

SYNTHESIS OF TESTING THE CC-ARP- CE TOOLBOX

OUTPUT O.T3.1

WORK PACKAGE T3 - IMPLEMENTATION AND FEEDBACK -
TOOLBOX VERIFICATION

Lead Institution	BFW - Austrian Research Centre for Forests	
Lead Author/s	Viktoria Valenta	
Version	V-02	
Date last release	21.02.2022	





List of contributors

- ❖ University of Ljubljana (PP1-LP):
Barbara Čenčur Curk, Jerca Praprotnik Kastelic
- ❖ CMCC Foundation (PP5):
Guido Rianna



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1. Introduction

The central component of the project TEACHER-CE is the Integrated Toolbox for Climate Change Adaptation and Risk Prevention in Central Europe (CC-ARP-CE), which will aid the water management sector in adapting to the impacts of climate change CC (and where possible mitigating it). This includes the prevention/reduction of the risk of flood, heavy rain and drought impacts as far as possible, for example by small water retention measures and protection of water resources through sustainable land-use management.

The aim of work package T3 - IMPLEMENTATION and FEEDBACK - toolbox verification was the testing of the Toolbox, which was developed in the frame of work package T2 and based mainly on tools from four CE projects FRAMWAT, PROLINE-CE, RAINMAN and SUSTREE.

Work packages T2 and T3 were interlinked closely since the Toolbox verification process (T3) ran parallel to the Toolbox development (T2). This was aimed at continuous feedback and fine-tuning of the Toolbox, adapting it to stakeholders' requirements.

Testing of the Toolbox beta version was performed by project partners (PPs) together with associated partners (ASPs) and a stakeholder Focus Group in pilot actions (PAs) set up in the previous projects (D.T3.1.1). This beta testing was set up to answer the following questions:

- Does the Toolbox reach its goal as an identification platform for issues + measures and a discussion platform for stakeholders?
- What are the limitations - what stops stakeholders from providing information?
- How is the user experience - do stakeholders know, how to use the toolbox and does it meet user expectations?

After improving the Toolbox (T2) according to the feedback derived from the beta-test, it was presented to a wider array of stakeholders to be further tested during training workshops (D.T3.2). These stakeholder interactions enabled clarification of needs and provided recommendations for Toolbox improvements (bottom-up approach) and for direct local and regional implementation of the Toolbox.

Implementing the development of the Toolbox in this way of multiple feedback loops enabled the identification and bridging of gaps of existing tools to fine-tune our Toolbox to the specific needs of the stakeholders who will be using it in the future.

2. Definition of the testing environment

2.1. PA characteristics and issues

The Toolbox was tested in 9 Pilot Action areas (PAs), selected from previously funded CE-projects (Figure 1):

- PA 1 Kamniška Bistrica River Basin (FRAMWAT)
- PA 2 Upper Lusatia (RAINMAN)
- PA 3 Lowland/piedmont Kamienna river basin (FRAMWAT)
- PA 4 Lower Silesia (RAINMAN)
- PA5 Enza river basin (previously Po river basin PA) (PROLINE-CE)
- PA 6 Vienna Water drinking water sources (PROLINE-CE)
- PA 7 Waidhofen/Ybbs drinking water sources (PROLINE-CE)
- PA 8 Middle Tisza Nagykunsági river basin (FRAMWAT & RAINMAN)
- PA 9 Dyje river basin (SUSTREE)

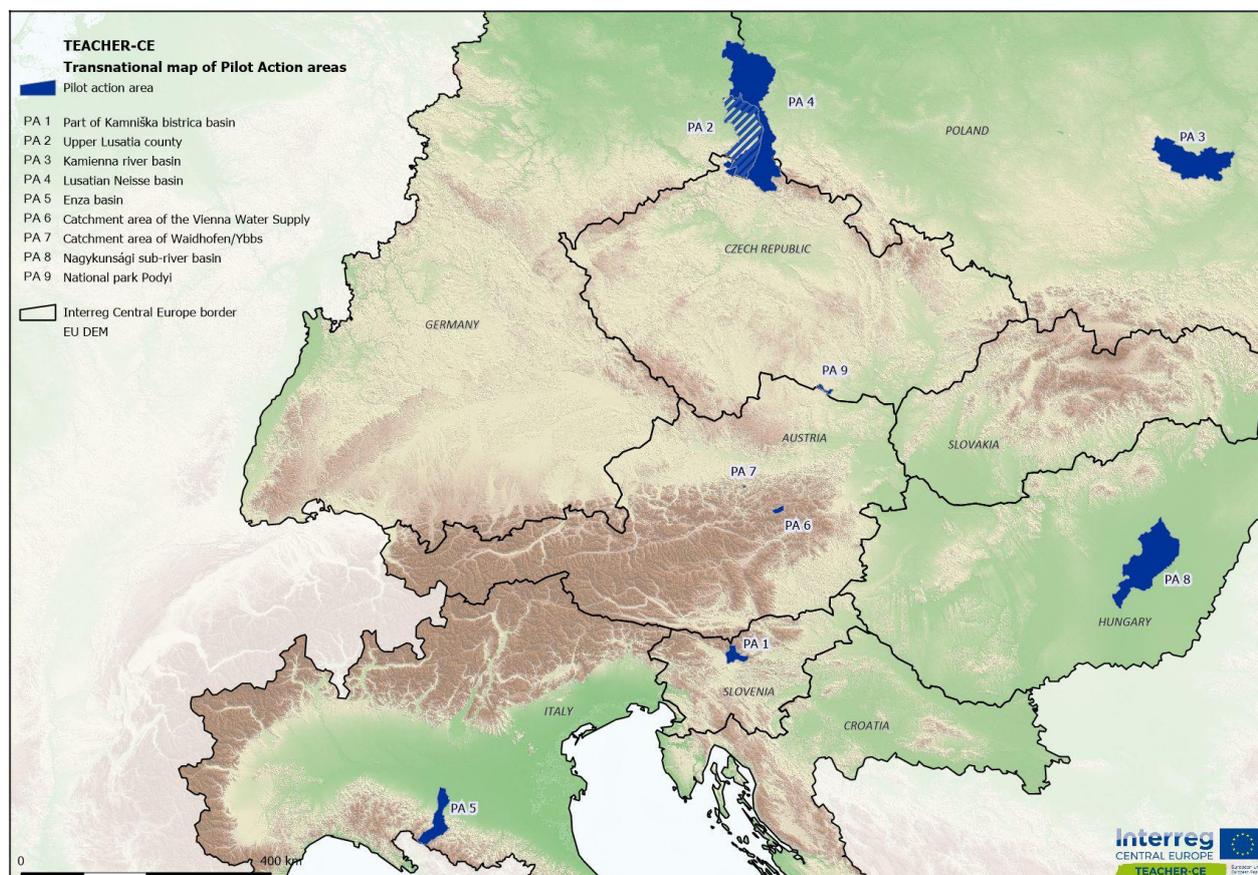


Figure 1: Transnational map of Pilot Action areas of the TEACHER-CE project.



To get a better overview of how individual PAs are related to each other, the following tables (Table 1 and Table 2) show the PAs classed according to geographic characteristics, land use and related issues studied in the precedent CE projects.

Table 1: Geographic characteristics and main focus of PAs as identified at the beginning of the project

	Droughts	Floods	Drinking water protection	Forest sustainability
Plain area	PA2, PA3, PA4, PA5, PA8	PA1, PA2, PA3, PA4, PA5, PA8	PA1, PA2, PA3, PA5, PA8	PA8, PA9
Hilly area	PA2, PA4	PA2, PA4, PA5,	PA2, PA5	
Mountainous area		PA1, PA5	PA1, PA5, PA6, PA7	PA6, PA7
Urban		PA1, PA3, PA5	PA1, PA3, PA5	

Table 2: Major land use in PAs and related issues

	Drought	Floods	Drinking water protection	Forest sustainability
Agricultural areas	PA2, PA3, PA4, PA5, PA8	PA1, PA2, PA3, PA4, PA5, PA8	PA1, PA2, PA3, PA5, PA8	
Forest	PA2, PA3, PA4, PA8	PA1, PA2, PA3, PA4	PA1, PA2, PA6, PA7, PA8	PA3, PA6, PA7, PA8, PA9
Pastures			PA6, PA7	PA6, PA7
Tourism			PA6	PA6
Urban and industrial areas		PA1, PA3, PA5	PA1, PA3, PA5	

These tables show on the one hand that the pilot actions cover a wide range of geographic variables and therefore make therefore make the results of the testing of the Toolbox representable for stakeholders from different situational backgrounds. On the other hand, they show a multitude of pressures on areas supposed to provide various services (e.g. drinking water protection). Over the course of the project, these demands were identified more precisely as seven Fields of Action (FoA), that the Toolbox would need to address (

Table 3).

Before the start of the Toolbox testing procedure, partners of all nine pilot actions identified Pluvial Flood Risk as one of the main issues. Also of high importance were Drinking Water Supply Management and Fluvial Flood Risk Management in most PAs. Less focus lay on FoAs like Ground Water Management and the Management of Water-Dependent Ecosystems. These priorities would shift in the course of the Toolbox testing (see Chapter 3.1).

Table 3: Fields of Action addressed in the Pilot Actions of the TEACHER-CE project.

Fields of Action / PA	PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8	PA9
Fluvial flood risk (management)	x		x	x	x	x	x	x	
Pluvial flood risk (management)	x	x	x	x	x	x	x	x	x
Ground water management	x			x	x	x			
Drinking water supply (management)	x	x		x	x	x	x	x	x
Irrigation water (management)		x	x	x	x			x	x
Water scarcity & drought risk (management)	x	x	x	x	x			x	x
Management of water-dependent ecosystems		x	x		x			x	x



2.2. Identification of gaps

The impacts of climate change on water management are complex, multifaceted, and interwoven. Weather phenomena of all kinds can affect how we manage our water. Whether it's heavy rain, flooding, or drought events - an event does not just have one impact, and a problem does not have just one solution. The TEACHER-CE Toolbox aims to bridge the gap of what is available and what is needed to deal with the challenges faced by various stakeholders in the water management sector.

Identified Gaps

- decision support
- integrated approach
- data on climate impacts
- multilevel transferability

Potential conflicts between different sectors intensified by climate change arise from increased competition for land use or from varied availability of resources. Adaptation needs in the water sector often require restrictions on land use for other sectors. Adaptation options cover a wide range of possible structural (e.g. construction of flood protection walls) and non-structural measures (e.g. adapted land use planning, awareness raising or adaptation of management), and it is not always easy to decide which measure to take.

Available tools often focus on a single type of issue (e.g. floods) and provide tailored solution for this problem. Other issues that may affect the same area or stakeholders, however, can get neglected in the process. An integrated water management approach that is adapted to climate change and includes a multitude of issues and solutions is missing.

The impacts of climate change on water management can vary greatly by region. Climate data are available and accessible from different reliable data sources. However, in order to be able to implement concrete solution measures for specific problems, it is important to know whether they will be compatible with the projected regional climate changes. In many areas, however, this is difficult to implement because they require post processing and data management, which is not easy to handle for non-experts.

Many countries have national tools to deal with certain aspects of water management. They are tailored to the country's policies and legislation. This makes them useful for localised application, but difficult to apply on a wider area or compare them to tools from other countries. This hinders transferability of results and cooperation on a transnational level.

3. Testing Synthesis

3.1. Testing of the TEACHER-CE toolbox CC-ARP-CE by partners

Testing all components of the Toolbox in terms of functionality and usability was a long process and involved testers from various scientific and technical backgrounds. This ensured that the Toolbox was looked at from different angles and valuable feedback was received to improve the next version.

The whole procedure covered five steps (Figure 2), but the main focus lay on testing two parts of the Toolbox: the collection of ISSUES in the Pilot Actions and the selection and ranking of MEASURES suitable to solve these issues.

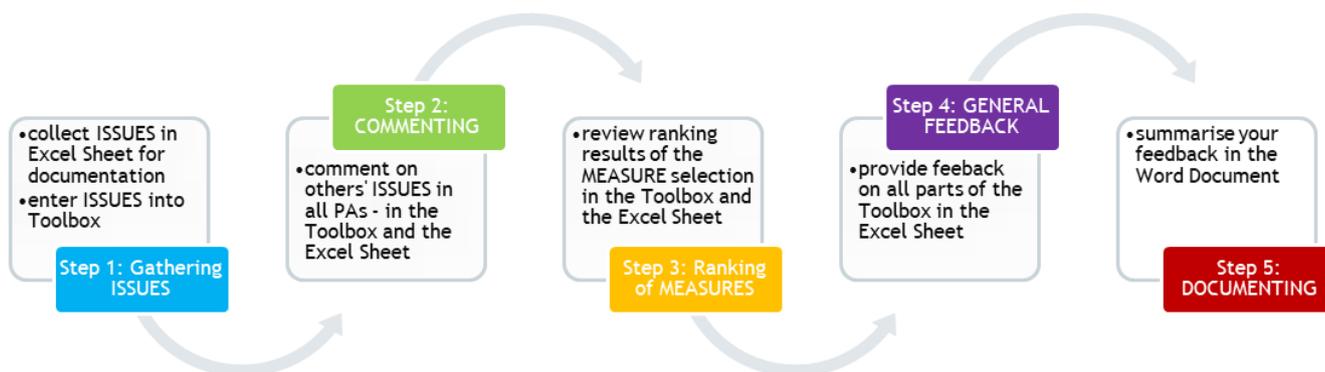


Figure 2: Procedure of testing the Toolbox by partners, associated partners and Focus Groups.

The testing showed the focus on specific Fields of Actions had slightly shifted in some PAs from what had been deemed important at the beginning of the project. This could have been due to actual changes in priorities or due to the inclusion of the stakeholder Focus Group in the assessment. In any case, the number of issues entered into the Toolbox in each PA differed from only 3 to over 30. In all PAs at least one issue related to pluvial flood risk management was entered, in most PAs issues entered also dealt with fluvial flood risk management. The least number of issues was related to irrigation water management (Table 4).

Table 4: Issues entered into the Toolbox in every Pilot Action according to the Fields of Action.

FoA/PAs	PA1	PA2	PA3	PA4	PA5	PA6	PA7	PA8	PA9	total
Fluvial Flood Risk (Management)	6	0	2	7	1	5	3	4	1	29
Pluvial Flood Risk (Management)	2	2	6	4	1	5	3	6	1	30
Ground Water Management	0	1	0	0	0	7	5	3	3	19
Drinking Water Supply (Management)	1	0	0	2	0	7	5	3	1	19
Irrigation Water (Management)	0	0	1	0	1	0	0	7	0	9
Water Scarcity & Drought Risk (Management)	1	0	7	1	2	0	0	5	2	18
Management of Water-Dependent Ecosystems	1	0	19	3	0	0	0	1	2	26
total	11	3	35	17	5	24	16	29	10	150

Dealing with identifying which Field of Action an issue belongs to, helps stakeholders to classify which actions can be considered to solve the problem. Such actions had been categorised by the project's expert group and ranked to best fit the issues. Toolbox users can rely on this pre-selection or choose their own priorities by using the AHP Criteria ranking tool. However, in the first testing stage, this was mostly done only by experienced users, as specific guidelines/manuals had not yet been provided for this tool. For more details see D.T3.1.2 Synthesis Report of Partner Testing.

In general the partners agree that the Toolbox is suitable as a documentation platform of local issues. Some PPs see the Toolbox as conceptually very valid, because it makes it possible not only to analyse the water-related issues in a given area and to identify the mitigation measures, but also to raise discussion and dialogue between the different parties involved. Members of the Focus Groups were very supportive of the idea of CC -ARP- CE and liked the functionality and the positioning as a decision support platform.



3.2. Synthesis of the National Stakeholder Workshops

The implementation of the Toolbox was embedded in a broad stakeholder process. 157 stakeholders took part in the eight planned workshops in the period from 19th October to 29th November 2021. In the course of the stakeholder training workshops, the Toolbox was presented and its use explained. Stakeholders had the opportunity of giving feedback and input directly at the workshop itself, but also for a set time-period afterwards, having gained experience in the use of the Toolbox themselves.

Additionally, the suitability of suggested measures was discussed. The identification of problem areas was undertaken in order to identify any shortcomings in knowledge of stakeholders, as well as the functionality and usability of the Toolbox.

According to the stakeholders who voted, half of the Toolbox is completely as expected, half is more or less as expected; also half consider the Toolbox suitable in supporting decision-making.

Currently, stakeholders are interested especially in two fields of actions:

Pluvial flood risk management and

Groundwater management

In this context, climate indicators are considered very important and the availability of this constantly growing data pool is seen as a key asset.

Participants or their institutions respectively would be interested in using the Toolbox for updating existing strategies related to water management.

In the case of regional and supra-regional issues, the Toolbox can provide a basis for decisions on the allocation of public funds.

More detailed feedback from the stakeholders can be found in the individual Stakeholder Workshop Reports from each Pilot Action (D.T3.2.2) and the Output on Feedback Analysis and Lessons Learnt from these workshops (O.T3.2).

4. Conclusions

4.1. Bridging the gaps

Stakeholders in the regions of each Pilot Action face very complex challenges in adapting water management to climate change. These complexities can sometimes be very overwhelming, so that a solution to the problem seems almost unattainable. The Toolbox is an important aid in this regard, as it not only helps to make the problem more tangible, but also offers suggestions for solutions:

The Toolbox guides through the decision process: One of the first steps in using the Toolbox is to enter the problem. Various parameters are queried in the process. This means that the stakeholders have to deal with their problem in different sections. By requiring them to choose a Field of Action and a Land Use Type, the problem and its implications become more concrete and thus easier to manage. The Toolbox therefore simplifies addressing the problem. Broken down in this way, it is also easier to choose, prioritize, and implement specific actions.

The Toolbox integrates different aspects of climate change impacts on water management: In a given region, all the different issues can be presented side by side. Proposed solutions are provided for each one, which can then be linked. It is also possible to compare diverse issues from a specific Field of Action from different regions and thus present stakeholders with better examples and possible solutions to solve their own problems.



The Toolbox provides a set of climate indicators for the users to better assess possible impacts in their area: Various indicators, including precipitation and temperature data, are mapped for the whole project area. Information is provided for two time horizons (2021-2050 and 2071-2100 compared to 1971-2000) under two climate altering gases concentration scenarios (IPCC RCP 4.5 and RCP 8.5). This can give the users a better understanding of the possible impacts of climate change in their area and select the relevant measures for their issues accordingly.

The Toolbox makes it possible to compare impacts, issues and solutions from various areas, transfer results and foster transnational cooperation: Users have access to issues and solutions from across Central Europe, which they can use as reference points for their own concerns. It also helps to navigate the universe of existing tools, which are closely related to the implementation of EU legislation (e.g. Water Framework Directive, Flood Directive, etc.). It provides links to EU and national information (tools, data portals, reports, legislation, etc.) related to the various Fields of Actions - from flood risk to drought management.

Identified Gaps

- decision support
- integrated approach
- data on climate impacts
- multilevel transferability

Implemented Solutions

- guidance on issues and measures
- combining different aspects of problems and solutions
- climate indicators mapped for Central Europe
- links to EU and national information

4.2. Knock-on Effects

The main focus of the Toolbox testing process was to make sure that stakeholder needs were met and the Toolbox bridges the gaps of what was available and what was needed to improve the adaptation of the water management sector to climate change.

Additionally, the testing process had a couple of other effects. It increased awareness of the adaptation process in the water management sector and established trust between the partners and the stakeholders in the Pilot Actions. Furthermore, it helped to share experiences and bring people together that might otherwise have not interacted. And it showed the bigger picture of how similar issues are tackled in different areas, whether at the local, regional or international level.