Water4All
Water security for the planet

European Partnership

TRAINING COURSE MATERIAL ON SYSTEMATIC THINKING PUBLISHED

Deliverable D3.13, August 2024

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CONTENTS

LIST OF ACRONYMS

ACRONYM	FULL TITLE
IWA	International Water Association
KH	Knowledge Hub
SRIA	Strategic Research and Innovation Agenda
Water4All	European Partnership on Water Security for the Planet
WOLL	Water Oriented Living Lab

ABSTRACT

The Water4All Partnership -Water Security for the Planet- is a funding programme for scientific research in freshwater. It aims to tackle water challenges to face climate change, help to achieve the United Nations' Sustainable Development Goals and boost the European Union's (EU) competitiveness and growth. It is co-funded by the European Union within the frame of the Horizon Europe programme (a key funding programme for research and innovation). The Partnership duration is for seven years from 2022.

Water4All consists of 5 Pillars. Pillar C is dedicated to Science - Policy - End-users Interface and consists of 4 tasks, of which TASK C.3 is dedicated to "Fostering capacity development of all actors". Task C.3 aims to increase capacity building of the water research and innovation community by the implementation of PhD schemes, mobility programmes and vocational training. Task C.3 consists of four subtasks:

- C3.1. Dedicated PhD Schemes Pilot Alignment and Implementation.
- C3.2. Vocational Training and Skills Development Programmes
- C3.3. Mobility Schemes
- C3.4. Capacity Building on Systemic Thinking and System Analysis

In Subtask C3.4. *Capacity Building on Systemic Thinking and System Analysis* the objective is to develop training materials for different audiences to increase their systematic thinking capacities to tackle various water challenges by understanding the interconnections across thematic areas, actors and priorities. As of May 2024, the training course material has been developed and published online at https://coda.io/@vito/nexuslearn/0-introduction-189. Partners in Subtask C3.4 have investigated and identified the potential ways of using this training material for steering strategic and thematic activities of Water4All partnership. This report summarizes the process of developing the systematic thinking training material and how they will be used in the future for facilitating the processes of updating the Water4All Strategic and Research Agenda (SRIA), knowledge hub (KH) activities and coordination of Water Oriented Living Labs (WOLLs) among others.

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Context

The water challenge is a wicked one. Its wickedness is exemplary for a myriad of challenges of the 21st century world: the multiple issues at stake relate to diverse activities and actors, they combine multiple functionalities, and address many structures and institutions, all of them strongly interrelated and intertwined in the fabric that constitutes societies. Therefore, our ambition is to give ***all*** the capacity to take actions in a wicked world, to support and accelerate the transition to a secure and sustainable water system.

Objectives

Our task is to foster systemic transformations via a capacity building program. In this program the development of sustainability competences is key. These are not only technical, but include systems thinking, long-term engagement, and navigating complex problems. But when have we given stakeholders enough capacity to help them transform the current water systems? With this deliverable (D3.13) of developments and updates of the training course material is delivered on systemic thinking adapted to different audiences.

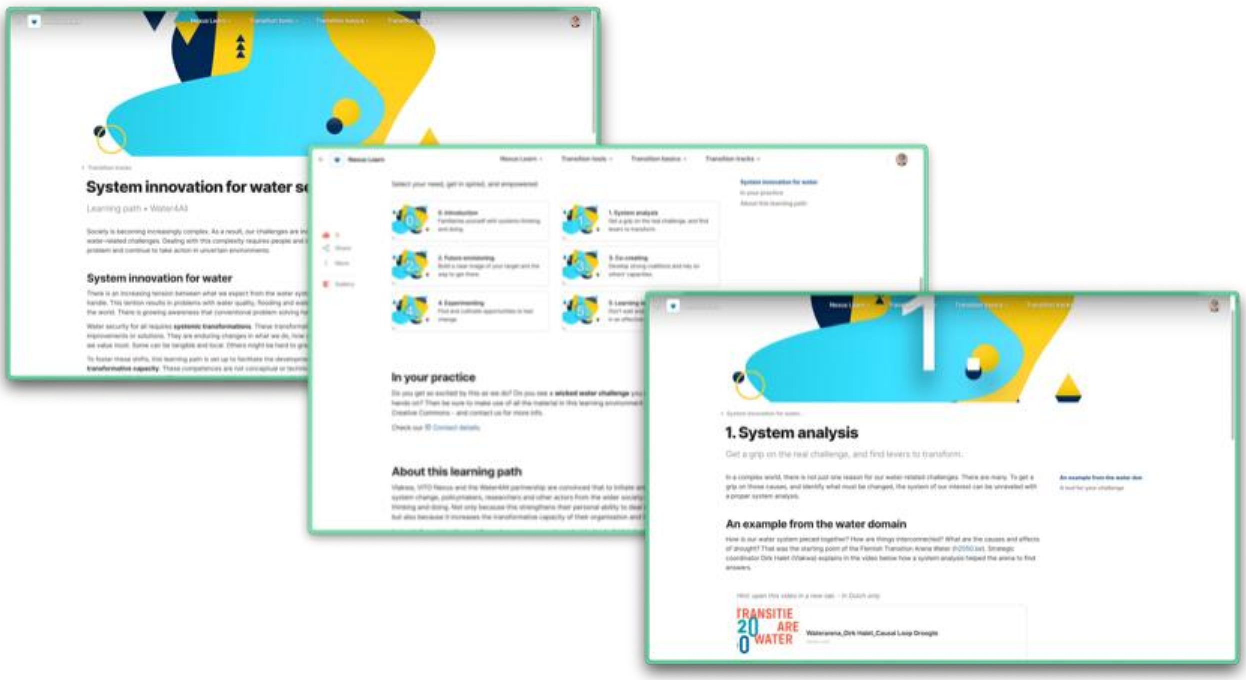

Figure 1 Screenshot of training material

Vlakwa, VITO Nexus and the Water4All partnership are convinced that to initiate and sustain sustainable system change, policymakers, researchers and other actors from the wider society can rely on systems thinking and doing. Not only because this strengthens their personal ability to deal with wicked problems, but also because it increases the transformative capacity of their organisation and their partners. Instead of acquiring these skills each on our own, we have decided to build this learning track around system innovation together. We developed it in co-creation. Also in its upcoming implementation, we want to learn what barriers and opportunities 'the other party' has, and how we can connect them.

Introduction to systems thinking and transformative capacity

First, **systems thinking and doing** helps us to navigate the wickedness mentioned above. We see sustainability transitions as changes to the systems our society is composed of. These systems consist of a diversity of elements (e.g. infrastructure as well as consumers), a myriad of interdependencies (e.g. logistically, financially, ...), and a wide set of rules (both formal and informal) according to which they behave. If we want to change our water system, some of those elements must probably be altered.

> ***YOU THINK THAT BECAUSE YOU UNDERSTAND ONE THAT YOU MUST THEREFORE UNDERSTAND TWO, BECAUSE ONE AND ONE MAKE TWO. BUT YOU FORGET THAT YOU MUST ALSO UNDERSTAND 'AND'.***
>
> **DONELLA MEADOWS, LEAD AUTHOR OF THE LIMITS TO GROWTH (1972).**

Second, **building transformative capacity** is the way we convey systems thinking and doing to our fellow researchers and (policy, industry and other) practitioners. Transformational capacity is defined as the ability to ‘‘create a fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable […]’’ (by Wolfram et al. 2019 after Walker et al. 2004). The corresponding framework includes 10 key components and 60 factors (Wolfram 2016, p. 127).

In the Flemish transition-arena on water, an engaged, open-minded and voluntary group of stakeholders set sail to a sustainable water management in the region. From a systemic understanding of the current situation, they created a shared ambition for 2050 and defined possible transition-pathways. The learning track of this Water4All partnership takes important knowledge and insights from the Flemish Transition Arena Water (h2050.be) and from Nevens et al. (2014) RealTouch.

Development process

Framework development (Q3 2022)

Before developing the training material, a comparative review of the Water4All objectives and current scientific insights on transformative capacity was conducted. This builds on literature and experiences in and outside of the sustainable water management realm. It led to the framework definitions above, and published via https://coda.io/@vito/nexuslearn/0-introduction-189.

Co-creative initiation (Q4 2022 – Q1 2023)

Among the partners of the Water4All capacity building program, VITO Nexus and Vlakwa organised a first online workshop on Monday October 10, 2022 and a second one on Monday December 12, 2022. The outcomes were summarised and shared with the partners to collect further feedback and have been discussed during the monthly recurring work package meetings since then. They were used to inspire the task of the partners and provided preliminary guidance on:

- Definition of the diverse audience of the Water4All Capacity Building
- Expected knowledge, skills or attitude from a change-maker in water
- Indicators for successful capacity building
- Proposal for a double modular approach to Water4All Capacity Building
- Possibilities for ‘learning by doing’ in the Water4All partnership

Generally, it was observed that most partners are not confident or experienced with the two frameworks (cf. above) this material relies on. Therefore, it was decided with the partners to plan one or two introductory workshops (if possible, in-person) for partners and a segment of stakeholders (e.g. PhD researchers).

Material development (Q2-3 2023)

Building on the partners’ input, literature and past experiences of VITO Nexus and Vlakwa, the training material was further developed. This was done in the flexible Coda-environment that is managed by VITO Nexus: https://coda.io/@vito/nexuslearn/system-innovation-for-water-security-178. Because VITO hosts this online environment, its long-term availability as open access material is warranted.

The delivered training material follows a double modular approach. First, it deals with the different elements of governing sustainability transitions after Nevens, De Weerdt, Gorissen and Berloznik (2013). These include 1. System analysis, 2. Envisioning, 3. Co-creation, 4. Experimentation, and 5. Learning-by-doing. Second, they follow increasingly more profound and detailed information, exercises, and reflections. This allows the diverse audience (in terms of interest, prior knowledge, and aim) to use the learning material according to their needs. Multiple combinations can as a result lead to various learning trajectories.

The modular, hierarchic page-based material includes:

- A general welcome page
- 1 introduction page
  - Wicked problems - Systems thinking and doing - Transformative capacity
- 5 training material pages
  - 1. System analysis - 2. Envisioning - 3. Cocreation - 4. Experimenting - 5. Learning-by-doing
  - An example from the water domain
  - A tool or approach for your challenge
- Contact and support details page

Hereafter, two review rounds have been organised, collecting feedback and suggestions from the partners directly in the online Coda environment, amending them by VITO Nexus and Vlakwa, and providing them again for a final review to the task partners and pilar leaders. From May 23rd to August 30th 2023, Task C3 partners have been invited to review the developed material. The following strength have been noted:

- Autonomy - "You can **decide** in what order and at what pace you go through the different tools, basics and transition tracks, which works very nicely."
- Perceived competence - "The various examples, videos and figures make the content **easily digestible**!"
- Relatedness - "I **enjoyed** reading the learning material and I think it has a great potential."

This feedback aligns very well with the ideas of self-determination theory and might confirm that we succeed in adapting to the different needs and situations of our diverse audiences (https://yea.org.nz/project/yea-data-points-self-determination-theory-basic-needs/).

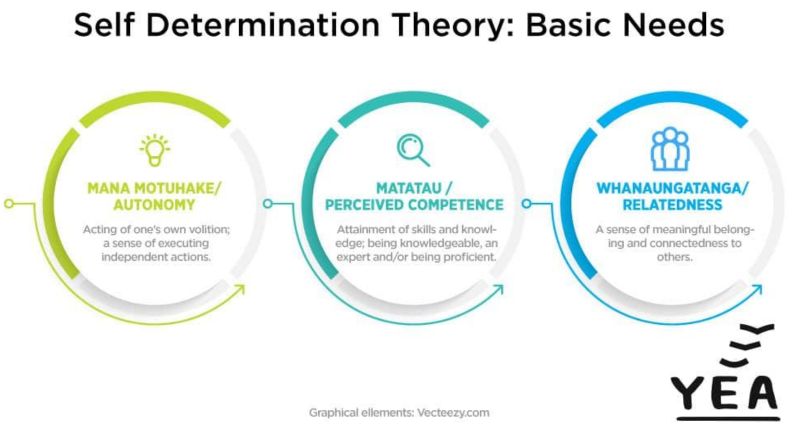

Figure 2 Self Determination Theory

Exploration of preliminary implementation opportunities (Q4 2023 – Q1 2024)

The material was subsequently presented at the Water4All Partner and Board meetings of 13 and 19 September 2023, under the title "Empowering Water4All to realise radical and enduring socio-technical innovations". Following the suggestions of task partners, pillar leaders and the Water4All governing board, implementation opportunities were explored earlier than anticipated.

They are summarised as:

N°	Opportunity	What can be done? How to start it?	Time horizon?* Roadmap of interaction
1	**SRIA** update during 2025. Side events, methods as part of the review process, e.g. stakeholder consultation (T-arena), and foresight exercises.	A consultative stakeholder workshop to update SRIA will be organized in 2024 (date tbc with Pillar A). There will be also a separate foresight exercise in 2024. The workshop and foresight exercise will focus on one or more of 7 SRIA themes (E.g. eco-sys-services, health, …). We can organize side events / formats to understand for example: 1. Which of the SRIA Theme(s) include "**wicked problems**"? 2. What are the "**root causes**" for the selected SRIA themes? 3. How to increase the "**transformative capacity**" in the SRIA themes? 4. And to envision the desired future for the selected systems.	Early 2024 – mid 2025? … Pillar A (information, activation, tutoring, and reflection)
2	**Learning** journey regarding the projects submitted within the Water4All calls. Coupling with **Knowledge Hub** (operational by May 2025) for the second call. E.g. CLD analysis and/or Reflexive Monitoring.	In the KHs, we want to synthesize and valorize the project outcomes, without waiting for their ending. Towards midterm of the projects we can organize a series of online and onsite meetings to do a "system analysis" or "reflexive monitoring" of e.g. aquatic ecosystem services by relying on the projects' interim outcomes and partners' insights. The findings of the exercise should give us input for drafting policy recommendations, rethink projects (and the calls) or bring key messages for the target groups.	Mid 2024? … Pillar B (call drafting, proposal review, workshops, tutoring)

N°	Opportunity	What can be done? How to start it?	Time horizon?* Roadmap of interaction
5	**Inspiration Program for Start Ups or the Business Development Program.**	Provide a session/course as part of the Task C.2	Pillar C (Water Alliance, KIT-PTKA)
6	**PhD schemes.**	Provide a session/course as part of the Task C.3.1	Pillar C (Wetsus, BRGM)
3	**Water oriented Living Labs**	The material can be used to identify the needs and challenges for the living labs or how to increase their capacity.	Pillar D (Water Europe, UFM-INNFO)
4	**International dimension**	Side events at for example: World Water Forum, IWA (Toronto), … Workshop to identify pathways for ecological restoration, …	Pillar E

This rendered however some implementation questions:

- "Do we have enough material and trainer capacity to actually use all methods?"
- "Who do we involve in the interactive co-creation for the SRIA of Water4All?"
- …

Adhering to the systems thinking approach ourselves, these questions led us the experimental execution of preliminary implementation opportunities to learn about the implementation.

Execution of preliminary implementation opportunities (Q2 2024)

Three of the identified opportunities were identified as ideal experiments to test the material's implementation according to the task partners. To each of the corresponding responsible partners a dedicated plan-of-attack was proposed, supported with bilateral meetings online and in person. So far, only the second opportunity was brought into practice, but each one rendered already interesting insights:

Update of the **Strategic Research & Innovation Agenda** (Task A1.3), linked with Task C.4.3 on Data Sharing.

- **Occasion.** A cocreation session (there is room for a one-and-a-half-day meeting) to update the SRIA, with a focus on data and digitisation, is organised on 3-4 June 2024 in Lisbon by L'Agence nationale de la recherche (ANR).
- **Status.** Following 3 meetings, a workshop outline has been proposed to the partners, incl. guiding principles, detailed questions, and engaging formats. Partners have been discussing internally of they can continue this way. (Active facilitation by VITO Nexus and Vlakwa was planned to be foreseen.) After a while it was decided to base all discussions upon the presentation of specific case studies / demonstration sites, rather than a systemic analysis. Yet, the interest of a participative, engaging format was kept.
- **Insight.** Developing a proper system analysis in co-creation is almost impossible if the process of engaging stakeholders and partners is not designed for it (i.e. continuous and transparent engagement).

Facilitation of the **Knowledge Hubs & Project Calls** (Task C1.1)

- **Occasion.** Kick-off meeting (23-24 April 2024, Madrid) of the first round of selected projects in Water4All 2022 Joint Transnational Call is an opportunity to 1) create awareness about the Water4All training material and 2) prepare the project collaborators for a mid-term reflexive session. Together this aims teach us how to optimize the calls, trigger synergies between projects, and lever their impact. A short and longer intervention have been proposed (provisionally planed on 23/4, 30' pitch).
- **Status.** Overall, a systems approach for the knowledge hubs required a longer-term view (difficult as people are changing roles) but with a short-term action. In this context we have been consulted about the role of facilitator for the Knowledge Hubs – as none of the participating projects showed interest in coordinating the hub. At the kick-off meeting we could organise a systemic networking session, which is now reported about via email to the individual participants that opted-in for it, or via https://coda.io/@vito/nexuslearn/water4all-transnational-projects-229.
- **Insight.** Our ability to 'deal' with knowledge creation across diverse settings (cf. living labs, ecosystems) seems to speak to other partners. In our opinion this requires however to rethink the role of a facilitator, not as a purely administrative role.

Figure 3Pictures of the systemic networking workshop in Madrid of the transnational projects.

Support for the **WOLL local stakeholder workshop** in Evora (Task D2)

- **Occasion.** Project meeting 21-23 February, Evora.
- **Status.** Following multiple meetings a workshop outline has been proposed to the partner, incl. guiding principles, detailed questions, and engaging formats. Partners have conducted round tables. No active facilitation by VITO Nexus was foreseen. A call to debrief is being scheduled.
- **Insight.** Partners recognize and acknowledge that they need to start asking different sorts of questions to stakeholders if they want to go beyond the obvious. They however organise the event in a different, short-notice, way hindering more profound support.

Generally, we make the following observations from the interactions with partners.

- Synergies are found in **co-creative settings** (e.g. stakeholder consultations, local partner workshops, knowledge hubs…), which is beneficial.
- Partners **recognize and acknowledge** they need to start asking different sorts of questions to stakeholders if they want to go beyond the obvious.
- They however **struggle to adopt** with confidence the proposed formats (complexity is hard to grasp, unable to embrace the uncertainty of the outcomes, unable to convince others).
- Yet, **supporters** stand up and endorse the approach.

Therefore, we bring forward the idea of **scaffolding transformative capacity**. In educational terms, scaffolding is providing temporary support to help learners grasp a concept, skill, or task that is initially beyond their ability. The support is gradually withdrawn as one gains confidence and competence, bridging the gap between what one already knows and what they are trying to learn.

Subcontracting testimonials and workshop tool to populate the training material (Q1-Q2 2024)

First, to populate the training material with inspiring examples and testimonials, a market survey was launched for 3 assignments: 1) document best practices, 2) craft digital and paper templates, and 3) build prototypes for physical games. It was available online via https://coda.io/@vito/nexuslearn/call-for-offers-210 and shared through personal invitations and public organisational channels like LinkedIn.

After the survey (14 companies invited, incl. VITO's framework contract partners) 6 quotations have been received. Following a comparison, Vlakwa and VITO Nexus jointly awarded the assignment (only assignment 1, see online description) for the multimedia documentation of practical testimonials of systemic approaches for sustainable water management to Ridder Marketing (PPNR 241431). They have quoted interesting prices (standard rates) and approaches for the available budget.

Each delivered example will consist of a concise introduction, an engaging text (around 1500 words), and 2 to 5 captivating photos or video shots suitable for publication on nexuslearn.vito.be and other media. The specific format (coverage report, testimonial, interview, etc.) is to be proposed by the content creator and subject to approval by Vlakwa and VITO.

There are 3 on-site shoots planned with groups composed of:

- **Yves De Weerdt** (0. introduction)
- **Dirk Halet** (1. system analysis – qualitative, 'provider')
- **Fernado Perreira / Patrick Peters** (1. system analysis – quantitative, 'user')
- **Robin Ibens** (2. future envisioning - storytelling, 'provider')
- **Ivan Pelgrims** (2. future envisioning - industry, 'user')
- **Haseeb Ahmed / Li An Phoa / Tim Soens / Dieter Cuypers** (3. co-creation - arts or history, 'provider')
- **Wim Van Gils / Jacob Bossaer** (3. co-creation - policy, 'user')
- **Evi Swinnen** (4. experimentation - arts)
- **Jan Goossen** (4. experimentation - industry, 'user')
- **Denis Dewilde** (5. learning - industry, 'user')
- **Patrick Willems** (5. learning - research, 'user')
- **Bernard De Potter** (5. learning - policy, 'user')

Figure 4 Pictures of the first testimonials being recorded in Leuven and Antwerp

Second, one of the fundamental principles of systems thinking is that we do not make decisions based on reality, but on our perception of reality. The better we understand our perception, the better decisions we can make. In addition to the above, an assignment was also awarded for the development of a workshop tool.

This tool will allow a specific (area-specific) water challenge to be viewed from different perspectives, with each perspective providing new insights and information (each view reveals new stakeholders, shows new relational lines, and enriches each stakeholder and relationship with new information).

This tool will, on the one hand, build openness and shared understanding, where everyone is acknowledged from their own perspective (shifting from "I think this" to "I understand from this perspective"). And on the other hand, it will also bring forth new possible solutions and provide insight into new coalitions to work on these solutions through a better understanding of the ecosystem.

Dissemination (Q2 2024)

The dissemination of the material happens through the Water4All partnership channels (newsletter, webpage) and during dedicated moments (agenda items) during partner meetings. Also, via partners, a dedicated email is sent that allows the material to be shared further in their network. Also, internal and external events are used to promote the training material and of course during the exploratory interactions with the patterns of other tasks and pillars, as well as internal inspiration talks at VITO and Vlakwa.

Additionally, we have been exploring even more interactive formats. During our market survey we got to know expert offices in the development and use of games to tackles societal challenges. Following a first discussion and questionnaire, we could assemble already a ton of ideas: participatory formats we have been experimenting with before, and which could be levered for our work, o.a. in policy settings.

Objective could include, but has not been seized yet:

- *a collection of interactive 'games' that stimulate systemic insights and facilitate group discussions, lasting anywhere from a minute to half an hour. These exercises should directly or indirectly relate to water.*
- *Drawing from literature, our experience, and your expertise, we aim to co-create these games through multiple sessions. Your role involves leading this process, 'harvesting' our collective experiences, and proposing the actual games. Together, we actively seek to test these games once or twice with participants. Each game should be transformed into an instruction sheet, accompanied by a portable box containing necessary accessories. This assignment explicitly calls for prototypes that creatively explore the potential of these games. The language for these is English, with an optional Dutch translation.*

Future work

Following the co-creation sessions, the following question was raised: can or must the partnership develop a transition arena to improve and update the research agenda? And start learning-by-doing, instead / in addition to a training approach to Capacity Building? This will be further explored in the next partnership phase, together with the implementation of the material and its tailored learning trajectories.

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