recommended five Principles to understand, value and manage water better (see Figure 1).

These Principles emphasize both the physical and the normative dimensions of water. Physically, water is constantly in flux, requiring attention for storage, access, use, contamination and purification of water (Principle 3). Normatively, water has value for many different stakeholders and in many different ways (Principles 1, 2 and 4). Including the physical and normative dimensions of water in systemic change, requires an integral approach based on the benefits and risks linked to water (Principle 5).

The Valuing Water Initiative has the following core activities it has identified to accomplish its objective of ensuring "Better decisions that impact water".

VWI Journeys: Demonstrate 4-5 practical applications of the valuing water principles to policy, business practices and behaviour across contexts, sectors, organizations and companies.

Leadership by example: Develop a Leadership Coalition of frontrunners who commit to learning how to apply the valuing water principles and share their learnings.

VWI's Learning Platform: Develop a knowledge platform which hosts both relevant knowledge inputs to support VWI and learnings and best practices to value water.

Action through Inspiration: Mobilize effective communication to inspire others to act through inspiration, influence and collaboration.

Annex 3 – Historical overview of Valuing Water

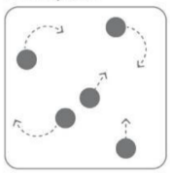
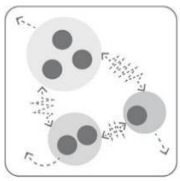
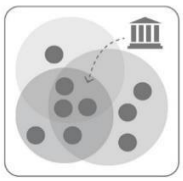
Since the adoption of the fourth Dublin principle in 1992 at the International Conference on Water and the Environment (ICWE, 1992) there is a formal recognition that water should be considered as an economic good taking into account affordability and equity criteria. This caused confusion. Savenije and van der Zaag (2002) distinguish two schools of thought. According to the first school of thought water should be priced at its economic value and the law of supply and demand would then ensure that the water is reallocated from low value to high value uses. However, this is a too narrow interpretation, as allocation is a societal question. The second school of thought interprets 'water as an economic good' as the process of integrated decision-making about the allocation, use and conservation of the scarce resource water, which goes beyond financial transactions. It is about making informed choices about the use, conservation and allocation of water on the basis of an integrated analysis of all costs and benefits in a broad sense, and not about determining the "market-clearing" price of water.

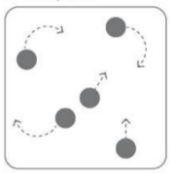
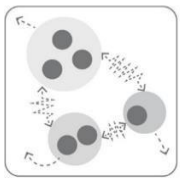
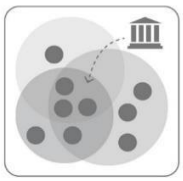
Valuing water has long been the domain of economists, who have developed various methods for quantifying the monetary value of water-related goods and services (Young & Loomis, 2014; Gibbons, 1986). The Total Economic Value (TEV) concept, applied to water by Rogers, Bhatia and Huber (1998), adopts a more theoretical and economic based approach to valuation. The TEV focuses on the use of valuation techniques that convert non-use values into monetary values through methods such as contingent valuation. Since 2000, attention has shifted to methods that also address environmental values (Emerton & Bos, 2004; Dyson, Bergkamp, & Scanlon, 2003) and social values. These developments represent gradual shifts in perspectives: from water as an economic scarce good that needs to be priced accordingly, to water as a societal good that has intrinsic value and foregone benefits to society, to an environmental perspective with high intrinsic values and benefits to society (e.g. clean air, clean water, coastal protection etc.). These shifts lead to shifts in valorizations, across shifting perspectives, across scales, across economic domains (private v public); thus gradually complicating their commensuration into one value or a single valorization frame. To illustrate, a 2016 paper by WWF listed fifty studies of water valuation.

Stakeholder-oriented approaches that place stakeholders closer to the center have gained attention since 2006 (FAO, 2006; Hermans, Van Halsema, & Mahoo, 2006). Such approaches widen the water-valuation lens. Rather than merely putting a monetary value on water resources, stakeholder-oriented approaches have provided a structured and transparent mechanism through which those affected can express the values that water-related goods and services represent to them (FAO, 2006). This differs from classic economic valuation in that it is embedded in the water resources management process, of which it forms an intrinsic part. Stakeholder-oriented approaches are used as a means for conflict resolution, decision-making, informing stakeholders, supporting communication and sharing insights.

Since 2016, valuing water has been one of the four lighthouse initiatives of the High Level Panel on Water (HLPW). The HLPW recognizes that global action towards Sustainable Development Goal (SDG) 6: Ensuring availability and sustainable management of water and sanitation for all, is critical, and therefore aims to build momentum toward a common vision for better stewardship of this global resource (World Bank, 2017). Valuing water is an important part of that vision. The HLPW initiative on valuing water has two purposes. First, it seeks to build a common understanding and language around key principles to guide approaches to valuing water in three critical dimensions: (i) the social and cultural, (ii) the environmental and (iii) the economic. Second, it stimulates political leaders to move their government agencies to take proactive steps for a better and sustainable water management, while galvanizing businesses and civil society in the same direction.

Annex 4 – Different phases of systemic change with actor roles

	1. Inception 	2. First movers 	3. Critical mass 	4. Institutionalization 
Industry	Stop denying the issue	Develop sustainable business models	Communicate a non-competitive agenda	Lobby for the new normal
	Partner with NGOs, or other stakeholders	Differentiate by introducing new business models and labels	Form or join platforms	Give credits to politicians
	Pilots, CSR projects, support/partner with foundations	Engage value chains	Be inclusive when others want to join	Comply with legislation
	Identify solution principles	Participate in rankings and benchmarks	Develop a sector strategy	Take on next issues
Government	Embrace the crises	Emphases long term vision	Come with policy goals and measures	Show political leadership
	Communicate a long-term vision	Challenge market actors on principals	Support platforms and coalitions	Announce legislation
	Make space for experiments and provide project subsidies	Be a launching customer	Influence behavior of consumers	Create the new normal
	Identify solution Principles	Recognize market leaders	Change takes incentives	Remove the laggards
NGOs	Raise awareness about the crisis	Reward first movers	Support frontrunners, pressure laggards	Lobby towards the government
	Be involved in projects	Support pro-active corporate strategies	Join platforms	Dialogue with policy developers
	Campaign against laggards	Naming and shaming of laggards	Be a “watch dog”	Monitor progress
	Set agenda for the next steps	Emphasize it is time to move on	Create transparency about the desired future	Shift attention to new issues

	1. Inception 	2. First movers 	3. Critical mass 	4. Institutionalization 
Financial Institutions	Donate to charity projects	Funding front runners	Join platforms with tax and finance expertise	Lobby towards the government
	Finance projects via foundations	Provide financial benefits for sustainable business models	Collaborate with other Financial institutions	Integrate new criteria in investment Policies
	Apply negative screening to end relationships with high-risk clients	Engage with all clients, especially the laggards	Create financial solutions for scaling	Exclude unwilling clients, also outside the Jurisdiction
	Be clear about the strategic positioning of the financial institute	Apply best in class screening	Link long term investments to the new normal	Communicate potential risks linked to new Issues
Research Institutions	Flag urgency of the issues	Showcase good practices in education and research	Continue to put pressure on change agenda	Provide overview of different policy Instruments
	Study system loops to create awareness about the underlying problems	Study best practices and Investigate failures	Be objective in studying the arguments for and against a new normal	Argue for specific policy instruments based on Research
	Learn from emerging practices and disseminate knowledge	Develop benchmarks and communicate periodic results	Calculate the potential impacts of the new normal	Monitor impact of the new policies
	Identify good practices and showcase them	Define agendas that could lift the entire market	Support lobby with scientific evidence	Identify new emerging issues