

Chapter 4

Potential frameworks

The term ‘water stewardship’ was first used in writing in 1970 and has since increased in usage. It is, however, still a rare word, as can be seen in [Figure 17](#).

The graph in [Figure 17](#) shows how often the word occurs in the English literature. The ordinate axis shows the percentage of the occurrence of the word as to every other word – which as can be seen is staggering low. To understand how rare the word is I attempted to find words that had the same rarity. I found the following words of similar narrow use: ailurophile (cat lover), cereology (the study of corn circles) and discobolus (a discus thrower in ancient Greece). I didn’t know any of the words and had to make a Google search for ‘rare words’.



Figure 17 The development of the use of the word ‘water stewardship’ as per the Google Ngram Viewer software. ([Michel et al., 2011](#))

So in general, while the word ‘water stewardship’ is increasingly popular, it is still a very rare word.

The etymology service Etymonline.com writes about the origin of the word stewardship as follows:

*Steward: Old English stiward, stigweard ‘house guardian, housekeeper,’ from stig ‘hall, pen for cattle, part of a house’ (see sty (n.1)) + weard ‘guard’ (from Proto-Germanic *wardaz ‘guard,’ from PIE root *wer- (3) ‘perceive, watch out for’).*

Used after the Conquest as the equivalent of Old French seneschal (q.v.). Meaning ‘overseer of workmen’ is attested from c. 1300. The sense of ‘officer on a ship in charge of provisions and meals’ is first recorded mid-15c.; extended to trains 1906. This was the title of a class of high officers of the state in early England and Scotland, hence meaning ‘one who manages affairs of an estate on behalf of his employer’ (late 14c.). Meaning ‘person who supervises arrangements’ at a meeting, dinner, etc., is from 1703.

Stewardship: ‘position or responsibilities of a steward,’ mid-15c., from steward (n.) + -ship. Specific ecclesiastical sense of ‘responsible use of resources in the service of God’ is from 1899.

The Merriam-Webster dictionary explains stewardship as *the conducting, supervising, or managing of something, especially: the careful and responsible management of something entrusted to one’s care.*

Dictionary.com defines stewardship as *the responsible overseeing and protection of something considered worth caring for and preserving.*

RELATED WORDS: *control, management, supervision, protection, conservancy, maintenance, care, sewing, housekeeping, keeping, safekeeping, saving, attention, storage, governing, upkeep, economy, salvation, custody, guardianship.*

The Alliance for Water Stewardship, the World Wildlife Foundation and the Water Footprint Network are all organisations that have adopted the concept of water stewardship and hence made an effort to attempt a definition.

‘Stewardship is about taking care of something that we do not own. Good water stewards recognise the need for collective responses to the complex challenges facing the water resources we all rely on. Good water stewards understand their own water use, catchment context and shared risk in terms of water governance, water balance, water quality and important water-related areas; and then engage in meaningful individual and collective actions that benefit people and nature.’

Alliance for Water Stewardship

‘We define Water Stewardship for business as a progression of increased improvement of water use and a reduction in the water-related impacts of internal and value chain operations. More importantly, it is a commitment to the sustainable management of shared water resources in the public interest through collective action with other businesses, governments, NGOs and communities.’

World Wildlife Foundation

'Concern about water in the private sector is rising rapidly. Companies worldwide are recognising that water is an essential ingredient in their business operations and the lack of access to sufficient water quantities or quality is posing a material risk to a growing number of companies. Water stewardship is one way a company can manage the complexities of balancing their own water use with the needs of communities and nature.'

Water Footprint Network

So while the definitions vary, there is the same common intuitive feel of the meaning of the word, including:

- Taking care of something that is a collective resource and not owned by you;
- In service to something larger than oneself and human society;
- Sustainable use, protection and overseeing of water;
- Integrating and mediating the complexity of different stakeholders needs for water;
- A special responsibility to nature's requirement for water.

Water stewardship can be used as an aspirational term. The purpose of this chapter is to try to capture the spirit, aspiration and intention of water stewardship in order to move us into a 21st-century role. It is a movement from water professional to water steward and a movement from managing water to co-using water.

A water stewardship approach would be an upgrade of water institutions such as utilities, municipalities, technology vendors, water consumers and research institutions to take part in a joint responsibility for water stewardship.

INTEGRATED WATER RESOURCE MANAGEMENT

Integrated Water Resource Management (IWRM) is a term that has a meaning aligned with water stewardship. The Global Water Partnership uses the definition 'IWRM is a process, which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystem' (Hassing *et al.*, 2009). IWRM is focused on balancing economic, social and environmental aspects around water and land. IWRM have a freshwater resource focus and seem primarily occupied with surface water resources (though groundwater is also mentioned).

The concept of IWRM was developed over a number of key conferences (Rahaman *et al.*, 2004):

International Conference on Water and Environment in Dublin in 1992: at this conference, it was recognised that IWRM takes place at three scales: local, national and international. The conference suggested the following four principles (WMO, 1992):

- (1) Freshwater is a finite, vulnerable and essential resource, which should be managed in an integrated manner.

- (2) Water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels.
- (3) Women play a central role in the provision, management and safeguarding of water.
- (4) Water has an economic value and should be recognized as an economic good, taking into account affordability and equity criteria.

Second World Water Forum and Ministerial Conference in The Hague 2000. This conference dealt with privatisation and warned about substituting a government monopoly with a private monopoly. The forum discussed the cost of water. The idea was that charging the full cost for water services would increase the incentive for water savings and this would help the financial requirements to ensure universal access to water. Additionally, appropriate subsidies should be made available to the poor. The rights to use of water and land for agriculture for the poor was also discussed ([World Water Council, 2000](#))

International Conference on Freshwater in Bonn, 2001: At this point, it was clear that IWRM was not as easy to implement as expected. Hence, the conference focused on guidelines of practice. It was realised that the first issue to solve was to meet water security needs for the poor; hence, decentralisation and partnerships came into focus. It was realised that the central unit in IWRM processes are water basins, and that a strong governance framework would be important to ensure that the collaborative process would succeed ([IISD, 2001](#)).

The World Summit on Sustainable Development in Johannesburg in 2002: Here, the principles earlier laid out earlier were elaborated upon and with an increasing focus on sustainability. There was a pressure to develop IWRM plans for major water basins on a short time horizon making use of public–private partnerships and involving all concerned stakeholders. Additionally, there was a special focus on women and gender-sensitive programmes ([IISD, 2002](#)).

Throughout these conferences there seems to be the main focus on developing countries, though this is not explicitly stated. Regardless – and this is important – it becomes increasingly clear that living up to the IWRM principles of gender sensitivity, decentralization, participation of stakeholders, focus on poverty, how to include the private sector in the discussions, ensuring coordination across stakeholders, focusing both on technology and human management, is much more difficult than originally expected. When experts and policymakers meet, there is clearly a shared logic as to how water resources should be managed. In practice, however, it is difficult.

The Global Water Partnership (GWP) is an international network whose vision is a water-secure world. The GWP mission is to support sustainable development and management of water resources at all levels. It was created in 1996 to promote IWRM practices and in 2009 they published a handbook in IWRM. The handbook addresses the large-scale challenge of IWRM and states that: ‘On the one hand, water is essential to human, animal and plant life. Water supports

productive activities, agriculture, generation of hydropower, industries, fishing, tourism, transport, for example. On the other hand, water can be extremely destructive, carrying diseases and flooding vast areas. Insufficient water or prolonged drought can result in widespread death and economic decline. Water can also cause or escalate conflicts between communities in a local or national basin, or in transboundary basins shared by more than one country' (GWP, INBO, 2009).

'The concept of IWRM though in principle right poses a number of challenges as river basins, does not follow country boundaries and governance structures are not set up to handle these challenges. The handbook is structured around some of the key challenges:

- What political and legal factors do basin managers need to understand and take into account?
- What are the functions and what are the different kinds of institutional and legal arrangements for basin organisations?
- What are the different ways in which basin organisations and basin management can be financed?
- What type, level, structure and frequency of stakeholder involvement should basin managers seek to establish?
- How should basin managers go about strategic planning?
- What do basin managers need to consider in developing and implementing basin action plans, and how can they get feedback on how plans are progressing?
- What data and information management systems do basin managers need for integrated water resources management?
- What are the key communication issues basin managers need to consider?

Global Water Partnership (GWP, 2009)

One finding, that I strongly agree with, and that I find important to underline, is that IWRM is a continuous and iterative process that is centred around a process of 'learning by doing' – which is similar to the natural process of trial and error. The ideal of local stakeholder-based management is easily overridden as the political and technical complexity is high – especially in these basin-wide systems spanning hundreds of square kilometres.

In a GWP background paper (GWP, 2000) on IWRM, the most important challenges that IWRM tries to overcome are stated as:

- Securing water for people (still a large part of the global population is without access to clean water);
- Securing water for food production;
- Developing other job-creating activities;
- Protecting vital eco-systems;
- Dealing with the variability of water in time and space;
- Managing risks;
- Creating popular awareness and understanding;

- Forging the political will to act;
- Ensuring collaboration across sectors and boundaries.

Many of these challenges can be recognised as topics from the comparable micro-level project around Tisso. It is clear that a holistic approach is required, it is also clear that there are nature-given limits to the resources and that the resources cannot be taken up entirely by human needs, but needs to be shared to sustain natural habitats and that the actual governance structure for facilitating IWRM is non-trivial. The IWRM has suffered from, in spite of intentions, being more top-down than bottom-up. Additionally, the focus has been primarily on the water supply side of the water issue, while the handling of wastewater has received considerably less attention. The focus of IWRM has been primarily on distribution and not so much on the actual state of basins and aquifers.

Your reflections: Where in your work can you apply some or all the principles of IWRM? Where have you applied them already?

THE ALLIANCE FOR WATER STEWARDSHIP

The approach by the Alliance for Water Stewardship may offer a complementary approach to IWRM. The method in the approach to water stewardship proposed by the Alliance for Water Stewardship is closer to a bottom-up approach. The Alliance for Water Stewardship is a global membership organisation including businesses, NGOs and the public sector. The organisation attempts to start a movement where members, through the adoption of the certification system ‘the International Water Stewardship Standard’, increase their awareness of own water issues as well as work on increasing their understanding of the greater water system they are part of. The approach embraces the ‘learning-by-doing’ principle by including a systematic approach to continuous actions working with water in an integrative way.

A fundamental principle is the belief that if major water users gain a sufficient understanding of their own water use and impacts on water in nature, and commit to publish these results transparently, then they will find the will and ways to improve. The public element and some of the criteria for the certificates ensure facilitation of coordination with other water users within the wider water catchment area.

The water stewardship standard (AWS, 2019a, b) covers the areas of good water governance, sustainable water balance, good water quality, important water-related areas and safe water, sanitation and hygiene for all (WASH), see [Figure 18](#).

To have ‘good water governance’ means to have a governance system implemented so that responsibility is clarified and a framework for action is



Figure 18 Key focus areas in the water stewardship standard. (AWS, 2019a, b)

implemented internally. This framework for actions must include a system for maintaining and updating water sustainability-related information.

‘Sustainable water balance’ means that the user’s direct water consumption is withdrawn from natural resources in a way to ensure that the water resources are continually replenished. Similarly, the consumer needs to look into the sustainability of its significant indirect water use when possible.

‘Good water quality status’ means understanding and taking co-responsibility for the water quality of the aquifer from where the water is abstracted.

The topic of ‘Important water-related areas’ is about identifying impacted areas with special water interests, either for water abstraction or wastewater effluents. In these areas, the water steward must comply with effluent standards as well as engage in the quality of the water-related area as a prerequisite for thriving eco-systems.

‘WASH’ is shorthand for safe water, sanitation and hygiene for all and represents the social responsibility for other less powerful water users. The criteria are related to the concept of ‘water as a basic human right’.

The process of water stewardship is an iterative cyclical process in five steps, as shown in [Figure 19](#):



Figure 19 The process of water stewardship. (AWS, 2019a, b)

Step 1 Gather and understand

In this step, the operator conducts a comprehensive data collection to obtain an overview of the actual water situation. The standard specifies the type of data that has to be gathered and analysed, including:

- Outlining the geographical scope of the entities own operation;
- Identify stakeholders and their water-related challenges and mutual impacts;
- Collect key water information on water balances, water quality, cost and governance;
- Understanding own indirect water use;
- Understanding current and future water challenges in the geographical area;
- Understanding water risk and opportunities;
- Overview of best water-related practice.

Step 2 Commit and plan

This step is about making the commitment to water stewardship public and practical. The step includes:

- The senior-most manager in charge of water must sign and publicly disclose the commitment;
- Develop an internal process for water stewardship in the organisation;
- Create a water stewardship strategy;
- Demonstrate the site's responsiveness and resilience to water risks.

Step 3: Implement

In this step, the actions in the action plan are implemented including best practices for water stewardship. The actions relate to areas of water balance, water quality, important water areas, WASH, shared resources, as well as documenting legal compliance to relevant legislation water authorities.

Step 4: Evaluate

The evaluation step is similar to the 'plan-do-check-act' process cycle seen in most ISO standards (International Organisation for Standardisation) and ensures a continuous evaluation of the effects of the implementation stage in step 3. It also includes evaluating the performance of water-related emergencies if any has occurred and an evaluation of the quality of the stakeholder dialogue. Finally, the water stewardship plan is to be updated based on the evaluation.

Step 5: Communicate and disclose

Here the water stewardship information such as governance system, plan, performance against targets, effort and results of stakeholder collaboration and compliance etc. are made public.

For each step of the process, the organisation must comply with a number of criteria; to give an impression of these criteria, some examples are (AWS, 2019a, b):

- Criteria 1.1: Gather information to define the site's physical scope for water stewardship purposes, including: its operational boundaries; the water sources from which the site draws; the locations to which the site returns its discharges; and the catchment(s) that the site affect(s) and upon which it is reliant (this is an example from step 1: gather and understand).
- Criteria 2.3: Create a water stewardship strategy and plan, including addressing risks (to and from the site), shared catchment water challenges, and opportunities (this is an example from step 2: commit and plan).
- Criteria 3.1: Implement a plan to participate positively in catchment governance (this is an example from step 3: Implement).
- Criteria 4.1: Evaluate the site's performance in light of its actions and targets from its water stewardship plan and demonstrate its contribution to achieving water stewardship outcomes (this is an example from step 4: Evaluate).
- Criteria 5.3: Disclose annual site water stewardship summary, including the relevant information about the site's annual water stewardship performance and results against the site's targets (this is an example from step 5: communicate and disclose).

The certification comes in three grades: core, gold and platinum, depending on the number of indicators the organisation meets.

I appreciate how the system encourages collaboration with other partners through collective action with other stakeholders in the same water area, as well as organisations representing indirect water use. At the same time, this may be a way of extending the network of organisations to obtain compliance to the water stewardship standard.

The framework of the Water Stewardship standard is comprehensive and integrates the actions required to address the complex issues of water to ensure good water governance. The standard seems first and foremost directed towards large industrial water consumers but ought also to give, for example, utilities or municipalities a firm grasp on all their water issues. According to the Alliance for Water Stewardship, the organisations that are currently certified according to the water stewardship standard primarily include the business, agriculture and health care sectors and a few cities.

The framework of water stewardship certification has several similarities with more well-known standards like the ISO 9000 (the International Organization for Standards standard on Quality Management) and even more relevant the ISO 14001 (Environmental Management System, EMS). For utilities, the Water Stewardship standard can in principle be used as an effective framework for keeping track of water sustainability in all its aspects as part of the ISO 14001 or ISO 9000 standards.

While this approach in principle solves some of the difficulties with IWRM, such as a stakeholder-based approach that is more bottom-up than top-down, it does also hold some challenges. First of all, it (at least so far) addresses primarily major water users and not the multitude of other water stakeholders in an area. Second, it may be very difficult from a water user perspective to find solutions in a water basin because the consumer does not hold any formal power over what everybody else does. Third, the certification process is voluntary and will only be carried out to the extent that a given company takes an interest in doing this kind of work.

Your reflections: What do you see as the key advantages and disadvantages with a standard certification approach? How much water sustainability mapping have you already carried out? Do you and your colleagues have a shared understanding of the water challenges around you, where you have a direct or indirect influence?

WATER FOOTPRINT

The Water Footprint Network promotes the concept of water footprint. A water footprint can be calculated for a product, an organisation or a country. Water footprints are divided into three different types of footprints (WFN, 2019):

- (1) The green water footprint is water taken up from the root zone of soil, typically by agricultural products.
- (2) The blue water footprint is water abstracted from groundwater or surface water sources and used in various typically industrial processes. This is, for example, the water abstracted by utilities.
- (3) The grey water footprint is the amount of freshwater required to assimilate pollutants to meet specific water quality standards.

The water footprint method includes direct and indirect water consumption. The network has carried out some elaborate work analysing a number of different water footprints:

- The production of one kilogramme of beef requires approximately 15 thousand litres of water (93% green, 4% blue, 3% grey water footprint). There is a huge variation around this global average. The precise footprint of a piece of beef depends on factors such as the type of production system and the composition and origin of the feed of the cow.
- The water footprint of a 150-gramme soy burger produced in the Netherlands is about 160 litres. A beef burger from the same country costs on average about 1000 litres.

- The water footprint of Chinese consumption is about 1070 cubic metres per year per capita. About 10% of the Chinese water footprint falls outside China.
- Japan with a footprint of 1380 cubic metres per year per capita, has about 77% of its total water footprint outside the borders of the country.
- The water footprint of US citizens is 2840 cubic meter per year per capita. About 20% of this water footprint is external. The largest external water footprint of US consumption lies in the Yangtze River Basin, China.
- The global water footprint of humanity in the period 1996–2005 was 9087 billions of cubic meters per year (74% green, 11% blue, 15% grey). Agricultural production contributes 92% to this total footprint.

Water Footprint Network ([WFn, 2019](#))

The Water Footprint Network provides tools to calculate the water footprint of individuals (simplified and extended version), a water footprint assessment tool and a national water footprint explorer providing data on the water footprint of most countries, including information on the distribution between internal and external consumption. Finally, they provide a list of products for which the water footprint has been analysed.

Additionally, for more professional use, the Water Footprint Network provides tools to analyse the water footprint of companies.

Your reflections: How much do you know about your water footprint? Do you have a sense of the water footprint of various products or is it completely unknown to you? Were you aware of the three different kinds of water footprints?

WATER STEWARDSHIP IN THE SUSTAINABLE DEVELOPMENT GOALS

The sustainable development goals (the SDGs) ([UN, 2015a, b](#)) represent a different framework for implementing water stewardship. For most water-related organisations there are many options for how to implement the SDG framework and typically more of the goals will be relevant.

Before applying the SDGs it is helpful to understand the full context of the SDGs. Otherwise, one may easily find oneself in a strange terrain, where the SDG goals and indicators are taken too literally. Organisations trying to translate the global context in a one-to-one way to the local level, attempting to influence the indicators directly in a strangely competitive way, will not achieve the success they hope for. Instead, any discussion about SDGs in organisations should be started by reminding everybody about the two basic concepts in the SDGs: ‘leave no one behind’ and ‘do no harm’.

The SDG is an impressive human innovation born in the UN in 2015 with goals reaching the year 2030. The previous UN goal framework, the Millennium Goals (WHO, 2000), were primarily aimed at the then-called developing countries. In the 1970s the world was divided into developed and developing countries. This division is not so relevant anymore as all countries today are distributed more evenly on a continuum from most to least developed, and many previously developing countries have effectively transcended that status.

The SDGs represents a significant change of mindset from the Millennium Goals. The SDGs are goals for the whole world. With this change of mindset, every country in the world could be said to have become a 'developing country'. The SDGs succeeds in conceptualising that all the goals are interconnected and that we live in an interconnected world. Improvements in one area may lead to improvements or deteriorations in another area. The goal is to find solutions for one that does not sacrifice the other and preferably supports other areas. Aim always for solving more than one problem.

This change in mindset has come as a continuation of the increasing understanding of the world as one finite interconnected place. An idea that was rooted in the 1970s by the Club of Rome and moved on by researchers and philosophers such as Rachel Carson, Buckminster Fuller, James Lovelock, Lynn Margulis, James Hansen, Vandana Shiva, Charles Eisenstein, Wendell Berry, Al Gore, E. F. Schumacher and many more.

The central goal in regard to water is of course SDG goal 6, 'Ensure availability and sustainable management of water and sanitation for all'. Each goal consists of the number of targets and indicators, for SDG 6 they are:

Goals

- 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all, and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.
- 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally.
- 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, and substantially reduce the number of people suffering from water scarcity.
- 6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.
- 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

- 6.a By 2030, expand international cooperation and capacity-building support to developing countries in water and sanitation-related activities and programs, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies.
- 6.b Support and strengthen the participation of local communities in improving water and sanitation management.

(UN, 2015a, b)

Your reflections: How are the SDGs relevant to what you do? Are you happy with SDG6 or do you think something is missing – can you find it in any of the other SDGs? Do you know how well SDG6 is progressing?

WATER AS A COMMON GOOD

The word ‘common good’ is related to the concept of commons, most notably known from the ‘tragedy of the commons’. The ‘tragedy of the commons’ was described in 1968 by Garret Hardin in an article by the same name (Hardin, 1968).

Hardin explains the ‘tragedy of the commons’ with grazing a pasture. Having more herdsmen using the open pasture to keep cattle may work reasonably well for centuries as tribalism, poaching and disease keep the number of herdsmen and beasts below the critical level of the carrying capacity of the pasture. However, as the struggling society finally finds a way to reach a level of civilisation where peace and prosperity rules, the problem of the common good becomes apparent. The logic of sharing a resource, the common good, develops into tragedy.

The reason is that each herdsman will try to optimise his gain. When considering adding one animal to his herd, his calculations look like this. There is both a gain and a loss. The gains from the added animal are his alone. The loss due to overgrazing, on the other hand, is shared between all the herdsmen. Hence, he will have a net benefit by adding an animal to his herd. As time passes and every herdsman have this same logic, overgrazing becomes an increasing problem until the ecological limitations of the pasture breaks-down and everybody, herdsmen and animals suffer. And that is precisely the ‘tragedy of the commons’:

‘Each man is locked into a system that compels him to increase his herd without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believed in the freedom of the commons.’

Hardin (1968)

The ‘tragedy of the commons’ is acutely relevant when it comes to water, both in terms of allocation of the resource of freshwater and water’s capacity for handling wastewater residuals. Therefore a key responsibility of the ideal water steward is to ensure allocation of this common resource. This should be done under the headline of ‘*the careful and responsible management of something entrusted to one’s care*’. The ‘something entrusted’ is water, but by whom has the water steward been entrusted the careful and responsible management of water?

Water as a common good is relevant to all living, and it must, therefore, be ‘entrusted’ on behalf of ‘all living’. Hence the responsibility expands beyond human needs to the lives of all creatures. Water as an absolute essential prerequisite for life is a commons belonging to all living. How can this be managed responsibly?

Hardin begins his article with a comparison with the problem of an arms race between nations. He pays tribute to the bold results presented in a paper by [Weisner and York \(1964\)](#). After they had looked carefully into the arms race dilemma, they concluded that there is no technical solution to the problem. As one country increases the number of arms, the other country will feel a decrease in national security, and in response will increase its own number of arms. This leads to an ever-escalating arms race and Weisner and York warned about impending nuclear war. However, what Hardin finds interesting is that there is no ‘technical solution’ to the problem. It is like playing tick-tack-toe. If both players understand the game and play within the conventions, none of them will ever win.

Hardin’s conclusion on the ‘tragedy of the commons’ was that the application of organising rules imposed from above was necessary to handle these types of dilemmas.

Economist Elinor Ostrom, winner of The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2009 (Nobel prize in Economics), upon a lifetime of studies, came to a different conclusion.

She received the prize for the contribution of ‘Challenge the conventional wisdom by demonstrating how local property can be successfully managed by local commons without any regulation by central authorities or privatization’.

Instead of a call for top-level management, she advocates that polycentric systems (that is systems with multiple centres) are more effective in handling commons than top-level centralised units ([Ostrom, 2009](#)). In an in-depth study of a police force divided into multiple different-sized departments in metropolitan areas, she found that there was not a single incidence where a large centralized police department outperformed smaller departments serving smaller neighbourhoods; in regard to multiple indicators. Similarly, from a study of irrigation systems in Nepal that compared ‘engineered and run by government’-systems with ‘built and run by farmers’-systems, she found that the latter type of system was usually more primitive, but they were able to grow

more crops, run the systems more effectively and get more water to the tail-end of the irrigation system.

A forest study of hers found that users monitoring forests were more important to the thriving of the forest than the type of forest ownership. The care was even stronger when local communities had strong rule-making autonomy and incentives to monitor.

She found that effective systems usually included:

- Communication among participants;
- The reputation of participants is well-known;
- Longer time horizons;
- Agreed upon sanctioning mechanisms;
- Conflict resolution mechanisms in place.

The most important value in these polycentric networks, she found, was trust. Elinor Ostrom posits that ‘all factors that increase the likelihood that participants gain trust in others and reduce the probability of being a sucker’ increase the effectiveness of poly-centred systems. A central take-home message from her research is that we need to learn to deal with complexity rather than rejecting it. And exactly handling complexity is what polycentric systems are good at (Ostrom, 2009)

Your reflections: Do you agree with Hardin or Ostrom? What do the two viewpoints mean practically in your work? What future would you like to live in?

IN SUMMARY

While the concept of water stewardship is good to capture the imagination, it has, in spite of a long incubation time since the 1970s, not resulted in more traction than rare words like ailurophile, cereology and discobolus. So how can we come closer to a practical implementation of water stewardship?

It is clear that while water stewardship depends on our scientific-technical knowledge, that alone will not be enough to succeed. It is necessary to move beyond the scientific-technical realm to capture the essence of water stewardship and to reap its benefits.

Ken Wilber (1996) provides a framework to organise one’s thinking about the complexity of that question. His idea of a quadrant model is that to capture the essence of a holon or a holistic whole, one has to address four different domains of that whole: the subjective (the I), the intersubjective (the we), the objective (the it) and the inter-objective (the its).

The subjective domain is about each of our individual practices. Here we need to answer questions about our individual role; if we believe it to be relevant (as I do), this is where we train our mindset and improve our connection to our heart and body. This is where we develop necessary competences in the technical as well as in the social domain.

The inter-subjective space is the we-space. This includes our shared stories, our decision systems, the trust we manage to build per Ostrom's recommendation. This is the space of our collective culture, what is considered normal behaviour here? How high is the integrity of our organisation? etc.

The objective domain is the domain of the 'thing' we are working with, in this case 'water'. It can be in the form of our water utility infrastructure, plants and components. It can also take a river, a groundwater reservoir, a water catchment area as the centre of attention.

The inter-objective domain is the domain not only of our central object, but the objects around that are related. If our object is a utility, the inter-objective space is all the stakeholders, who may be organised in an industrial symbiosis – or not. This also includes a number of other key stakeholders, as could be seen in the case about Tisso.

The point of Ken Wilber's model is that we need to address all four quadrants when we want to improve or progress. Together these four aspects can describe everything there is to know about a holon. A holon means something that is a whole as well as a part. Holons are found everywhere and any domain can be viewed as a holon. When considering all four quadrants, we ensure to apply a holistic view of our problem and the odds of success increases drastically (see [Figure 20](#)).

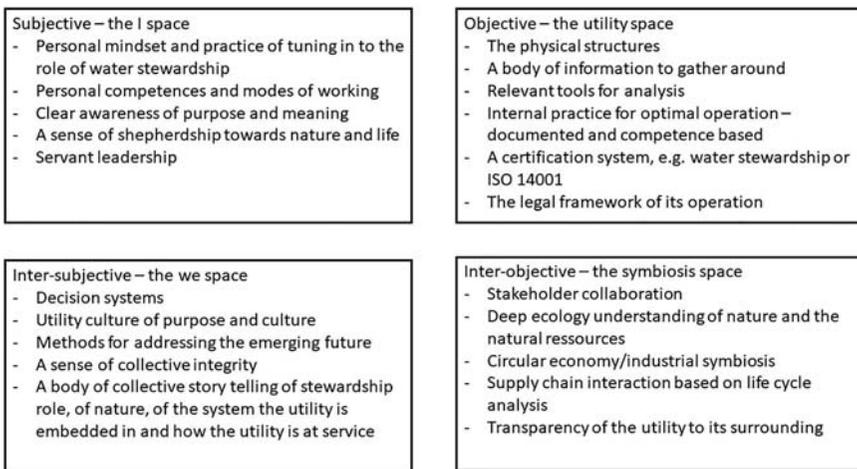


Figure 20 Example where a utility is considered as a holon. (Source: Ingildsen)

'We did not create the earth, it was given to us. Instead of just "take, make, sell, use and dump", our role is to be good stewards who pass what has been given to us on to the next generation in the same or better condition as the one in which we received it.'

Otto Scharmer (2013)

Your reflections: What parts of your work have elements of water stewardship? Are there foregone opportunities to be a steward of water? What are the main barriers for water stewardship in your life?

