The B-WaterSmart Innovation Alliance

Deliverable 1.5

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The B-WaterSmart Innovation Alliance

D1.5: The B-WaterSmart Innovation Alliance

Summary

The Innovation Alliance (InAll) of the B-WaterSmart (BWS) project was established across the project's six Living Labs (LLs): Alicante, Bodø, Flanders, Lisbon, East Frisia, and Venice. InAll constitutes a key co-production instrument of the B-WaterSmart project. It was designed for the primary problem-owners of the LLs to internalize and learn by doing how to use the B-WaterSmart objective-oriented assessment framework, developed in WP6, as a main tool for strategic planning on water smartness. This deliverable aims to provide the lessons learnt from the BWS InAll, including recommendations for case owners (follow-up beyond the project) and future users (replication).

Deliverable number	Work package
D1.5	WP1
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Date	History of Changes
Oct 2024	Version reviewed: • In section 3.1, Figures 6 and 7 were replaced by the updated figures, removing the deleted original dates in phases 3 and 4 and keeping only the final dates. • In Chapter 6, URL links to cited project reports were added.

Table of contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

AC	Assessment Criterion
AF	Assessment Framework
BWS	B-WaterSmart
BWS AF	Water-Smartness Assessment Framework
EI	Expected Impact
InAll	Innovation Alliance
LL	Living Lab
LL_i	Living Lab problem-owner
$M_{i,j}$	Metric
MS	Milestone
Qi	Question i
SO	Strategic Objective
SWOT	Strengths, Weaknesses, Opportunities and Threats
T	Task
WP	Work Package

Executive summary

The B-WaterSmart (BWS) project ultimately aimed at accelerating the transformation to water smarter economies and societies. To achieve this, we first need to measure performance against defined objectives. Next, we must establish a long-term strategy to continuously track the improvement needs identified to overcome the anticipated challenges/risks and to gather the resources to implement better solutions, which vary from quick-win measures to big investments depreciated over long time-periods. Successful innovation in real-world environments, such as the BWS Living Labs (LLs), relies on competencies in strategic planning and the use of a quantitative, objective-oriented assessment framework.

In this contest, WP1 (Co-create & demonstrate systemic innovation in six Living Labs) focuses on co-creating and demonstrating systemic innovation in six LLs: Alicante, Bodø, Flanders, Lisbon, East Frisia, and Venice. The Innovation Alliance (InAll) was established across these LLs as a key co-production instrument of BWS and was tailored for the seven BWS LL primary problem-owners (LL_i) from the six LLs to internalize and learn by doing how to develop/revise a strategic plan and how to use the key instrument for strategic planning, i.e. the objective-oriented water-smartness assessment framework (BWS AF), developed in WP6, and the online dashboard implementing it, developed within Task 3.9.

InAll provided a platform for improving one process (strategic planning) and two products (a framework and its dashboard), namely by (i) building the organizations' capacity for strategic planning, (ii) testing the prototype version of the water-smartness assessment framework, delivering recommendations for its refinement and transformation into a software tool (dashboard), and (iii) applying and validating the dashboard as a management support tool. It involved the LL primary owners (water utilities or municipalities) as the key water smartness planners (and doers) and the first users of the framework and the dashboard, as well as meetings and discussions with the partner leaders of the referred tasks and work packages (WP1, WP6, T3.9). On the one hand, InAll provided a proper environment for the LL_i to learn by doing and share their experiences on how to develop/revise a strategic plan (or the strategic planning process) for their organizations, in this case, toward water smart(er) systems and services, and on how to use the BWS AF and the dashboard. On the other hand, it provided an opportunity for the respective developers (WP6 and T3.9) to receive the LL_i feedback on the framework and the software, and improve them. The seven LL_i represent diverse missions, characteristics, locations, contexts, dimensions, and challenges, a diversity that potentiates the soundness and the replicability of the framework and the dashboard.

The InAll process followed a 5-phased schedule program to facilitate a common guidance to strategic planning, as well as the application of the BWS AF. The feedback processes were interactive, as the identification by the InAll participants of the benefits, drawbacks, problems, bugs, and suggestions was being communicated to the respective developers while they were

implementing improvements and fixing the problems along the process. Several feedback requests were collected using structured questionnaires specifically designed to facilitate the process. General information and suggestions or recommendations for future users of the framework and the dashboard were also requested. The strategic plan template, a living document along the InAll, was developed providing support and guidance. It was upgraded along the process, to receive suggestions from the users and make it clearer and facilitate its future revision by the same or other people of the capacitated LL_i or its use by other organizations.

Based on the analysis of the LL_i feedback, the main conclusions and lessons learnt are:

- Overall, within InAll, the six problem-owners (one from each LL) developed a plan following the strategic planning process and considered their participation as positive:
    - InAll provides a means for organisations to learn about the strategic planning process; to create awareness of their data limitations and to create the knowledge to assess the *status quo* and identify where they stand, creating their baseline; to define the strategies to achieve their targets towards a water-smart management;
- team cooperation and collaboration are important factors for success;
- it should replicate the planning methodology, use of tools and delivery of the template of the InAll strategic document providing guidance;
- it should improve the clarification of some metrics, the availability of data required, and the problems with the use of the tools in development;
- it should be considered
    - face-to-face meetings, workshops, and group meetings, considering the different goals, and reducing the duration of online meetings;
    - from the beginning, increase clarification of the goals of the process and simplify the different targets to achieve;
    - design the dashboard in parallel to the assessment framework, to make the dashboard available at an early stage of the InAll process, and reduce the use of work in Excel;
    - to keep believing that it is possible to achieve the goals.

It is clear that the major constraints identified by the InAll participants are related with the co-production of the assessment framework and the dashboard. This process required a significant effort (including work repetition), sharing, and involvement of the participants while developing their planning process and learning.

Besides the aspects mentioned before, the future users of the tools (assessment framework and dashboard) will benefit from the efforts and recommendations provided by the pioneers of B-Watersmart. For future capacity-building initiatives, it is fundamental to clarify from the beginning the goals, effort, and resources required, as well as the benefits and time planning. In the case of co-production processes, it is recommended that all participants become aware of the additional effort required and the benefits of the outcome for their respective organizations.

Acknowledgements

The WP1 team responsible for preparing the D1.5 document deeply acknowledges the contributors and facilitators of the links between WP1, WP6 and WP3. From WP6, SINTEF is deeply acknowledged for providing the B-WaterSmart Assessment framework and facilitating its use and feedback – Rita Ugarelli, Camillo Bosco, Gema Raspatti, Guillaume Bour, and Andrea N. Skytterholm; From WP3, ICCS responsible for the Dashboard development – Lucyna Lekawska-Andrinopoulou, Nefeli Cauchi, Ilias Angelopoulos, and Theodoris Theodoropoulos.

1 Introduction

1.1. Objectives

The B-WaterSmart (BWS) project ultimately aimed at accelerating the transformation to water smarter economies and societies. To achieve this, we first need to measure performance against defined objectives. Next, we must establish a long-term strategy to continuously track the improvement needs identified to overcome the anticipated challenges/risks and to gather the resources to implement better solutions, which vary from quick-win measures to big investments depreciated over long time-periods.

Successful innovation in real-world environments, such as the BWS Living Labs (LLs), relies on competencies in strategic planning and the use of a quantitative, objective-oriented assessment framework. In this contest, WP1(*Co-create & demonstrate systemic innovation in six Living Labs*) focuses on co-creating and demonstrating systemic innovation in six LLs: Alicante, Bodø, Flanders, Lisbon, East Frisia, and Venice.

The Innovation Alliance (InAll) was established across these LLs as a key co-production instrument of the B-WaterSmart project and was tailored for the seven BWS LL primary problem-owners (LL_i) from the six LLs (with Flanders LL including two primary problem-owners) to internalize and learn by doing (Rebelo et al., 2021) how to develop/revise a strategic plan and how to use the key instrument for strategic planning, the objective-oriented water-smartness assessment framework (BWS AF), developed in WP6, as a main tool for strategic planning (Silva et al., 2023).

To support the development of the strategic planning, an online dashboard was developed within Task 3.9 - *Deploying the B-WaterSmart assessment framework* (Lekawska-Andrinopoulou et al., 2023) to facilitate the use of the BWS AF. The BWS InAll provided a platform for testing the prototype version of the BWS AF, offering recommendations for its refinement and transformation into a software tool. Additionally, the dashboard was validated as a management support tool through feedback from the primary problem-owners and discussions with Task (T) and Work Package (WP) leaders.

This document presents the lessons learnt from the BWS InAll, including the recommendations for case owners (follow-up beyond the project) and for future users (replication). It is a result of B-WaterSmart project.

1.2. Structure

After this chapter of introduction, Chapter 2 describes the BWS InAll process and the strategic planning process. Chapter 3 provides an overview of the BWS AF and the dashboard testing processes and summarizes the InAll role and accomplishments in their co-production process, as well as the approach followed to produce the feedback recommendations, and the lessons learnt from BWS InAll. Chapter 4 presents the BWS InAll feedback provided by the BWS InAll LL problem-owners on the BWS AF and dashboard, as well as on the capacity building and strategic planning processes. Chapter 5 presents the conclusions and lessons learnt.

2 The InAll and strategic planning processes

2.1 Overview

BWS InAll is a capacity-building initiative focused on strategic planning, thus requiring a performance assessment process. As a management support tool, BWS InAll follows a 5-phased iterative process to ensure continuous improvement and effective strategic decision-making. This process is based on the BWS AF, which supports multi-stakeholder and strategic decision-making towards the transition to a water-smart society that recognizes multiple values and facilitates the active participation of a varied set of actors (Ugarelli et al., 2022a). To facilitate the use of the BWS AF, a dashboard was developed as a support tool (Lekawska-Andrinopoulou et al., 2023). Both the BWS AF and the dashboard were first used during the BWS InAll, for testing and identification of the first recommendations for improvement, following co-production processes.

Seven BWS LL_i participated at BWS InAll, namely Aguas de Alicante (Alicante, Spain), Municipality of Bodø (Bodø, Norway), De WaterGroep and ProefStation (Flanders, Belgium), Lisbon Municipality (Lisbon, Portugal), OOWV (East Frisia, Germany), and Veritas (Venice, Italy), following a common phased program for developing the strategic planning. The seven BWS LLi tested the first version of the water-smartness assessment framework, BWS AF V_0, in close collaboration with WP6 (Figure 1), the BWS AF developer, and provided recommendations for its improvement. A computational web-tool, FAST (**F**ramework **AS**essment **T**ool) (Ugarelli et al., 2022b), was provided by SINTEF to the LL_i for their first use of the framework and collection of feedback. Cardoso et al. (2022) provide a more detailed description of this approach.

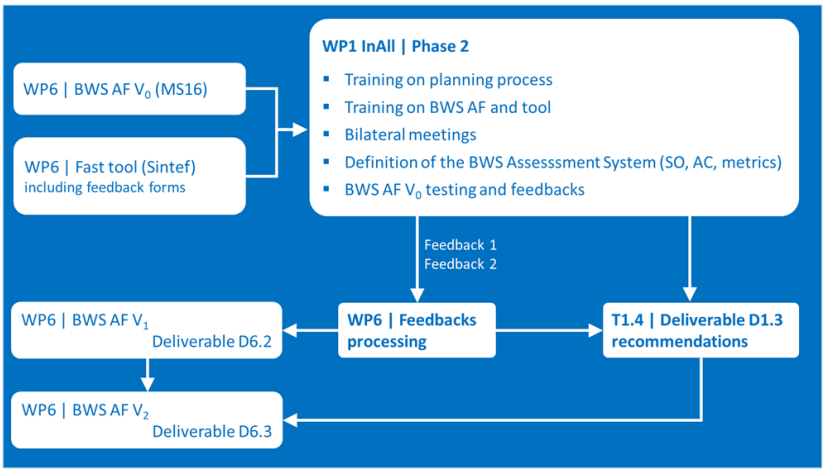


Figure 1: Overview of the approach adopted in InAll for supporting (via testing and providing recommendations) the development of the BWS AF of water smartness (Cardoso et al., 2022)

Regarding the dashboard, its application and testing was conducted in close collaboration with WP3 (Figure 2), the dashboard provider. The dashboard was developed within WP3 (Lekawska-Andrinopoulou et al., 2023), providing an early version to be first used for testing during the InAll and for the first recommendations' provision on the dashboard. This was an interactive process (Figure 1), as the identification by InAll users of bugs and problems was being communicated to the software developers while they were trying to fix them along the process. Close to the end of the dashboard-use phase, a second version was provided with significant updates. It was not possible to use the full version of the software to follow the complete strategic planning process within InAll, as the delivery date was postponed from the due date.

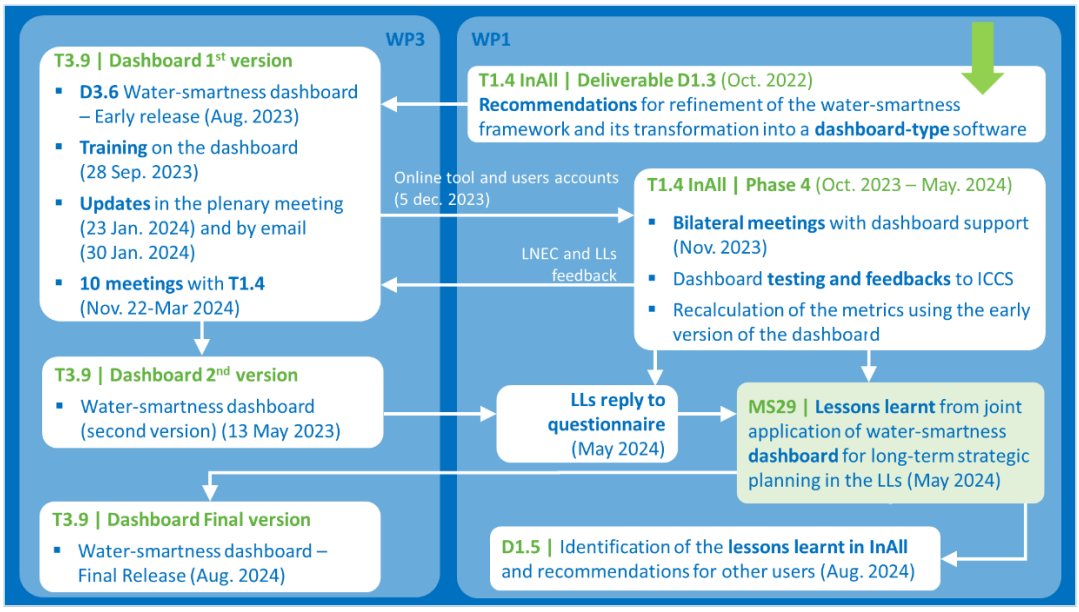


Figure 2: Interaction between T1.4 and T3.9 to provide feedback to the dashboard (Cardoso et al., 2024)

The present chapter includes a description of both the InAll and the strategic planning processes, as well as the BWS AF V_0 and dashboard testing processes.

2.2 The InAll process

The InAll process followed a 5-phased schedule program (Figure 3) to facilitate common guidance to strategic planning. The tasks related to the BWS AF correspond to Phases 2 and 3, and those related to the dashboard with Phases 4 and 5 of Figure 3. Each phase had a particular work program, specifying the work to be developed by each LL_i team, and included dedicated training related to the partial objectives to be reached in the phase.

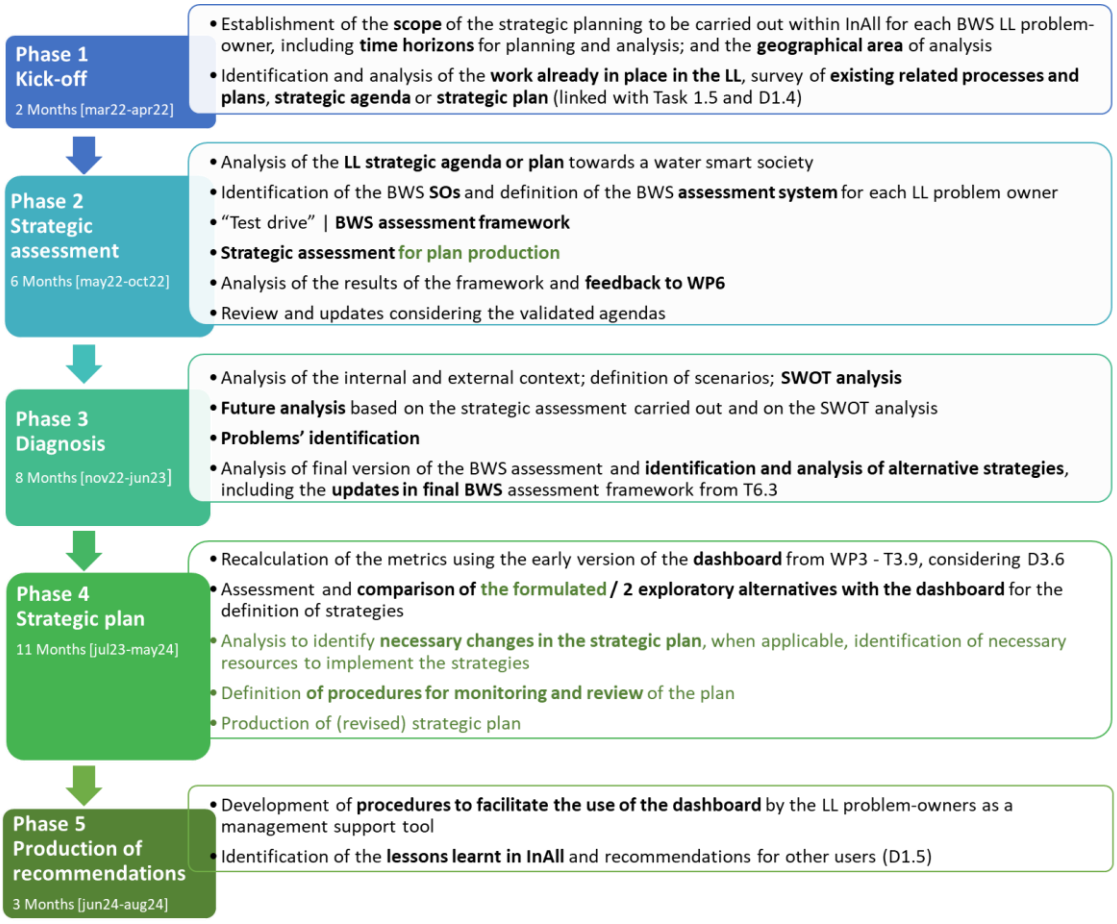


Figure 3: The InAll process | 5-phased schedule program (adapted from Cardoso et al., 2023)

Phase 1 was dedicated to the establishment of the scope and time horizons of the strategic planning and the analysis of the work already in place in the LL_i. Phase 2 focused on the analysis of the LLi strategic agenda towards a water smart society as defined in D6.1 to establish the strategic objectives (SO) and the assessment system – it included the "test drive" of the BWS AF to provide feedback to WP6. Phase 3 was dedicated to the SWOT analysis, definition of scenarios and prospective analysis, as well as identification of strategies, with the necessary updates considering the final BWS AF. Phase 4 focused on the use of the early version of the dashboard for computing the metrics and comparing alternatives. It also included updates in the strategic plan, identification of resources needed, and definition of procedures for plan monitoring and review. Phase 5 was dedicated to developing procedures to facilitate the use of the dashboard by the LL_i as a management support tool, as well as recommendations for other users (Cardoso et al., 2023).

In addition to these developments, InAll provided participants with opportunities for debating, sharing experiences, and proposing improvement recommendations. The work developed by each LL_i was tailored to its specific context and needs.

2.3 Strategic planning process

The strategic planning process towards a water-smart society followed by InAll is based on the AWARE-P approach (Alegre et al., 2012). The strategic planning level is characterized by a corporate and long-term view and aims at establishing and communicating the strategic priorities to staff and citizens. The main objectives of strategic planning are to support, strengthen and provide coherence to the management decision process; improve the organization's performance; provide a means to adapt the activity of the organization to the changing needs of the society and the environment, identify relevant scenarios, mitigating the risks to the activity; develop objective-driven strategies leading to the achievement of the organization objectives as a water service provider; and produce a strategic plan, unique to the entire organization.

At the strategic management and planning level, as for the tactical and operational levels, the planning process follows the structured closed loop presented in Figure 4 (Alegre et al., 2012; Alegre and Covas, 2015), including:

(i) definition of the objectives and the assessment system (criteria, metrics, and reference values);
(ii) elaboration of a diagnosis, including identification of the main problems, analysis of scenarios, and definition of targets to be achieved;
(iii) elaboration of the plan, including the identification, comparison and selection of alternative solutions to overcome the problems identified in the diagnosis;
(iv) implementation of the plan; and
(v) monitoring, progress assessment, and review.

Planning process

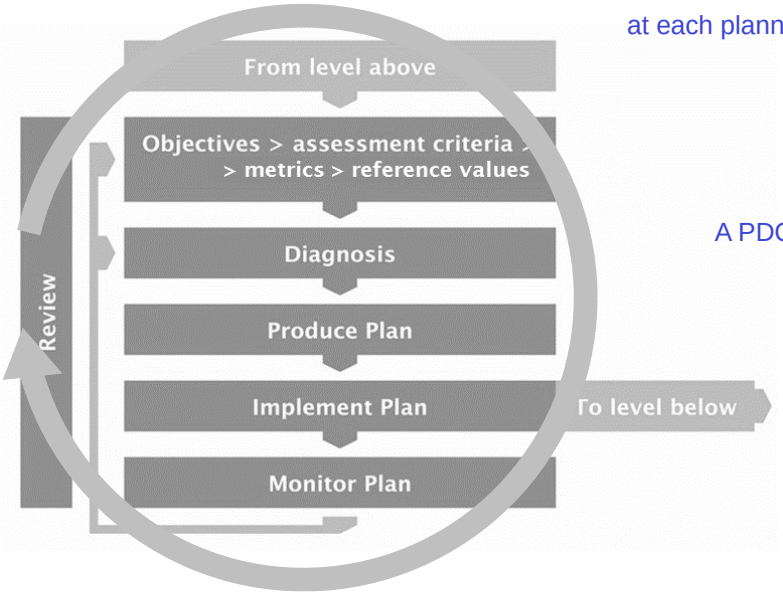


Figure 4: The planning process (adapted from Alegre et al., 2012; Alegre & Covas, 2015)

Most organizations already have elements of this process in place. However, a review mechanism is often missing, i.e., a way to measure compliance with set goals and account for likely scenarios, as well as effective alignment between the different management levels.

3 InAll accomplishments and co-production process

3.1 Overview

Figure 5, Figure 6, and Figure 7 provide an overview of the developments of the InAll process in each phase, including the meetings with the participants, the inputs developed and provided by the InAll responsible team, and the outputs achieved by the LL_i.

Phase 1 Kick-off developments (Mar-Apr 22)	Input side, T1.4 and WP6	Output side
1.1. kick-off meeting		
• Background of the organization and LL strategic agendas to discuss in the meeting (template provide by LNEC and to fill by organization)	√	√
• **Strategic planning concepts** (LNEC presentation)	√	
• Strategic plan **document** (LNEC template)	√	
• BWS **assessment framework** overview (SINTEF presentation - WP6)	√	
• Detailed planning of activities	√	
1.2. Establishment of the scope of the strategic planning to be carried out within InAll for each BWS LL problem-owner		
• **BWS assessment framework V_0** (MS16) excel file and appendix 9 with metrics description (from WP6)	√	
• Strategic plan **sections 2, 3 and 4** of the template (organization characterization, plan scope and time horizon and vision and mission) (to developed by each organization)		√
1.3. Analysis of the work already in place in the LL, survey of existing related processes and plans, strategic agenda or plan (linked with Task 1.5 and D1.4)		
• Strategic plan **section 1** of the template (background) (to developed by each organization)		√

Phase 2 Strategic assessment developments (May-Oct 22)	Input side, T1.4 and WP6	Output side
2.0. Phase 2 meeting		
• **Work developed in Phase 1** by InAll LL teams (LL teams presentation)		√
• Detailed planning of activities	√	
2.1. Analysis of the **LL strategic agenda** or plan in the face of water-smart society		
• Strategic agenda (each organization, T1.5)		√
2.2. Identification of **BWS strategic objectives and definition of the BWS system**		
• Strategic plan **section 5** of the template (to developed by each organization)		√
• 1st Bilateral meetings (LNEC with each organization 1.5h)	√	√
2.3. "Test drive" | **BWS assessment framework**		√
• Training dedicated to BWS planning process (T1.4 and T6.2)	√	
• The facilitation tool of BWS assessment framework (SINTEF tool, WP6.2)	√	
• Tutorial for the use of the facilitation tool (WP6.2)	√	
• Interviews for social and governance metrics (WP6.2)	√	
2.4. **Strategic assessment** for plan production		
• Strategic plan **section 6.1** (baseline assessment) of the template		√
• Reference values defined in WP6.2	√	
2.5. Analysis of the results of the **framework and feedback to WP6**		
• Forms for the feedback on the BWS content (included in the tool; WP6.2)	√	
• Feedback 1 on the BWS content (regarding the metrics)		√
• Feedback 2 on the BWS content (regarding the framework as a strategic plan tool)		√
2.6. Review and updates considering the validated agendas and BWS framework V1		
• Strategic plan revision, **section 1 to 6.1** of the template		√
D1.3. Recommendations for refinement of the water-smartness framework and its transformation into a dashboard-type software	√	

Figure 5: InAll phased program and achievements for Phase 1 and Phase 2

Phase 3 Diagnosis developments (Nov 22 - Sep 23)	Input side, T1.4 and WP6	Output side
2.6. Revise/finalize earlier sections 1 to 6.1 of the template		√
3.0. Phase 3 meeting		
• Work developed in Phase 2 by InAll LL teams (LL teams' presentation in Nov-22 and Mar-23 meetings)		√
• Training dedicated to BWS planning process (LNEC presentation in Nov-22 and Mar-23 meetings)	√	
• Detailed planning of activities (LNEC presentation)	√	
3.1. Analysis of the internal and external context; definition of **scenarios; SWOT analysis**		
• Strategic plan **section 6.2** of the template – **SWOT** (to developed by each organization)		√
• Strategic plan **section 7.1** of the template – **scenarios** (to developed by each organization)		√
3.2. **Future analysis** based on the strategic assessment carried out and on the SWOT analysis		
• Strategic plan **section 7.2** of the template – **prospective evaluation** (to developed by each organization)		√
3.3. Problems' identification		
• **2nd Bilateral** meetings (LNEC with each organization 1.5h)	√	√
• Provide additional BWS AF feedbacks on bilateral meetings – core metrics		√
3.4. Analysis of **final version of the BWS assessment** and identification and analysis of **alternative strategies**, including the updates in final BWS assessment framework from T6.3		
• BWS assessment framework V2 (WP6, task 6.3)	√	
• **3rd Bilateral** meetings (LNEC with each organization 1.5h)	√	
• Strategic plan revision, **section 5, 6 and 7** of the template		√
• Strategic plan section 8 (partially) of the template – identification and **analysis of alternatives** and **strategies** (to developed by each organization)		√
• InAll session in **Alicante PSB36** meeting		√

Figure 6: InAll phased program and achievements for Phase 3

Phase 4 Strategic plan (Oct 23 - May 24)	Input side, T1.4, WP6, T3.9	Output side
4.0. Phase 4 meeting Part 1 – InAll session in Alicante PSB meeting (19 Sep. 23)		
• Overview of InAll activities so far (LNEC presentation)	√	
• Water scarcity in East-Frisia LL | challenges and strategies (East-Frisia LL presentation)		√
• Water scarcity in in Alicante LL LL | challenges and strategies of Aguas de Alicante (Aguas de Alicante presentation)		√
• Detailed planning of activities (LNEC presentation)	√	
4.0. Phase 4 meeting Part 2 – online meeting (28 Sep. 23)		
• Training dedicated to BWS planning process (LNEC presentation)	√	
• Training and discussion dedicated to the Dashboard (ICCS presentation)	√ (T3.9)	
4.1. Recalculation of the metrics using the early version of the **dashboard**		
• Dashboard (T3.9)	√ (T3.9)	
• Strategic plan revision **section 6.1** of the template		√
4.2. Assessment and **comparison of the formulated / 2 exploratory alternatives** with the dashboard for the definition of strategies		
• **4th** round of **Bilateral** meetings (LNEC with each organization 1.5h)	√	√
• Validate the tool for assessment and comparison of alternatives		√

Phase 4 Strategic plan (Oct 23 - May 24)	Input side, T1.4, T3.9	Output side
Phase 4 intermediate plenary meeting (23 Jan. 24)		
• Overview of InAll activities so far (LNEC presentation)	√	
• **Training** dedicated to BWS planning process (resources needed for the plan implementation and monitoring and revision plan) (LNEC presentation)	√	
• Revisiting the **dashboard** including the new developments (ICSS presentation)	√ (T3.9)	
• Challenges and strategies in Lisbon LL (CML LL presentation)		√
• Strategic framework De Watergroep – From risk to process (De Watergroep presentation)		√
• Detailed **planning** of activities (LNEC presentation)	√	
4.3. Analysis to identify necessary changes in the strategic plan, when applicable, identification of necessary **resources to implement the strategies**		√
• Strategic plan **section 9** of the template (to developed by each organization)		
4.4. Definition of procedures for **monitoring and review** of the plan		
• 5th Bilateral meetings (LNEC with each organization 1.5h)	√	√
• Strategic plan **section 10** of the template (to developed by each organization)		√
4.5. Production of (revised) strategic plan		
• Strategic plan revision (to developed by each organization)		√
4.6 Milestone MS29		
• Questionnaire about the Dashboard	√	√
• MS29 document	√	

Figure 7: InAll phased program and achievements for Phase 4

As already mentioned, both the BWS AF and the dashboard were firstly used during InAll for testing and providing the first recommendations for improvement, following co-production processes. The work developed in the InAll to provide feedback, with the input from the LLi, is described in the following sections, as it constitutes a sound contribution to the development of the lessons learnt and for the recommendations for future users and replication of the processes.

3.2 InAll testing of the B-Water Smart assessment framework V_0

3.2.1 Framework overview

The BWS AF main purposes are to i) support the organizations in the definition of long-term strategic objectives towards a water-smart society and in the assessment of achievement of these objectives; ii) help policy-makers and decision-makers to identify and overcome existing barriers and implement their strategic agendas towards a water-smart society; and iii) enable benchmarking by providing a minimum set of metrics that can be used for comparisons concerning their own objectives, in time and with other organizations (Ugarelli et al., 2021).

Considering the strategic planning process (section 2.3), the framework constitutes an assessment tool to support, at the strategic level, the establishment of the organization assessment system, to carry out the diagnosis, support the decision-making, and monitor the progress.

The framework is objective-driven and presents a tree structure, composed of objectives-criteria-metrics (Figure 8). The BWS AF V0 has five strategic objectives (SOs), described through 17 assessment criteria (AC), and assessed by 73 metrics, with the corresponding reference values established for each metric. An overview of the framework is presented in Table 1, the metrics are presented in the Annex, and a detailed description of each component of this V0 of the framework is provided in Ugarelli et al. (2022a).

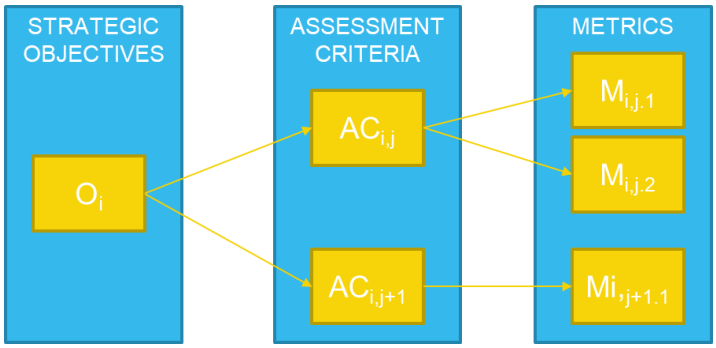


Figure 8: The BWS AF tree structure (Ugarelli et al., 2022a)

Table 1: Overview of the first version of the water Smartness BWS assessment framework (BWS AF V_0)

STRATEGIC OBJECTIVES	ASSESSMENT CRITERIA	NUMBER OF METRICS
A. Ensuring water for all relevant uses	A.1 Safe and secure fit-for-purpose water provision	6
	A.2 Accessibility and equity (for people and for other uses)	5
	A.3 Financial viability	3
	Total A	**14**
B. Safeguarding ecosystems and their services to society	B.1 Safeguarded water ecosystems	3
	B.2 Enhanced ecosystem services to society	5
	B.3 Resource efficiency	6
	Total B	**14**
C. Boosting value creation around water	C.1 Circular policy making	5
	C.2 Circular economy growth	3
	C.3 Resource recovery and efficient use	7
	Total C	**15**
D. Promoting adaptive change towards resilient infrastructure	D.1 Enabling planning to promote adaptive change towards circularity and resilience	1
	D.2 Implementing adaptive change towards resilient infrastructure	2
	D.3 Effectiveness of the adaptive change towards resilient infrastructure (Diagnosis)	9
	Total D	**12**

E. Engaging citizens and actors across sectors in continuous co-learning and innovation	E.1 Awareness	4
	E.2 Multi-sector network potential	4
	E.3 Stakeholder engagement processes	4
	E.2 Capacity building	3
	E.3 Information and knowledge sharing	3
	Total E	**18**
TOTAL FRAMEWORK		**73**

3.2.2 Testing process of BWS AF

According to the InAll program (Figure 3), the BWS AF is to be applied as a tool for strategic planning in Phases 2, 3 and 4 in order to: i) establish the objectives and the assessment system for the organization towards a water-smart society; ii) carry out a diagnosis for the identification of the problems and potential solutions; iii) support decision on strategies to be implemented. InAll provides, on the one hand, a chance for the LL_i to learn by doing and share their experiences using the BWS AF and, on the other hand, it is a privileged opportunity for the BWS AF developers to receive their feedback on the framework. These aspects were included during the testing process. The aim of the InAll testing process was twofold: to deliver the BWS AF V_0 (provided by WP6 (Ugarelli et al., 2022a) to the InAll LL_i, and to get feedback on the BWS AF V_0 to the developers (WP1 (InAll) to WP6, Figure 1).

The feedback of LL_i was clustered into:

i) **specific feedback for each strategic objective, criteria, and metric of the framework | feedback 1**, aiming at assessing particular aspects, such as the clarity of description, existing gaps, the feasibility of computation, and data sources, among others, to produce an updated version of the framework BWS AF V_1, mainly constituting the focus of deliverable D6.2 (Ugarelli et al., 2022b).

ii) **generic feedback about the framework | feedback 2**, aiming at assessing whether the framework fits the purpose of **strategic planning** (Figure 4) and receiving suggestions regarding its use through a dashboard-type software.

A detailed description of the process and the results obtained are presented by Cardoso et al. (2022). Herein, an overview of the results, more focused on the recommendations, is presented in section 4.1. The BWS AF V_0 validation was planned within InAll Phase 2.

3.2.3 Characterization of the LL problem-owners

The scope of the strategic planning developed within InAll is at the organization level, i.e., each BWS LL_i, develops its own planning. Given the different missions, characteristics, locations, contexts, and dimensions, the set of organizations involved represents a diversity of scales and scopes. However, one of the LL_i decided to apply the planning process at the LL scale instead of at the organization scale, allowing to extend the BWS AF V_0 feedback to

the applicability at the LL level. A brief anonymously characterization of the six organizations (out of seven) which provided their feedback on BWS AF V_0, including the strategic objectives according to the LL strategic agendas and the LL expected impacts (EI) of the project results, is presented in Table 2, as this is an important information to support and explain the main developments, concerns, objectives, and decisions taken by each organization towards a water-smart society.

Table 2: Brief characterization of each LL_i which provided feedback on BWS AF V0 (Cardoso et al., 2022)

LL_i		LL_1	LL_2	LL_3	LL_4	LL_5	LL_6
Water services		Water supply and wastewater treatment	Water supply, transport, storage, and production	Water supply, wastewater treatment	Water supply and wastewater drainage and treatment	Water supply and sewerage, regenerated water for agriculture and urban uses	Wastewater and stormwater management; water reuse
LL challenges		• Increasing water demand by industry and agriculture • Untapped efficiency potential water resources allocation	• High drinking water demand due to dense population • High irrigation water demand for agriculture • Groundwater overexploitation • Water quality deterioration • Water scarcity due to climate change	• Need for reuse and recovery schemes for wastewater and sludge • Limitations to reuse and recovery due to low acceptance • Untapped efficiency potential (water & resource valorization)	• Decrease leaks in drinking water network and infiltration in the wastewater network • Increase efficiency potential on water use • Increase energy recovery, reuse excess heat • Increase resilience to climate change	• Boosting sustainable and circular economy around water through water reuse and resource recovery	• Distance from freshwater sources • Need to increase urban green areas • Growing population • Economy
Strategic objectives according to LL agenda	SO A	x	x	x	x	x	x
	SO B	x	x	-	x	x	x
	SO C	-	x	x	x	x	x
	SO D	x	-	x	-	x	x
	SO E	x	x	x	-	x	x
LL expected impacts of project results	EI 1	x	-	-	x	x	x
	EI 2	x	x	-	x	-	x
	EI 3 + 4	x	x	x		x	x
	EI 5	-	-	x	x	x	x
	EI 6	-	-	x	x	x	-
	EI 7	x	-	x	-	x	x
	EI 8	-	x	-	-	x	-
	EI 9	-	-	-	x	x	-

Strategic objectives: SO A: Ensuring water for all relevant uses; SO B: Safeguarding ecosystems and their services to society; SO C: Boosting value creation around water; SO D: Promoting adaptive change towards resilient infrastructure; SO E. Engaging citizens and actors across sectors in continuous co-learning and innovation
Expected Impacts: EI 1. Decrease in use of freshwater resources; E1 2. Improved water used efficiency; EI 3 + 4. Water reuse; EI 5. Reduction in water related energy use; EI 6. Energy recovery; EI 7. Nutrient recovery; EI 8. Mineral recovery; EI 9. Recovery of other relevant resources

3.3 InAll testing of the Dashboard

3.3.1 Dashboard overview

As described in section 2.3, the BWS AF constitutes the assessment tool to support, at the strategic level, the establishment of the organization's assessment system to carry out the diagnosis, support the decision-making, and monitor the progress. The BWS dashboard digitally implements the BWS AF (Silva et al., 2023) using the tree structure presented in Figure 8, where strategic objectives are split into assessment criteria, which are supported by metrics. In the dashboard, this structure is preserved allowing the user to choose the Strategic Objectives (SO), the Assessment Criteria (AC) and the metrics of interest for the assessments (Lekawska-Andrinopoulou et al., 2023). Moreover, the dashboard is to be used to support each step of the strategic planning process towards water-smartness, as presented in section 2.3.

As presented in Lekawska-Andrinopoulou et al. (2023), the early version of the dashboard provided the possibility to carry out an assessment based on the objectives, criteria, and metrics to be selected from the BWS AF (Figure 9). The diagnosis step allows to calculate the outputs for metrics and to assess results (Figure 10). For that, the user is requested to provide the input values, and the output values are calculated, and the result judgment is made visible. Judgement is based on the reference values defined in the D6.3 (Silva et al., 2023).

In the early version, the reference values could not be modified and the equation for the calculation of each metric and the respective needed variables are visualized. After this step, the user can create scenarios for previously selected metrics and define expected trends for each of them, based on external factor(s) (Figure 11).

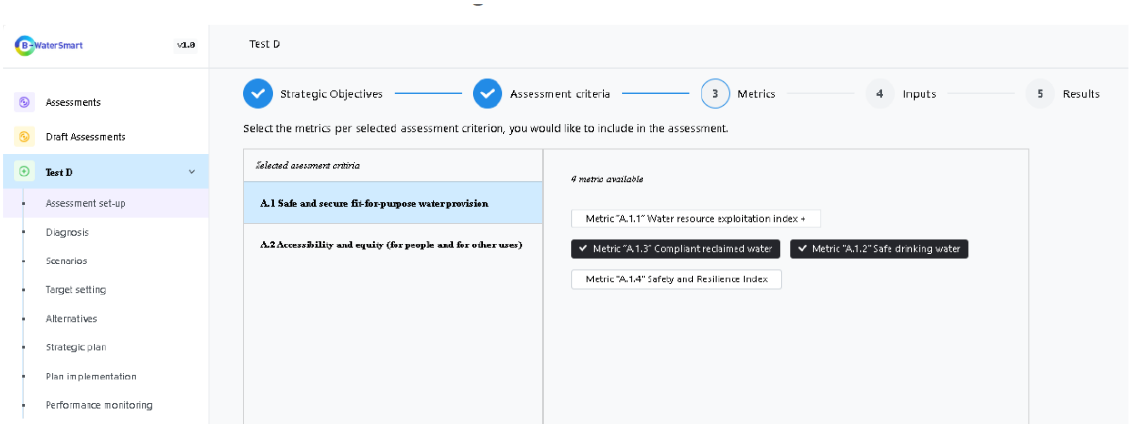


Figure 9: Dashboard | metrics' selection (Lekawska-Andrinopoulou et al., 2023)

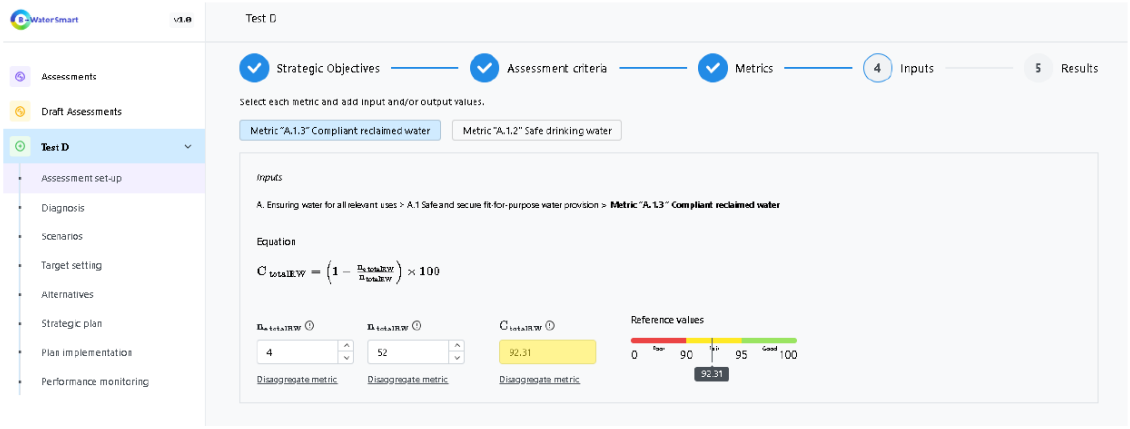


Figure 10: Dashboard | assessment result (Lekawska-Andrinopoulou et al., 2023)

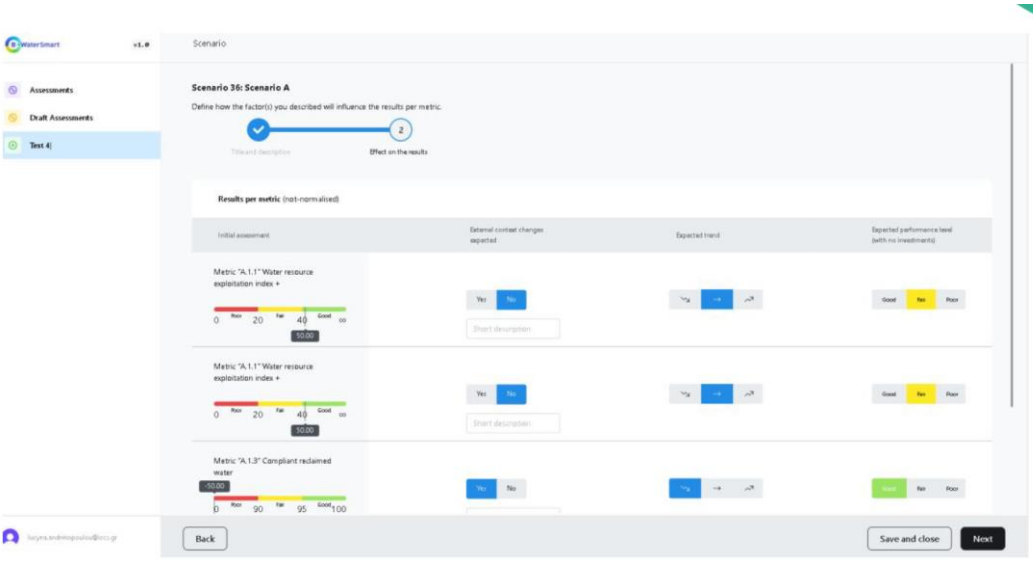


Figure 11: Dashboard | scenario assessment result (Lekawska-Andrinopoulou et al., 2023)

3.3.2 Testing process of the dashboard

As already referred, according to the InAll program (Figure 3), the dashboard was to be applied as a tool to support the strategic planning in Phases 2, 3, and 4 of the program in order to:

- establish the objectives and the assessment system for the organization towards a water-smart society;
- carry out a diagnosis for the identification of the problems and potential solutions;
- support decision on strategies to be implemented.

The aim of the InAll testing process regarding the dashboard (Lekawska-Andrinopoulou et al., 2023) was to deliver to the dashboard developers the feedback from the users, i.e. the LLi (information flow from WP1 to WP3, Figure 1). The timeline for the dashboard testing is also presented in Figure 2.

The six LLs provided feedback. As a co-production process, several challenges arose that needed to be overcome. This process was not straightforward mainly because, as already referred, the testing was an interactive process. This means that during the use of the dashboard by InAll, several errors and problems were found and reported by the users, and, in the meantime, the problems were fixed.

Additionally, the strategic planning process was not fully included in the early version, and some delays occurred in its phased deliveries. To minimize the disturbances of the testing process, several adjustments were implemented in the InAll time schedule, in agreement with the dashboard developers.

To facilitate the feedback and to ensure the main aspects of the dashboard as a support tool of each step of the strategic planning process (Figure 4) was assessed, a questionnaire with 36 questions addressing the following categories was developed and provided to the LLi (Figure 12):

- General aspects related to the actual use of the dashboard: usefulness, user-friendliness, and intuitiveness.
- Specific aspects related to the planning process, namely:
    - Objectives, criteria, metrics, and reference values;
    - Diagnosis;
    - Scenarios and prospective evaluation;
    - Strategies;
    - Implementation, monitoring, and revision of the Strategic Plan;
    - Input and output;
    - Overall opinion.
- Suggestions and recommendations.

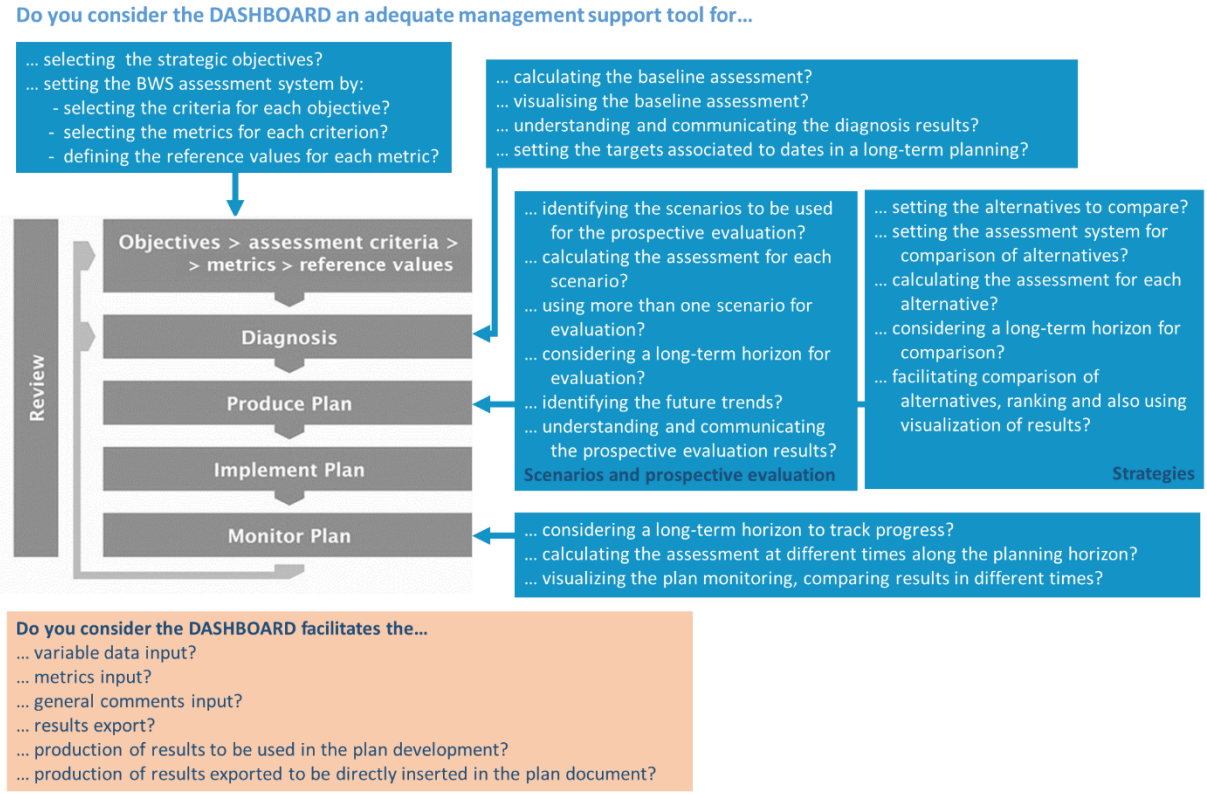


Figure 12: Questionnaire to collect feedback on the Dashboard as a support tool for strategic planning

3.4 InAll key aspects to address as lessons learnt and for recommendations for future

Regarding key aspects to address as lessons learnt and for recommendations for future use, the feedback from the LL_i was based on a questionnaire developed to facilitate the process, illustrated in Figure 13.

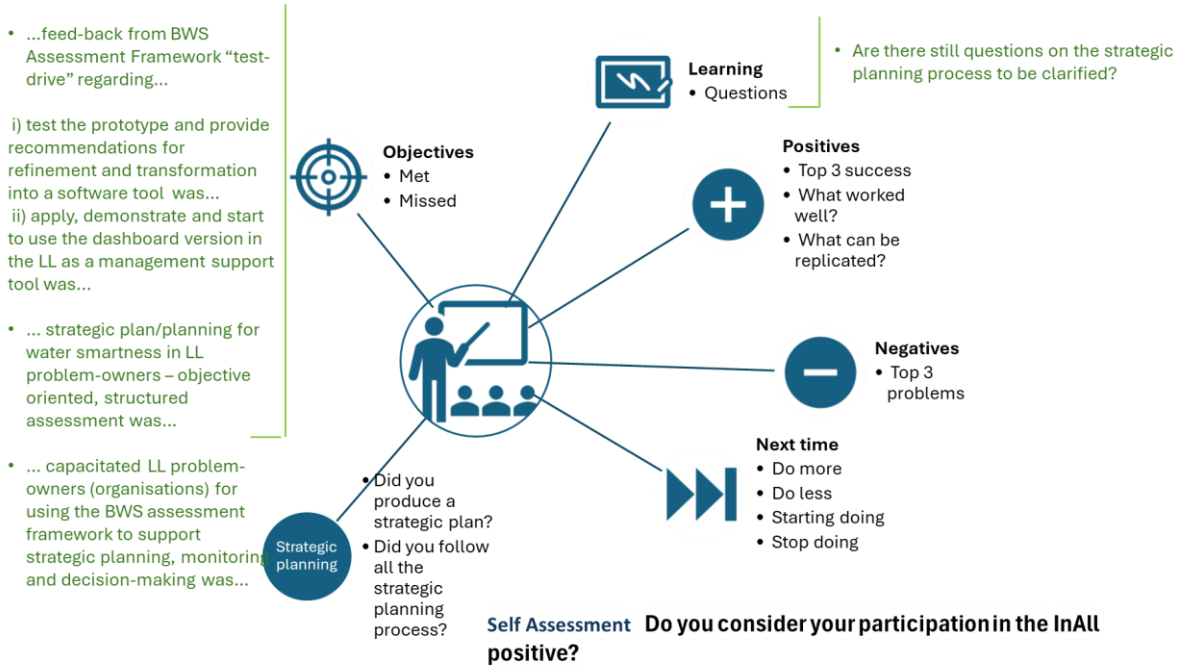


Figure 13: Questionnaire to collect feedback for lessons learnt and for recommendations from InAll

4 InAll feedback | assessment framework, dashboard, capacity building and strategic planning processes

4.1 Assessment framework

4.1.1 Feedback 1 | specific feedback for each strategic objective, criteria, and metric of the framework

Strategic objective level

As described in section 2, six (out of seven) LL_i provided feedback on each of the three levels of the BWS AF V_0 – strategic objectives, assessment criteria, and metrics. At the SO level, questions were relative to the clarity and need for revision of each AC. Additionally, the LL_i were asked to answer if all relevant points of view are covered for each SO. Figure 14 anonymously summarizes the answers received from each LL_i, and Cardoso et al. (2022) presents the detailed results. Overall, the LL problem-owners indicated some ACs required revision. The LL_i answers on relevant points of view helped draw the recommendations on AC revision and improvement.

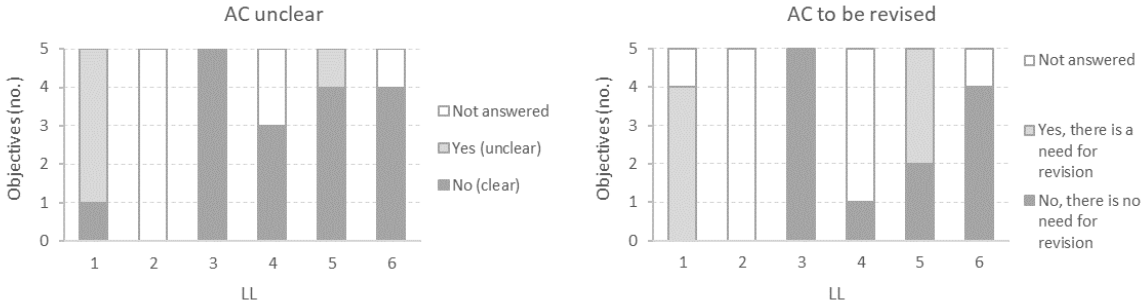


Figure 14: Overall feedback at the strategic objectives level, per LL_i (Cardoso et al., 2022)

At the assessment criteria level, the focus was on the lack of metrics in some ACs and misplaced metrics between ACs. The high number of no answers may bias this analysis; nevertheless, two LL_i reported no lack of metrics in the ACs, whereas, for one LLi, the majority (10/17) of the ACs lack metrics. Regarding misplaced metrics between ACs, there were only two positive answers. Cardoso et al. (2022) presents the detailed results.

The LL_i feedback at the metrics level focused on the metrics' relevance at the strategic level, the availability of data and the adequacy of the reference values used to conduct the diagnosis during the strategic planning process. Figure 15 presents the number of metrics assessed as relevant at the strategic level by each LL_i, which varies between 14 and 50 metrics out of a total of 73. Cardoso et al. (2022) present the detailed results.

A relevant issue for metric feasibility is data availability. Unavailable data was indicated for 2 to 12 metrics, sufficient information available to provide valuable insights was selected for 12-53 metrics, and fully available data for 1-22 metrics.

Concerning the adequacy of the proposed reference values, Figure 16 shows that two LL_i identified one metric with no adequate reference values in their contexts, while the other LL_i identified four, five, and 18 metrics, respectively.

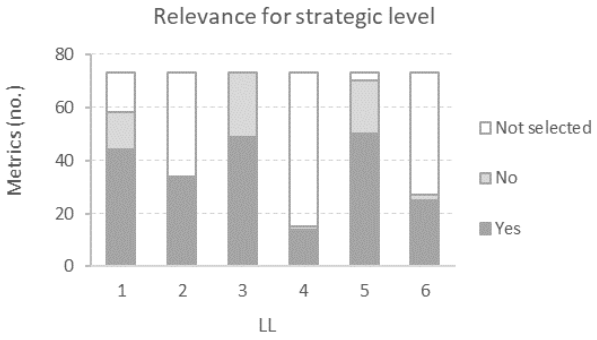


Figure 15: Overall feedback of each LL_i at the metrics level, regarding the relevance for strategic level (Cardoso et al., 2022)

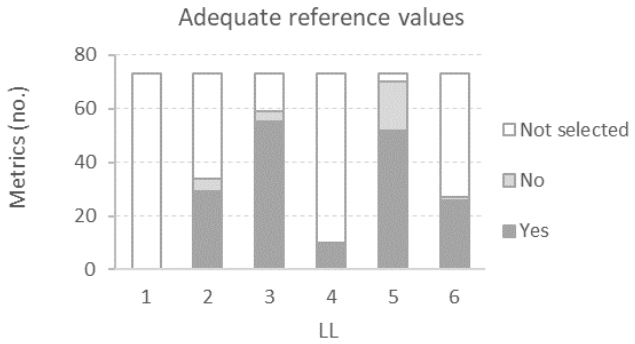


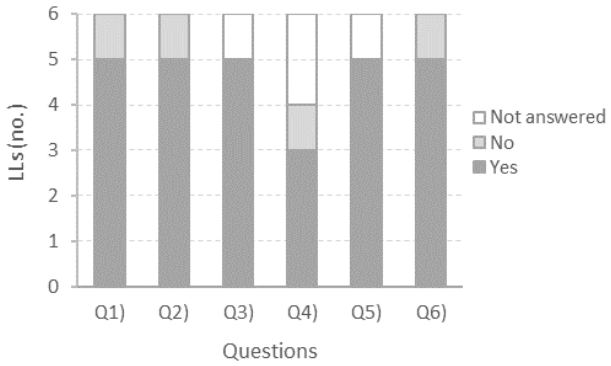
Figure 16: Overall feedback of each LL_i at the metrics level regarding the reference values (Cardoso et al., 2022)

4.1.2 Feedback 2 | generic feedback about the framework

The second feedback provided by each LL_i was related to the framework's applicability as a strategic planning tool. For that, each LL problem-owner answered six questions (Cardoso et al., 2022), and the aggregated results are presented in Figure 17.

Five of the six LL_i consider that the BWS AF is feasible (Q1), fits the purpose of supporting strategic planning (Q2), is useful for developing new strategic plans (Q3), for diagnosing and identifying improvement opportunities (Q5), and exploring alternatives (Q6). One LL_i considers BWS AF useful only for developing new strategic plans (Q3) and for diagnosing

(Q5). Related to revising and monitoring the implementation of existing strategic plans (Q4), three LL_i considered BWS AF to be useful, one LL_i replied that it was not useful, and two LL_i did not answer since this feedback was provided at an early stage of the planning process, before having an overview of the BWS AF full application.



Q1) Is it **feasible** to use the AF for strategic planning and decision-making process?
Q2) Does the AF fit its purpose to **support strategic planning** and decision-making process?
Q3) Is the AF useful for **developing new strategic** plans?
Q4) Is the AF useful for revising and **monitoring implementation** of existing strategic plans?
Q5) Is the AF useful for diagnosis and identification of **improvement opportunities**?
Q6) Is the AF useful for exploring alternative water smartness **strategic** paths?

Figure 17: LL_i overall feedback on BWS AF as a strategic planning tool (Cardoso et al., 2022)

4.2 Dashboard

4.2.1 Feedback on generic aspects

The overall results of the questionnaire (section 3.3.2), translating the feedback from the InAll LL_i, are presented in Figure 18 to Figure 21 (Cardoso et al., 2024). In the Annex, a table anonymously summarizes the answers of each LL_i to these questions and presents their comments and suggestions. All questions were answered, and the results indicated the dashboard as an adequate management support tool by four LL_i. Regarding the general questions (Figure 18), all the LL_i have used the dashboard.

	Question	
General	Have you used the dashboard?	
	Are you currently using the dashboard?	
	If yes | Following your experience in using the dashboard for strategic planning, within InAll:	
	- is this tool useful for strategic planning?	
	- is this tool user friendly?	
	- is this tool intuitive for strategic planning?	

Legend: yes no Partially NR

Figure 18: Overall results of the questionnaire | General questions (Cardoso et al., 2024)

The majority were still using and considered the tool useful or partially useful and intuitive for strategic planning, and user friendly. The major issues are due to problems and bugs that have made it difficult, as it was not a completely developed software.

4.2.2 Feedback on planning process

Concerning the questions related to the step of the planning process associated to the definitions of the *objectives, criteria, metrics, and reference values* (Figure 19), overall, the majority of the LL_i considers the dashboard an adequate management support tool for establishing the assessment system, except for the definition of the reference values, as it does not allow to adapt the reference values to the LL scope and context.

With regard to the questions related to the step of the planning process associated to the *diagnosis* (Figure 19), the majority of the LL_i considers the dashboard an adequate management support tool for establishing the *baseline assessment*, about 50% consider it useful or partially useful for *visualizing the baseline assessment and setting the targets associated to dates in long-term planning*, while replies associated to *understanding and communicating the diagnosis results* differ (useful, partially, not useful) are mainly due to the need of displaying additional information.

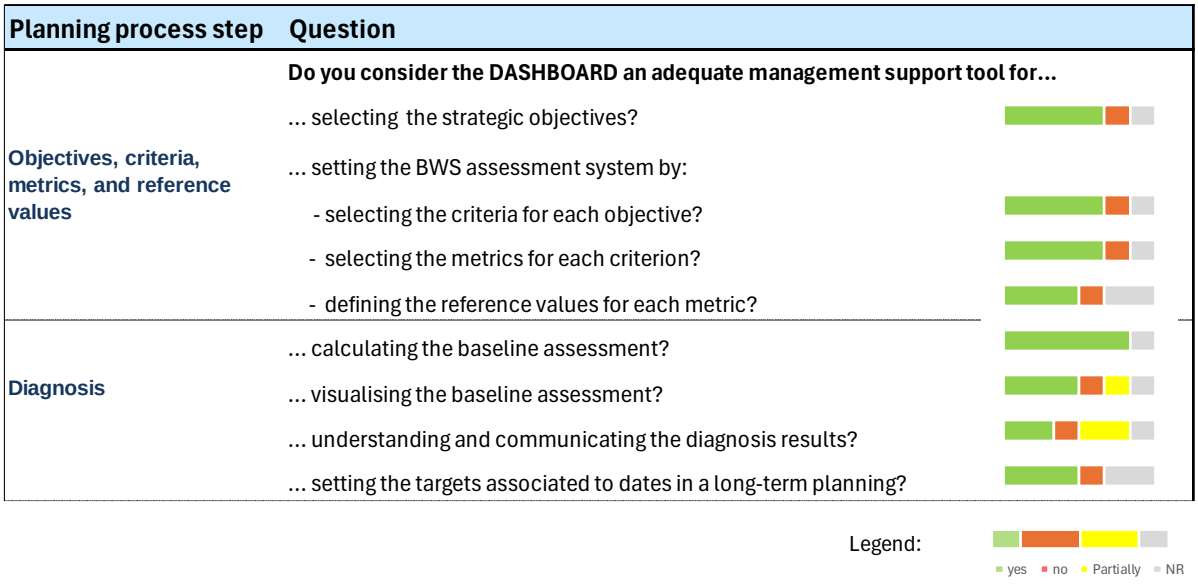


Figure 19: Overall results of the questionnaire | Steps of the planning process – Objectives, criteria, metrics, and reference values, and Diagnosis (Cardoso et al., 2024)

Regarding the questions related to the step of the planning process associated with the *scenarios and prospective evaluation* (Figure 20), it is evident that an increased number of non-answered questions. All LL_i respondents consider the dashboard useful for calculating the *assessment for each scenario, using more than one scenario for evaluation, and*

considering a long-term horizon for evaluation. With respect to the identification of the *scenarios to be used for the prospective evaluation and of the future trends*, results differ (useful, partially, not useful), mainly due to the need to involve other experts in the analysis. Concerning u*nderstanding and communicating the prospective evaluation results*, the respondents consider the dashboard as useful or partially useful.

Looking at the questions related to the step of the planning process associated with the *strategies* (Figure 20), again a limited number of replies was provided, in this case, only half of the LL_i provided their answers to the questions. All respondents consider the dashboard useful for *setting the alternatives to compare, setting the assessment system for comparison of alternatives, and calculating the assessment for each alternative*, while for considering a *long-term horizon for comparison*, there is one LL_i that considers the dashboard not useful. Additionally, the replies differ regarding the *facilitation for comparison of alternatives, ranking and using visualization of results*, mainly because the visualization of the alternatives is not very intuitive, and there is not an overall strategic plan table/report that synthesizes evaluations and comparisons.

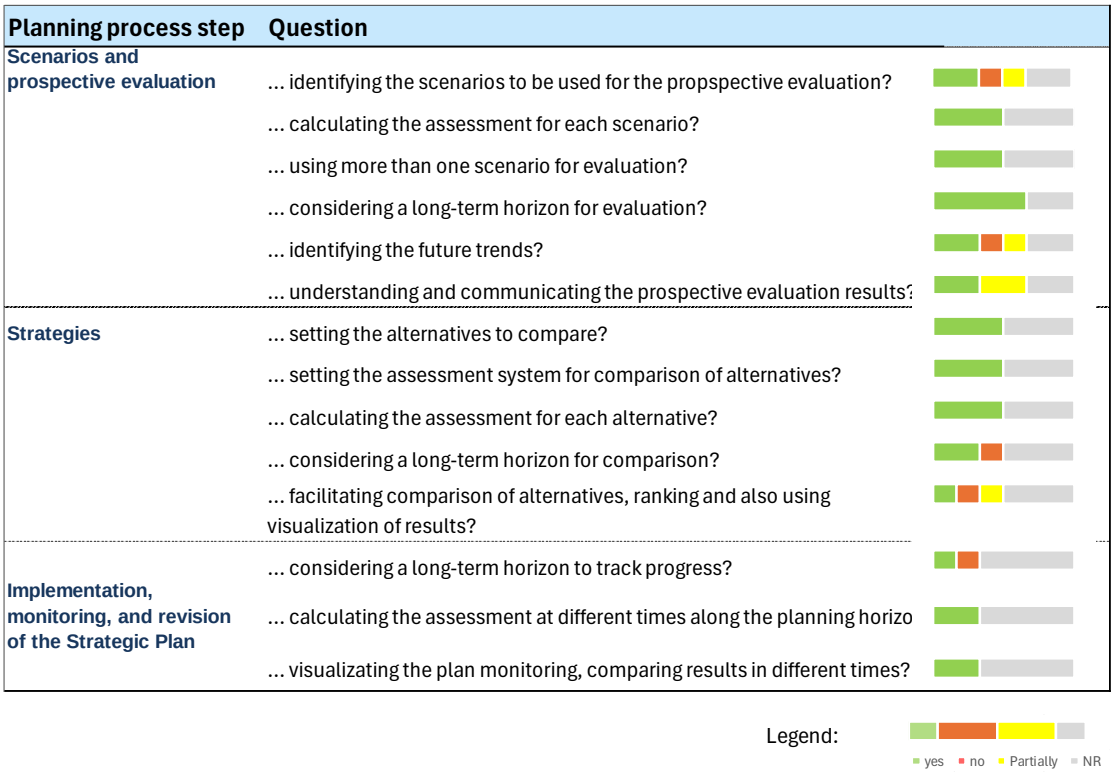


Figure 20: Overall results of the questionnaire | Steps of the planning process – Scenarios and prospective evaluation, strategies, and implementation, monitoring and revision of the strategic plan (Cardoso et al., 2024)

With respect to the questions related to the step of the planning process associated with the *implementation, monitoring, and revision of the strategic plan* (Figure 20), again, a limited number of replies (only two) were obtained. Both respondents consider the dashboard useful for *calculating the assessment at different times along the planning horizon and for visualizing the plan monitoring, comparing results in different times*. One LL_i found it useful for *considering* a *long-term horizon to track progress* and another found it not useful.

Concerning the questions related to the *input and output* of information (Figure 21), the LL_i identified room for improvement in all questions, mainly related to the exportation of information and the fact that it is not possible to add comments in the dashboard.

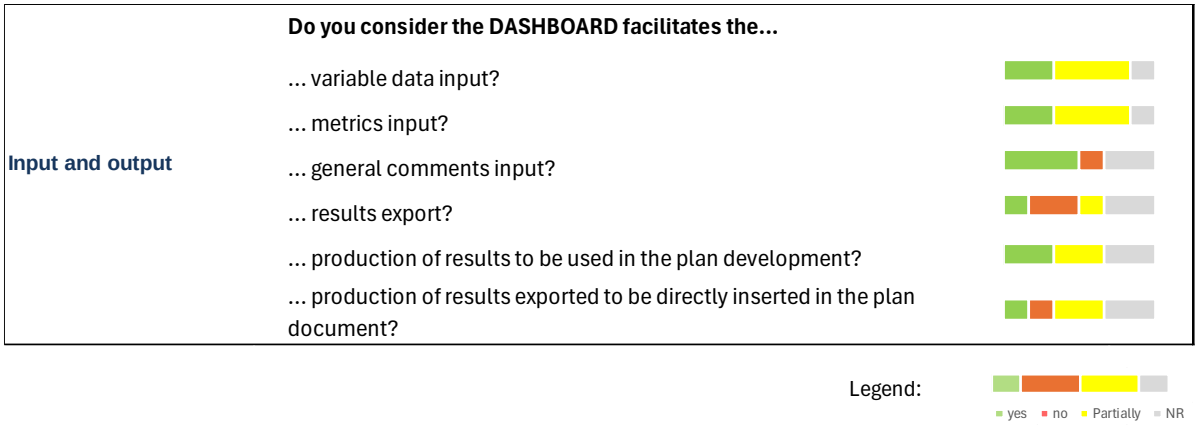


Figure 21: Overall results of the questionnaire | Input and output of information (Cardoso et al., 2024)

4.3 Feedback on capacity building and strategic planning processes

The overall results of the questionnaire, translating the feedback from the InAll LL_i regarding the InAll *strategic planning development, achievement of objectives and learning* is presented in Figure 13. In the Annex, a table anonymously presents the answers of each LLi to these questions and presents their comments and suggestions. In Figure 23, an overview of the lessons learnt is presented.

Concerning the questions related to the *planning process*, six LL_i developed a plan and followed the strategic planning process, even if one of them did it partially. This means that all six LL were represented in the InAll process.

With regard to the questions related to the achievement of the *objectives*, all LL considered as fully met both *the test of the prototype and provision of recommendations for refinement and transformation into a software tool*, as well as the *strategic plan/planning*

for water smartness in LL problem-owners – objective oriented and with a structured assessment. Five LL considered to fully meet the objective of *capacitation of LL problem-owners (organizations) for using the BWS assessment framework to support strategic planning, monitoring and decision-making*, and one did not. Regarding the objective *to apply, demonstrate and start to use the dashboard version in the LL as a management support tool*, four LL considered this objective fully met, while two did not. Four LL_i considered that there are still questions on the strategic planning process that need to be clarified while two did not. These are mainly related to how the dashboard output can be integrated into the strategic plan, and the possibility to incorporate metrics and objectives not directly linked to water smartness in a broader planning scope.

InAll	Question	
General	Did you produce a strategic plan?	
	Did you follow all the strategic planning process?	
Specific		
Objectives	**The following objective of Inall ...** **...feed-back from BWS Assessment Framework "test-drive" regarding...** - i) test the prototype and provide recommendations for refinement and transformati-- into a software tool was met?	
	- ii) apply, demonstrate and start to use the dashboard version in the LL as a management support tool was met?	
	... strategic plan/planning for water smartness in LL problem-owners – objective oriented, structured assessment was met?	
	... capacitated LL problem-owners (organisations) for using the BWS assessment framework to support strategic planning, monitoring and decision-making was met?	
Learning	Have all your issues/doubts on the strategic planning process been clarified?	

Legend: 

Figure 22: Overall results of the questionnaire regarding InAll strategic planning development, achievement of objectives and learning

Overall, as *positive* aspects, the *three top successes* were identified as the learning on the strategic planning process, the awareness raising of data limitations, and the knowledge to get an overview of the organization's *status quo* and to define the strategies to achieve the targets towards water-smartness. It was also identified as *positive* the team project cooperation and collaboration. Aspects to be replicated in future initiatives are the use of the planning methodology and the developed tools by others, as well as the delivery of the InAll template of the strategic plan, containing guidance.

Overall, the three main *negative aspects* are the initial difficulties understanding some of the metrics, the unavailability of required data, and the problems with the dashboard use, which consumed a significant amount of time in the process.

For the *next time*, it was identified the need to consider face to face meetings, workshops, and group meetings, as well as to better clarify from the beginning the goals of the process. Additionally, it was also mentioned that the duration of online meetings should be reduced, as well as the number of important targets in the process, and the rigidity of metrics. One in-person meeting, group meetings with partners with different goals, designing the dashboard in parallel to the assessment framework, keep believing that it is possible to achieve the goals and that the use of work Excel sheets should be reduced were among other referred aspects. The six LL considered their participation in InAll as positive.

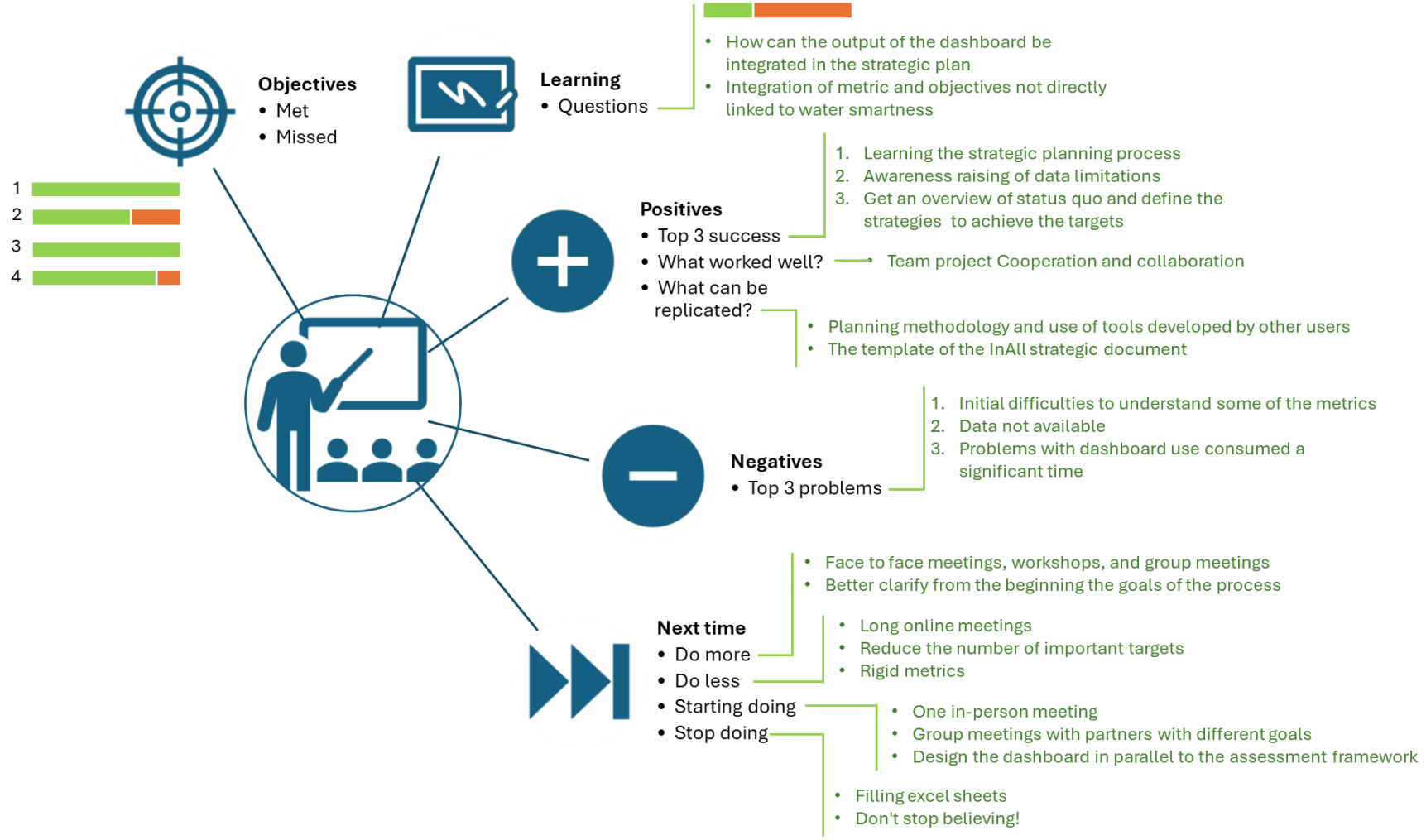


Figure 23: Overview of the lessons learnt

5 Conclusions and lessons learnt

The InAll is an innovation alliance established across the project's six Living Labs of the project B-WaterSmart: Alicante, Bodø, Flanders, Lisbon, East Frisia, and Venice. InAll constituted a key co-production instrument of the B-WaterSmart project. It was tailored for the seven primary problem-owners to internalize and learn by doing the strategic planning process and using the B-WaterSmart objective-oriented assessment framework, and the online dashboard implementing it as a main tool for strategic planning.

Therefore, InAll provided a means for improving the strategic planning process and two products, an assessment framework and its dashboard, namely by (i) building the organizations' capacity for strategic planning, (ii) testing the prototype version of the water-smartness assessment framework, delivering recommendations for its refinement and transformation into a software tool (dashboard), and (iii) applying and validating the dashboard as a management support tool, delivering recommendations for its refinement and transformation into a software tool. It involved the LL primary owners (water utilities or municipalities), as the key water smartness planners (and doers) and the first users of the framework and the dashboard, as well as meetings and discussions with the partner leaders of the referred tasks and work packages.

On the one hand, InAll provided a proper environment for the problem-owners to learn by doing and share their experiences on how to develop and revise a strategic plan (or the strategic planning process) for their organizations, in this case, towards water smart(er) systems and services, and on how to use the BWS AF and the dashboard. On the other hand, it provided an opportunity for the developers to receive feedback, respectively, on the framework and the software, and to improve them. The seven problem-owners represent diverse missions, characteristics, locations, contexts, dimensions, and challenges, a diversity that potentiates the soundness and the replicability of the framework and the dashboard.

Overall, within InAll, the six problem-owners, one from each LL, followed the strategic planning process and considered their participation positive.

Based on their feedback, the main conclusions and lessons learnt are that:

- InAll provides a means for the organizations to:
    - learn about the strategic planning process;
    - create awareness of their data limitations;

- create the knowledge to assess the *status quo* and identify where they stand, creating their baseline;
- define the strategies to achieve their targets towards a water-smart management;

- the team project cooperation and collaboration are essential factors for success;
- it should be replicated the:
  - planning methodology;
  - use of tools;
  - delivery of the template of the InAll strategic document providing guidance;
- it should be improved
  - the clarification of some metrics;
  - availability of data required;
  - problems with the use of the tools in development;
- it should be considered
  - face-to-face meetings, workshops, and group meetings, considering the different goals, and reducing the duration of online meetings;
  - from the beginning, increase clarification of the goals of the process and simplify the different targets to achieve;
  - design the dashboard in parallel to the assessment framework and reduce the use of work in Excel;
  - to keep believing that it is possible to achieve the goals.

It is clear that the major constraints identified by the InAll participants are related to the co-production of the assessment framework and the dashboard. This process required a significant effort (including work repetition), sharing, and involvement of the participants while developing their planning process and learning.

Besides the above-mentioned aspects, future users of the tools (assessment framework and dashboard) will benefit from the efforts and recommendations provided by the pioneers of B-WaterSmart. It is important to highlight that the data availability may constitute an important limitation and weakness for the organization, which may be overcome by the opportunity to use the tools for strategic planning.

For future capacity-building initiatives, it is fundamental to clarify the goals, effort and resources required, benefits, and time planning from the beginning of the process. In the case of co-production processes, it is recommended that all participants become aware of the additional effort required and the benefits of the outcome for their respective organizations.

6 References

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Appendix

- Assessment criteria and metrics of BWS AF V0 Feedback questions
- Overview of the LLi feedback on the dashboard questionnaire
- Overview of the six LLi feedback on the lessons learnt questionnaire

Table 3: Assessment criteria and metrics of BWS AF V_0 (Ugarelli et al., 2022a)

Assessment Criteria (AC)	Metrics
A.1 Safe and secure fit-for-purpose water provision	A.1.1 Water resource exploitation index, plus (WEI+)
	A.1.2 Alternative water resource exploitation index (AWEI)
	A.1.3 Safe drinking water
	A.1.4 Compliant reclaimed water
	A.1.5 Security and resilience index – drinking water (DW)
	A.1.6 Security and resilience index – wastewater (WW)
A.2 Accessibility and equity (for people and for other uses)	A.2.1 Physical access to water supply (households and small businesses)
	A.2.2 Physical access to water supply in public spaces for quality of life
	A.2.3 Physical access to water supply (industrial use)
	A.2.4 Agriculture area with access to water for irrigation
	A.2.5 Number of points with potential conflicts of water use
A.3 Financial viability	A.3.1 Consumer willingness to pay
	A.3.2 Affordability
	A.3.3 Financial continuation
B.1 Safeguarded water ecosystems	B.1.1 Minimum water flow
	B.1.2 Effective stormwater treatment
	B.1.3 Effective wastewater treatment
B.2 Enhanced ecosystem services to society	B.2.1 Benefits from regulating services (water quality)
	B.2.2 Maintaining nursery populations and habitats
	B.2.3 Regulation of extreme events
	B.2.4 Water provision by ecosystem
	B.2.5 People enjoying cultural ecosystem services
B.3 Resource efficiency	B.3.1 Water footprint for drinking water
	B.3.2 Water footprint for wastewater
	B.3.3 Carbon footprint for drinking water
	B.3.4 Carbon footprint for wastewater
	B.3.5 Energy consumption
	B.3.6 Drinking water consumption
C.1 Circular policy making	C.1.1 Statutory compliance
	C.1.2 Preparedness
	C.1.3 Policy instruments
	C.1.4 Green public procurement
	C.1.5 Level of ambition
C.2 Circular economy growth	C.2.1 By-products recovery revenues
	C.2.2 Green jobs
	C.2.3 Circular economy business models in practice
C.3 Resource recovery and efficient use	C.3.1 Water-related materials recovery
	C.3.2 Fertilizer production avoided

Assessment Criteria (AC)	Metrics
	C.3.3 Sludge beneficial use
	C.3.4 Water consumption from other sources
	C.3.5 Reclaimed water use
	C.3.6 Reclaimed water production
	C.3.7 Energy production
D.1 Enabling planning to promote adaptive change towards circularity and resilience	D.1.1 Infrastructure Planning Index for Adaptive Change
D.2 Implementing adaptive change towards resilient infrastructure	D.2.1 Infrastructure Value Index
	D.2.2 Infrastructure Implementation Index for Adaptive Change
D.3 Effectiveness of the adaptive change towards resilient infrastructure (Diagnosis)	D.3.1 Linear water losses
	D.3.2 Water storage capacity
	D.3.3 Water retention
	D.3.4 Incident occurrences
	D.3.5 Combined Sewer Overflows
	D.3.6 Time for restoration
	D.3.7 Level of autonomy (of infrastructure)
	D.3.8 Level of redundancy
	D.3.9 Treatment capacity utilization
E.1 Awareness	E.1.1 Knowledge and education
	E.1.2 Local sense of urgency
	E.1.3 Hydrocitizenship
	E.1.4 Discourse embedding
E.2 Multi-sector network potential	E.2.1 Clear division of responsibility
	E.2.2 Network Cohesion
	E.2.3 Authority
	E.2.4 Room to maneuver
E.3 Stakeholder Engagement processes	E.3.1 Stakeholder inclusiveness
	E.3.2 Protection of core values
	E.3.3 Progress and variety of options
	E.3.4 Collaborative agents
E.4 Capacity building	E.4.1 Smart monitoring
	E.4.2 Evaluation
	E.4.3 Cross-stakeholder learning
E.5 Information and knowledge sharing	E.5.1 Information availability and use
	E.5.2 Information transparency and sharing
	E.5.3 Knowledge cohesion

Table 4: Overview of the six LL_i feedback on the dashboard questionnaire.

Question	Living Lab LL_1	LL_2	LL_3	LL_4	LL_5	LL_6	Comments
Have you used the dashboard?	Yes	Yes	Yes	Yes	Yes	No	
Are you currently using the dashboard?	Yes	Yes	Yes	Yes	Yes	No	• *only for use tests*
If yes | Following your experience in using the dashboard for strategic planning, within InAll:							
- is this tool useful for strategic planning?	Yes	Yes	Partially	Yes	Yes	NR	• *however, it is not finished, and it is not without bugs* • *if some limitations can be corrected* • *usefulness constrained by errors* • *very good concept, limited by usability issues*
- is this tool user friendly?	Yes	Yes	Yes	Yes	No	NR	• *however, it has its weaknesses* • *very difficult when selected metrics amounts disappear each time I load in. This was specifically the metrics from interviews* • *very good concept, limited by usability problems at detail level*
- is this tool intuitive for strategic planning?	Yes	Yes	No	Yes	Yes	NR	• *further metrics regarding economics would assist* • *good guidance, very clear in general terms*
Objectives, criteria, metrics, and reference values							
Do you consider the DASHBOARD an adequate management support tool for…							
… selecting the strategic objectives?	No	Yes	Yes	Yes	Yes	NR	• *the dashboard only presents the strategic objectives, there is no mechanism to support which objectives to select, however if you know which objectives you want to select it is adequate* • *as a support tool (setting strategic objectives involves a complex process)*
… setting the BWS assessment system by:							

Question	Living Lab						Comments
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6	
- selecting the criteria for each objective?	Yes	Yes	No	Yes	Yes	NR	• *the dashboard only presents the criteria, there is no mechanism to support which criteria to select, however if you know which criteria you want to select it is adequate* • *some metrics may be of interest even if the criteria isn't of interest. Being able to see the metrics without selected the criteria can be useful* • *the tree structure is very intuitive*
- selecting the metrics for each criterion?	Yes	No	Yes	Yes	Yes	NR	• *the dashboard only presents the metrics, there is no mechanism to support which metrics to select, however if you know which metrics you want to select it is adequate* • *partially because it does not allow the introduction of new metrics*
- defining the reference values for each metric?	NR	No	Yes	Yes	Yes	NR	• *partially because: 1) it does not allow the introduction of new metrics; 2) it does not make possible to adapt the reference values to the scope of LL* • *the dashboard helps giving reference values* • *the ones by default are not always clear*
Diagnosis							
… calculating the baseline assessment?	Yes	Yes	Yes	Yes	Yes	NR	• *information button on the metrics definitions is not so visible*
… visualizing the baseline assessment?	Partially	No	Yes	Yes	Yes	NR	• *the visualization per strategic objective, criteria and metric is great, however there is no possibility to export the results* • *it doesn't work* • *quick, compact visualization*

Question	Living Lab						Comments
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6	
… understanding and communicating the diagnosis results?	Partially	No	Yes	Yes	Partially	NR	• *the visualization with the scale good to poor (green to red) is easy to understand, however there is still additional explanation needed* • *the configuration of the diagnosis pdf report must be improved (values are not well visible)* • *being able to export the results would be also helpful*
… setting the targets associated to dates in a long-term planning?	NR	No	Yes	Yes	Yes	NR	• *because it is not possible to set the dates we want*
Scenarios and prospective evaluation							
… identifying the scenarios to be used for the prospective evaluation?	No	Yes	NR	Yes	Partially	NR	• *the dashboard does not help to identify the scenarios* • *I did not use the dashboard passed the diagnosis. (It was not functional when I completed it in February/March)* • *more useful to summarize scenarios than to identify them*
… calculating the assessment for each scenario?	Yes	Yes	NR	NR	Yes	NR	• *however, it would be nice to be able to select less metrics than in the baseline assessment* • *we did not find an assessment for each scenario, but only a qualitative future trend evaluation* • *convenient*
… using more than one scenario for evaluation?	Yes	NR	NR	Yes	Yes	NR	• *it is no problem to use several scenarios* • *we don't know because we only have a scenario*
… considering a long-term horizon for evaluation?	Yes	Yes	NR	Yes	Yes	NR	
… identifying the future trends?	No	Yes	NR	Yes	Partially	NR	• *future trends have to be identified by experts* • *guides the process and summarizes it*

Question	Living Lab						Comments
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6	
… understanding and communicating the prospective evaluation results?	Partially	Yes	NR	Partially	Yes	NR	• *we do not find an overview report of the evaluation* • *being able to export the results would be also helpful*
Strategies							
… setting the alternatives to compare?	Yes	NR	NR	Yes	Yes	NR	• *we don't know because there are some problems in using the Dashboard* • *the connections between the alternatives and their scenario are not evident* • *This is the stage in which I have more doubts, but it is probably my fault*
… setting the assessment system for comparison of alternatives?	Yes	NR	NR	Yes	Yes	NR	• *we don't know because there are some problems in using the Dashboard* • *the alternatives are compared on the basis of their impact on the metrics*
… calculating the assessment for each alternative?	Yes	NR	NR	Yes	Yes	NR	• *we don't know because there are some problems in using the Dashboard* • *the values are input not calculated* • *very easy once you are used to the assessment process*
… considering a long-term horizon for comparison?	No	NR	NR	Yes	Yes	NR	• *maximum time horizon is 2029 for alternatives*
… facilitating comparison of alternatives, ranking and also using visualiz**ation** of results?	No	NR	NR	Partially	Yes	NR	• *the visualization of the alternatives is not very intuitive* • *we do not find an overall strategic plan table/report that synthesizes evaluations and comparisons* • *being able to export the results would be helpful in this regard*
Implementation, monitoring, and revision of the Strategic Plan							
… considering a long-term horizon to track progress?	No	NR	NR	NR	Yes	NR	• *at the moment there is just a short-term horizon possible* • *this part was not working when we tried it*

Question	Living Lab						Comments
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6	
… calculating the assessment at different times along the planning horizon?	Yes	NR	NR	NR	Yes	NR	• *this part was not working when we tried it* • *useful*
… visualizing the plan monitoring, comparing results in different times?	Yes	NR	NR	NR	Yes	NR	• *however, there are some bugs in the current version* • *this part was not working when we tried it*
Input and output							
Do you consider the DASHBOARD facilitates the…							
… variable data input?	Yes	Partially	Partially	Yes	Partially	NR	• *some limitations should be corrected* • *it could be improved with legends/informative sheets on the meaning of the different variables* • *in some cases, it does not accept values which are apparently correct*
… metrics input?	Yes	Partially	Partially	Yes	Partially	NR	• *some limitations should be corrected* • *information button on the metrics definitions is not so visible* • *does not allow to save partial input progress*
… general comments input?	No	Yes	NR	Yes	Yes	NR	• *there is no possibility to insert general comments* • *comments can be written only when defining scenario, strategies*
… results export?	No	Yes	NR	Partially	No	NR	• *no result export possible at the moment* • *only diagnosis is exportable* • *this option should be improved*
… production of results to be used in the plan development?	Partially	Yes	NR	Partially	Yes	NR	• *the results can help in the plan development* • *only diagnosis is exportable*
… production of results exported to be directly inserted in the plan document?	No	Yes	NR	Partially	Partially	NR	• *no export possible at the moment* • *only diagnosis is exportable* • *It could be made easier through adding more export functions*

Question	Living Lab						Comments
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6	
General comments: - it could be useful adding an overall strategic plan table/report that synthesizes evaluations and comparisons, facilitating the overview of the process - it could be useful inserting legends/informative sheets on the meaning of the different variables and indicators - it's difficult to answer this from the dashboard testing I completed in February. I would need to test the dashboard again for better feedback. But I do not have time							

Table 5: Overview of the six LL_i feedback on the lessons learnt questionnaire.

Question	Living Lab					
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6
Did you produce a strategic plan?	**Yes** newly developed for LL	**Yes** new developed	**Yes** new	**Partially** there is a plan for some objectives; we made a territorial diagnosis, the diagnosis is recent, a comprehensive integrated strategic plan can be done in a near/medium future	**Yes** new	**No** we had already one, not in revision
Did you follow all the strategic planning process?	**Yes**	**Yes**	**Yes**	**Yes**	**No** From Background to Implementation, monitoring, and revision of the SP	
Objectives						
The following objective of InAll …						
...feed-back from BWS Assessment Framework "test-drive" regarding…						
i) test the prototype and provide recommendations for refinement and transformation into a software tool was met?	**Met**	**Met**	**Met**	**Met**	**Met More discussion about the BWS Assessment Framework could have been desirable**	**Met**
ii) apply, demonstrate and start to use the dashboard version in the LL as a management support tool was met?	**Met**	**Not met** Because it is not completely developed as we have reported on the 23/05/2024 14:49 and 28/01/2024 18:30	**Met**	**Met**	**Met** Mostly, but not completely, due to the limitations of the tool	**Not met**
… strategic plan/planning for water smartness in LL problem-owners – objective oriented, structured assessment was met?	**Met**	**Met**	**Met**	**Met**	**Met** Very useful and strict	**Met** good to get familiar with and for inspiration

Question	Living Lab					
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6
… capacitated LL problem-owners (organizations) for using the BWS assessment framework to support strategic planning, monitoring and decision-making was met?	**Met**	**Met** Only for the strategic planning	**Met**	**Met**	**Met** It could be interesting to specifically assess the adaptation of the BWS to different types of organization	**Not met**
Learning						
Are there still questions on the strategic planning process to be clarified?	**Yes** How can the output of the dashboard be integrated in the strategic plan	**No**	**No**	**No**	**Yes** Integration of metric and objectives not directly linked to water smartness	**No**
Positive aspects						
Identify 3 top positive aspects of success	1) internal discussions on assessment framework 2) awareness raising of data limitations 3) get an overview of status quo and possible scenarios and strategies	1) convergence of alternative solutions for water management for irrigation 2) estimation of the costs inherent to each solution 3) developed tools (Baseform)	1) gives a clear view of strengths and weaknesses, highlights missing data 2) informs how new regulations will affect the municipality and what future investments will be needed 3) provides evidence if we are reaching the goals and ambitions set in plans	1) objective criteria and metrics 2) logic methods and holistic diagnosis 3) traceable and easily transferable and shareable planning method	1) understanding Objectives/Metrics structure 2) learning the stages and process of strategic planning, coherence of dashboard and SP 3) avoiding confusion between objectives and strategies	1) learning organization decision making process and methodology 2) inspiration from SOB list 3) collaboration

Question	Living Lab					
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6
What worked well in your organization?	Internal cross-divisional workshops	Team project Cooperation	The integration of existing plans to ensure the relevance, importance and continuation of the strategic document	The collaboration among the several stakeholders through an objective reading/interpreting system	Involving the Sustainable Development Department Making use of the existing tools for data reporting	Comparison of our system and the proposed system
What can be replicated?	Internal cross-divisional workshops, workshops with regional stakeholders	Planning methodology and use of tools developed by other users	The structuring of the InAll strategic document can be re-used	The process and means for involving	In case it is not in place, creating a system for continuous data reporting linked to the control systems Look for synergies with other monitoring/reporting systems in place (Quality Management, SDG/GRI) to avoid duplicating efforts	sob list
Negative aspects						
Identify 3 top negative aspects of success	1) process time 2) data not available in the needed structure 3) a lot of work with filling excel sheets	1) lack of data 2) reliability and coherence 3) Organizational culture resistant to change	1) not 'one-size-fits-all' 2) need to take into account financial aspects more 3) repetitive re-entering data into each version of the dashboard	1) not easy integrability with preexisting systems (where they were) 2) low flexibility for transversal crossing	1) initial difficulties to understand some of the metrics (e.g. some of those related to "Engaging citizens and actors across sectors in continuous co-learning and innovation") 2) problems with dashboard use consumed a significant time 3) limitations to face-to-face meetings due to COVID-19 had a negative impact on the process"	1) time consuming 2) expectation to commit to all phases 3) different levels of maturity of participants
Next time						

Question	Living Lab					
	LL_1	LL_2	LL_3	LL_4	LL_5	LL_6
- **do more**	Working in the dashboard, maybe earlier development	-	Smaller LL focused group meetings	Better clarify and transversally share from the beginning (clearer and easier language and in person meetings) the goals of the process and its integration in the whole system	Bilateral meetings, face to face meetings and workshops, short meetings	-
- **do less**	Maybe the meetings could be shortened a little bit, more time boxing	-	Rigid metrics, more flexibility per LL context and situation	Reduce the number of important targets and avoid putting them all together; the risk is of impinging on the results themselves	Long online meetings	-
- **start doing**	Maybe respective meetings for partners a) developing a new strategic plan b) revising a plan	-	One in-person meeting midway where changes can be implemented, and the content is better understood	-	Design the dashboard in parallel to the assessment framework	-
- **stop doing**	Filling excel sheets	-	Don't stop believing!	-	-	-
Do you consider your participation in the InAll positive?	**Yes**	**Yes** We have been learning a lot	**Yes**	**Yes**	**Yes** We should probably have devoted more time, especially at certain stages of the process. Usefulness was limited due to the fact that we had just finished a strategic plan (on the other hand, it allowed us to understand some of its failures and limitations)	**Yes**