GOCE 036822

SCENES
Water Scenarios for Europe and for Neighbouring States

Instrument: Integrated Project
Thematic priority: Global change and ecosystems

Deliverable 2.11
Final draft of Pilot Area Conceptual Models and narrative storylines, and including a list of short term policy options

Due date of deliverable: 30.04.2010
Actual submission date: 21.05.2010

Start date of project: 1.11.2006 Duration: 48 months

Wageningen University Final version

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
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SCENES
Water Scenarios for Europe and for Neighbouring States
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Deliverable 2.11
(WorkPackage 2, scenarios)

Final draft of Pilot Area Conceptual Models and narrative storylines, and including a list of short term policy options

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Vliet, M. van, 2010, Final draft of Pilot Area Conceptual Models and narrative storylines, and including a list of short term policy options, SCENES Deliverable 2.11, Wageningen University, Wageningen

1 Introduction

This report analyses the results of the third round of Pilot Area Workshops (PAWS3) of the SCENES project. It additionally provides a meta-analysis that is meant to give insight in the overall outcomes at a rather general level. The Deliverable can only show a small part of the diversity and complexity of results that were derived in the separate Pilot Area workshops. When reading this deliverable, please bear in mind that this large richness of information in the results of the Pilot Area workshops is not completely reflected. Rather, the focus is on existing complementarities and communalities and thus for details we referre to the reports from the separate Pilot Areas, which can be found in SCENES Deliverable IA2.4.

PAWS3 formed the fourth step in the SCENES participatory scenario development framework, which is described in more detail in (van Vliet et al. 2007; Kok and Van Vliet in prep). This framework consists of four steps in which qualitative and (semi)-quantitative methods are combined. These steps are chosen in order to work towards a set of long-term scenarios and related short-term (policy) actions, rooted in a common understanding of the functioning of the current system. The steps are:

Step 1: Present and near future.
Step 2: Looking at the future (long-term stories).
Step 3: Critical review of stories.
Step 4: Playing it back (short-term options).

The results of each step were used in subsequent steps; together they make up the final scenarios. The set of products includes a story of the present; long-term exploratory stories; and short-term actions to reach a normative objective.

Step 1 and 2 have been executed in the first round of Pilot Area workshops (see (van Vliet 2008; van Vliet et al. subm.) and Step 3 in the second round of Pilot Area workshops (see (van Vliet 2009).
In Step 4 the focus moves from exploratory story development to normative desired options. Through a backcasting exercise (e.g. (Dreborg 1996; Robinson 2003), the necessary (short-term) actions needed to reach a desired objective are identified for each of the exploratory stories.

1.1 Goal of PAWS3

The goal of the workshop was to define several (policy) actions to reach a specific (desired) objective within each of the previously defined scenarios, via a backcasting approach. The focus is on the short and middle term actions.

1.2 Backcasting Theory

Backcasting involves working backwards from a particular desired future objective to the present, in order to determine the (policy) measures that would be required to reach that point (Robinson 2003).

According to Dreborg (1996) the main characteristics of backcasting are:

- The product: sets of (policy) actions that need to be executed to reach a certain desired objective within an existing storyline.
- For whom: input for the policy-forming process. This includes not only policy makers, but also anybody else with the intention to induce change (i.e. NGOs, farmers, and other actors)

- To achieve what: testing the robustness of particular policy measures or other strategies; highlight consequences of strategic choices.

1.3 Backcasting in SCENES

Within SCNENES the backcasting methodology will help us to:

- test how effective/robust certain actions or policy measures are, by testing them in a number of plausible futures (= the existing scenarios)
- identify ultimately a number of (policy) actions that will lead to a more desirable future, *independent from the future that is portrayed.*
- expand the mental model of participants towards out-of-the-box thinking by working backwards.

For the understanding of this deliverable it is good to describe the general overview of steps taken in the backcasting workshops. Note however, that backcasting is an iterative process and in many workshops the different steps were therefore less explicit than shown below. The following section is taken largely from the 'cookbook' for PAWS3, which was disseminated to all Pilot Area coordinators prior to the workshops.

A. Desired objective in 2050

In a plenary decide on the desired objective that you want to discuss in detail. The desired objective should be the same for all groups, but each group works within a different scenario. The objective should be specific, but not so specific that it leaves no room for action within any of the scenarios.

B. Obstacles, opportunities and milestones

B1. Take the Fuzzy Cognitive Maps (FCMs[1]) of the present and the future, and ask the question: what are the main things that have to change to reach that future with regard to the issue at stake?

- What are obstacles and opportunities that occur along the (story)line when you want to reach/avoid the specific issue by 2050.
  - Ask questions like: "*Suppose that, by the year 2050, option X is implemented to the extent that is assumed in the future image, what opportunities and obstacles have occurred 'along the way'?* (Kerkhof 2006)"
  - Look at the FCMs; are there any strong feedbacks that you need to take into account? Any other sectors that you need to influence in order to influence the sectors that are directly affecting /affected by the obstacle? (It would be good to have the FCMs printed out/placed on the wall)

B2. Define milestones that need to be reached. These are often linked to one or multiple obstacles and opportunities. Milestones are the major intermediate steps that need to be taken in order to reach the desired objective.

- What do they entail?
- Why are they needed?

[1] FCMs are a type of conceptual models that were developed in the first and second workshop (see for details van Vliet, 2007).

C. (Policy) actions

Which (policy) actions should be implemented to reach the specific objective, and milestones?

- Map the policy actions on a time line (or a second one if the obstacles/opportunities time line is too crowded).
- Write down the actors; who needs to take actions?

D. Timetrends

Draw timetrends of some indicators to illustrate the changes that take place over time. This step is mainly meant to illustrate the main effects of the (string of) actions, but the timetrends can also be used with local models.

E. Robust actions

In a plenary solutions and actions needed are compared. Are there similarities, actions that need to be taken in most (if not all) scenarios? These are robust actions that should be disseminated further. Also interesting are actions that are very specific to a certain future and that would almost certainly fail in other scenarios.
At the end of the workshop activities can be defined and plans can be made how to follow-up (especially if there are policy makers involved).

2 Analysis of results

In this chapter the results for the different steps in the backcasting exercise are analysed. It starts with an overview of the activities in PAWS3, after which it follows roughly the sequence of the proposed framework and thus starts at the analysis of the desired objective. In section 2.3 a short overview of the results is given, together with a deeper analysis of the obstacles and opportunities. In section 2.4 main strategies (lines of actions and milestones) are analysed. The robust actions are compared in section 2.6, after the main actors responsible for executing the actions.

2.1 Overview of activities in PAWS3

Table 1 shows an overview of the activities in each Pilot Area for the third round of Pilot Area workshops.

Table 1; Overview of output received from the third round of workshops

Pilot Area	date PAWS3	same objective?	robust strategies?	scenarios used				number of timelines	consists of	remarks
				EcF	FoE	SuE	PoR			
Baltic region	11-12/01/2010	yes	yes	x	x	x	x	4	a, m, ob, op	indicators time trends
Narew	18-19/06/2009	similar	yes	3		3		3*2 [2)]	a, m, ob, op	timetrends
Peipsi	8-9/12/2009	similar	yes	x		x	x	3	a, m, ob, op	
Tisza	26-27/11/2009	yes	yes	2	2	2	2	4*2	a, m	
Danube Delta	8-9/10/2009	several issues	yes			x		1	a, m, ob	adapted methodology
Crimea	20-21/10/2009	yes	yes	x	x	x	x	4	a, m, ob	timetrends
Lower Don	18/12/2009	yes	yes	x	x		x	3	a, m, ob	
Candelaro	10/12/2009	yes	yes		x		x	2	a, m, ob, op	timetrends
Guadiana	12/02/2010	yes	yes	*PoR+EcF and PoR+SuE [1)]*				2	a, m, ob, op	
Seyhan	23/10/2009	yes	no			x		1	a, ob	adapted methodology

a: actions, m: milestones, ob: obstacles, op: opportunities
EcF = Economy First, FoE = Fortress Europe, SuE = Sustainability Eventually, PoR = Policy Rules
[1)] scenarios were a combination of the two fast-track scenarios mentioned
[2)] each group did 2 scenarios

Overall we can conclude that all Pilot Area followed the proposed framework to a large extent. The Danube Delta and Seyhan workshops used an adapted methodology, which better fitted the local circumstances. Due to time shortage only few Pilot Areas managed to use timetrends. The main ideas behind the framework were, however, used and therefore the outcomes could be used in this meta-analysis.

2.2 Analysis of desired objectives

Table 2 gives an overview of the desired objectives used in each Pilot Area. Most Pilot Areas used one desired objective, but in the Tisza two objectives were used for each of the four scenarios. Danube Delta used several objectives within the Sustainability Eventually scenario.

Table 2; Overview of the desired objectives per Pilot Area, clustered by region.

Pilot Area	desired objective	water quality / quantity	notes
Eastern Baltic region			
Baltic regional panel	Good water status by 2050 for all freshwaters	both	further specified: both good ecological status and sufficient water quantity
Narew	a good water status according to EU Water Framework	quality	
Peipsi	stabilize anthropogenic eutrophication in the lake and decrease the average total P concentration to a level below 0.04 mg/l	quality	
Lower Danube region			
Tisza	The water balance of the Hungarian section of the Tisza is not negative	quantity	Two objectives for each of the four scenarios
	Pollution reaching the Hungarian Tisza section is minimal	quality	
Danube Delta	Sustainability future – several water quality issues	quality	7 objectives for 1 scenario (SuF)
Black Sea region			
Crimea	efficient water use for food production	both	includes both quality and quantity aspects
Lower Don	water quality is in compliance with certain standards	quality	second objective on water quantity was not used due to time limitations
Mediterranean region			
Candelaro	adequate water availability for the future in agriculture	quantity	
Guadiana	Good status of water ecosystems, compatible with socio-economic viability	both	includes both quality and quantity aspects
Seyhan	realization of sustainable irrigation	quantity	

The desired objectives were diverse; none of the objectives was the same. Most of Pilot Areas used an objective on water quality (5), three objectives were on water quantity and three Pilot Areas included both water quality and quantity aspect in the same objective. In the Mediterranean region the focus was mainly on water quantity, whereas in the Baltic region the focus was mainly on water quality. In the Black Sea region both water quality and quantity aspects were seen as important. Due to time limitations, however, the Lower Don did the backcasting only for water quality.
In PAWS1 clusters were created in a card session, to map the most important issues in each Pilot Area (van Vliet 2008). These clusters have been used as boxes in the FCMs of the present. They were also analysed on their content by categorising them into nine categories, among which water quality and water quantity (see Table 2.2 in Deliverable 2.5). The percentages of clusters related to water quality and quantity

corresponds with the focus of the desired objective (see Table 3). This shows that the backcasting exercise addressed the most import water aspect in each Pilot Area.

Table 3; Comparison of percentage of clusters on water quality and quantity and the desired objective

Pilot Area	percentage clusters on water quality	water quantity	desired objective
Peipsi	13.3	6.7	water quality
Narew	18.8	18.8	water quality
Danube Delta	16.0	0.0	water quality
Crimea	12.5	12.5	Both
Lower Don	27.3	9.1	water quality
Candelaro	4.2	25.0	water quantity
Guadiana	2.4	19.5	Both

2.3 Analysis of milestones, actions, obstacles and opportunities

All backcasting exercises of the Pilot Areas combined covered about 350 milestones, 500 actions, 140 obstacles and 50 opportunities. Due to the large amount of milestones and actions it was not possible to study them in detail. Lines of connected milestones and action have however been combined by the Pilot Area organisers into main strategies, which are studied in section 2.4.

Most of the milestones, actions, obstacles and opportunities were placed in the second period. However, not every period covers the same amount of time. The density was generally highest in the first period and lowest in the last. As we were aiming for short term (2010-2015) and middle term (2015-2030) actions, this is like we expected.

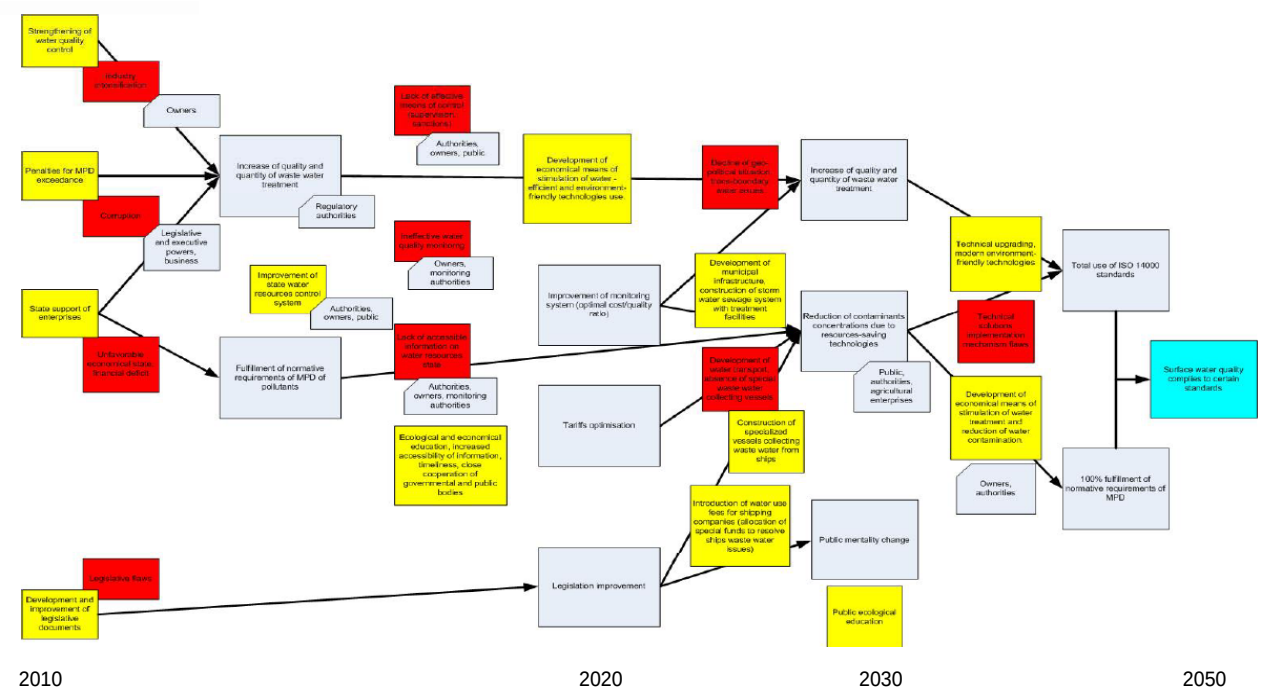

Figure 1; Timeline from the Lower Don workshop for Economy First; Actions: yellow boxes, milestones: grey boxes, obstacles: red boxes and desired endpoint blue box

In the timeline from the Lower Don (Figure 1) actions (in yellow) lead to milestones (in grey). Sometimes a milestone is followed by another milestone and sometimes two actions are needed to reach a milestone. The red boxes show the obstacles. Most of them are tackled by the actions. Most of the milestones and actions are placed before 2030.

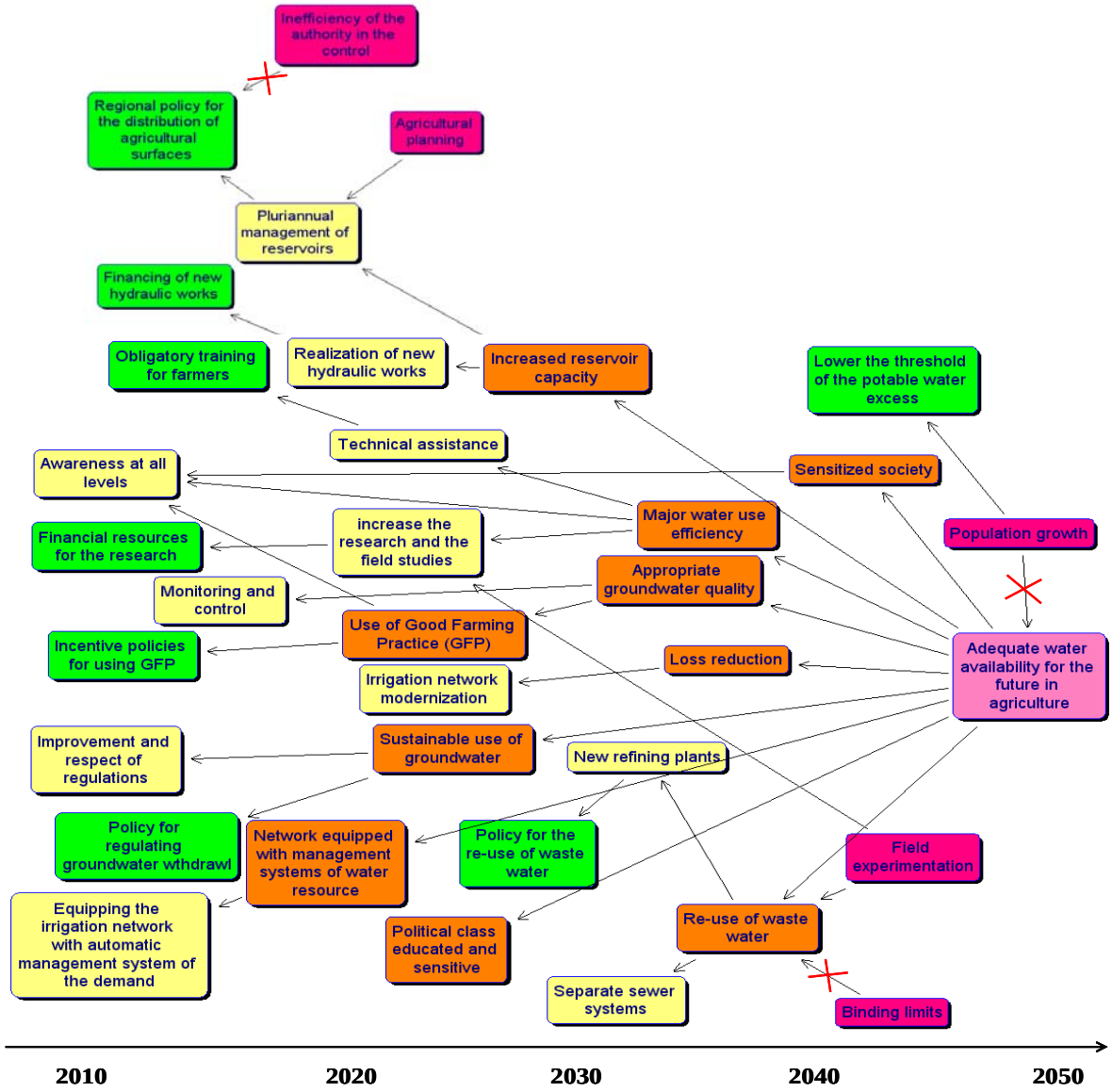

Figure 2; Timeline from the Candelaro workshop for Policy Rules; actions: orange, policies: green, milestones: yellow, obstacles: fuchsia boxes and desired objective pink box.

In the Candelaro timeline (Fig. 2), the pink box represents the objective to be achieved. One or two actions (orange) lead to one milestone (yellow), which leads to a second milestone, which in the end leads to the desired objective (pink). Often a policy (green) is needed to start the actions. In fuchsia the obstacles (arrows with a cross) and opportunities are shown that might affect the different actions and milestones.

In some Pilot Areas results were present from future to present, so in the same manner as they were produced. There arrows often pointed backwards in time (e.g. Fig.2). In other Pilot Areas they decided to draw the arrows to go with the flow of time (e.g. Fig. 1 and 3), as some found it difficult to present against the flow of time.

However, not all timelines looked similar. In the Narew one group could only envision a good water quality under Economy First, if water quality degraded first. This would then make people aware of a need to change behaviour. Therefore almost all lines of actions and milestones went via the milestone 'decrease of regional attractiveness'.

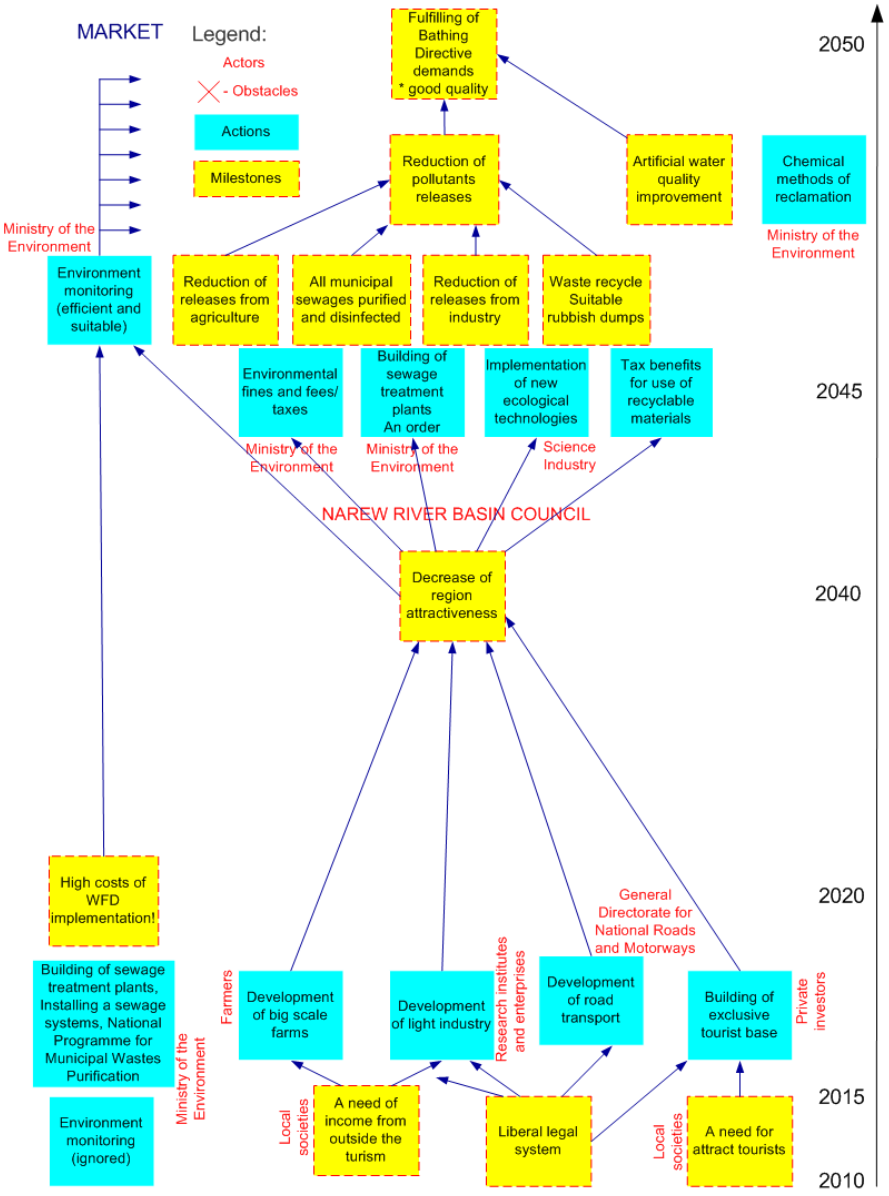

Figure 3; Timeline for the Narew workshop for Economy First

Obstacles and opportunities
Four scenarios have been used in the Pilot Area workshops. They can be characterised by two axes; a globalised versus a regionalised world and a self-interest driven, reactive world versus a solidarity driven pro-active type of world (see Figure 4).

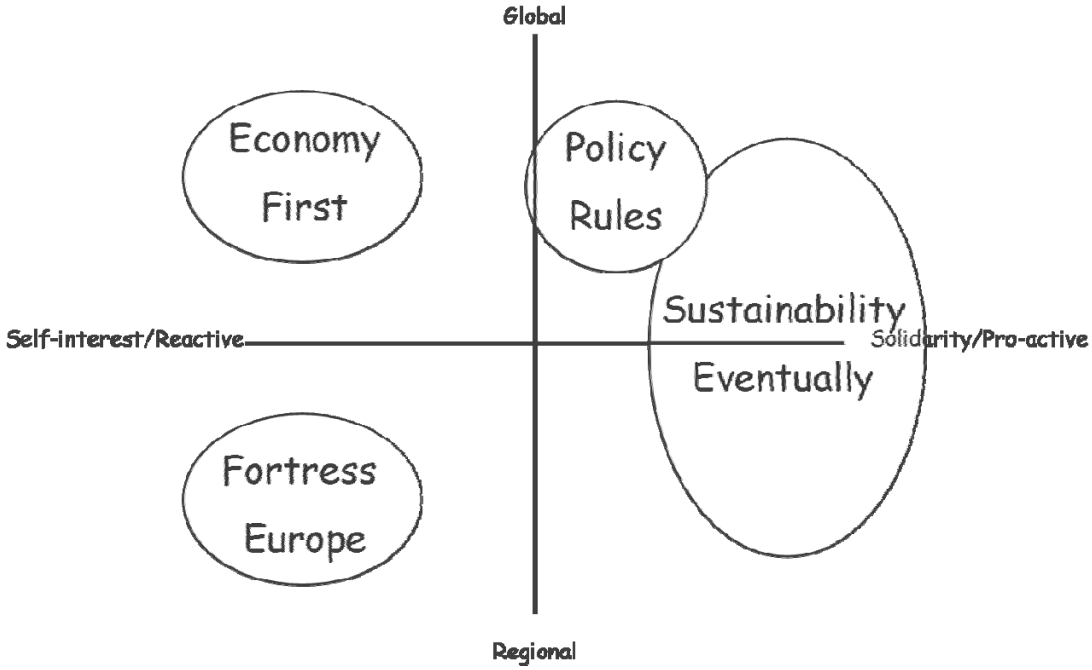

Figure 4; Scenario axes, showing the place of the scenarios along the axis of self-interest/reactive versus solidarity/pro-activeness and global versus regional.

The original idea was that obstacles and opportunities would arise from the scenario used. In some Pilot Areas they were also discussed at the end of the workshop, showing more the problems that might arise if the timeline was followed.

If we look at the average number of obstacles and opportunities per scenario, it appears that Fortress Europe was the most 'difficult' scenario, as it has the highest average number of obstacles and the lowest numbers of opportunities (Table 4). Furthermore, it was used the least of all the scenarios, which underlines the notion that it is a scenario that stakeholders had problems with. Sustainability Eventually was the 'easiest' scenario with the highest number of opportunities, and the lowest number of obstacles.

Table 4; Overview of the average number of obstacles and opportunities per scenario

Scenario	average number of obstacles	average number of opportunities
Economy First	8,1	5,3
Sustainability Eventually	7,0	7,8
Fortress Europe	10,3	4,7
Policy Rules	8,3	5,1

But not only the amount of obstacles and opportunities differ per scenario, also the type differs. The opportunities and obstacles can be clustered in different categories, as shown in Tables 5 and 6.

Table 5; Number of opportunities by scenario and the percentage per category

Category	Economy First	Policy Rules	Fortress Europe	Sustainability Eventually
legislative / policy	0%	8%	11%	5%
management	27%	17%	11%	9%
economic	27%	25%	33%	27%
social	13%	25%	11%	23%
environmental	7%	8%	22%	36%
research / technologies	13%	8%	11%	0%
cooperation	0%	0%	0%	0%
other	13%	8%	0%	0%
total number	*13*	*11*	*7*	*19*

The analysis of the opportunities per scenario shows that each scenario has specific obstacles. Economy First produced many management and economy opportunities, and was low on policy, and environment. This could also be expected considering the storyline. Typical opportunities for Economy First were those related to technological development, which is assumed to be high in this scenario. Policy Rules was surprisingly low in policy and environment, but resulted in more economic and social opportunities. Management was also quite well represented. For Policy Rules typical opportunities were large programs and aspects like better planning.
For Fortress Europe opportunities of only one Pilot Area were available. There were surprisingly many environmental related opportunities (e.g. single pollution control institution makes control better). Typically for Fortress Europe was the attention to centralisation (like one leading institution) as an opportunity.
For Sustainability Eventually there was a surprisingly high number of economical opportunities. As expected there were also many social and environmental opportunities; organic farming and a shift in social values were typical opportunities.
Overall it does seem that most of the opportunities related back to the general background of the scenarios. Not all results were that straightforward, likely due to the different approaches taken in different Pilot Areas on assigning opportunities.

A similar analysis has been conducted with the obstacles. Obstacles were used in two ways, as constraints from the scenarios and as a 'reality check' at the end of the exercise (will this really work?). Still there is a relation between the type of obstacles and the scenario used in the backcasting exercise.

Economy First has a rather equal spread of obstacles, with focus on management (see Table 6). The share of legislation / policy is the highest of the four scenarios. Apparently they are more perceived as being an obstacle in a market and economy orientated world. Typical obstacles, which were mentioned several times, can be found in Table 7. For Economy First they include obstacles like a lack of finances and a lack of regulation.

Table 6; Number of obstacles by scenario and the percentage per category

Category	Economy First	Policy Rules	Fortress Europe	Sustainability Eventually
legislative / policy	17%	7%	12%	8%
management	24%	37%	14%	38%
economic	15%	24%	33%	8%
social	16%	10%	11%	21%
environmental	9%	12%	26%	10%
research/technologies	4%	2%	2%	4%
cooperation	7%	0%	0%	12%
other	11%	7%	2%	2%
total number	*37*	*34*	*35*	*35*

Policy Rules has many obstacles in management, but also a large share of economical obstacles. It has the lowest share of policy related obstacles, which is logical for a future where policies are important and very likely to be complied with.
Backcasting exercises under Fortress Europe included many economic and environmental obstacles. In this scenario the environment is not important and economical growth is low due to the regionalized world. This is mirrored in the share of obstacles in these two categories. A typical obstacle for Fortress Europe is the pressure to produce food and energy, which might lead to pollution and water shortage.
In Sustainability Eventually management obstacles have a very large share, as have social obstacles. There will be many social changes, and society will deal differently with problems. This might lead to problems with the management that will have to change from a top down approach to much more localised and governance approach. A typical obstacle in this respect is the lack of capacity to make these changes (see Table 7).

Table 7; Most often mentioned obstacles per category

Category	Economy First	Policy Rules	Fortress Europe	Sustainability Eventually
legislative / policy	- political instability, - lack of regulation, - lack of financial support	-	- political instability	- lack of support
management	- lack of finances, - ineffective control	- lack of coordination, - to strict guidelines	- conflicts of interests, - lack of stakeholder involvement, - lack of funding	- lack of financing, - problems with / lack of will with participatory processes.
economic	- lack of financial support	- lack of funding, - existing subsidies with the wrong results	- much pressure on certain sectors (like energy and agriculture) to produce	- lack of financing - high environmental taxes
social	- demographic issues: population decrease / urban sprawl	-	- Lack of involvement of stakeholders	- not enough capacity to make the changes

(continues on next page)

Category	Economy First	Policy Rules	Fortress Europe	Sustainability Eventually
environmental	- increase in pollution	- increasing pollution (from agriculture and other sectors)	- pressure to produce food and energy might lead to pollution and water shortage	- long recovery from pollution - intensification
research / technologies	- introduction of new polluting technologies	-	-	- need for new indicators
cooperation	- problems with cooperation	-	- conflicts and lack of cooperation	-
other	-	-	-	-

If no obstacles are given there were no obstacles mentioned more than once in that category and scenario.

The overview of typical obstacles shows the differences between scenarios. Under social issues for instance, involvement of stakeholders is difficult in a Fortress Europe world, which will be more centralised. In Sustainability Eventually involvement will be easier, but the capacity to do it right is often lacking. Interesting is also the problems with cooperation in Economy First and Fortress Europe, which are not present in the more solidarity / pro-active scenarios (see Figure 4).
There were also similarities between scenarios; a lack of finances was an obstacle that was mentioned in many Pilot Areas and across all scenarios and is likely to always be a problem when aiming for ambitious goals.

2.4 Main strategies

In the backcasting exercises main lines of actions and milestones can often be discerned so that they together lead to (aspects of) the desired objective. These lines can be seen as strategies. All Pilot Areas have identified main strategies. In total more than 130 main strategies have been defined, more or less equally divided over the four scenarios (see Appendix 1 for the full list of strategies). These main strategies have been clustered in order to show what kinds of strategies are most frequent in the different scenarios (Table 8). One strategy can be placed under several categories.

Table 8; Number of strategies by scenario and the percentage per category

category	Economy First	Policy Rules	Fortress Europe	Sustainability Eventually
legislative / policy	20%	24%	13%	11%
management	22%	28%	24%	30%
economic	18%	7%	9%	14%
social	10%	7%	22%	23%
environmental	10%	26%	11%	16%
research	6%	6%	11%	2%
cooperation	8%	2%	2%	0%
other	8%	0%	9%	5%
	33	*32*	*39*	*31*

All scenarios score quite high on management strategies, which is the only category that has a share of more than twenty percent in each scenario.
Economy First has the highest share of economic strategies compared to the other scenarios. It also resulted in many legislative and management strategies, which is unexpected given that market liberalisation is at the core of most storylines. These legislation and policy strategies are, however, mainly largely economic in nature (see Table 9).
Policy Rules has the highest percentage of all scenarios in legislation/policy. Also management strategies have a relatively high share, just like environmental strategies. This is quite like one would expect with this scenario.
Fortress Europe has many social issues, but they include aspects like strong control. However, also education is often mentioned. Also in this scenario management strategies play a large role. In Fortress Europe the typical management strategies are focused on infrastructure.
Sustainability Eventually scores high on social issues, but has a relatively low percentage of environmental strategies. This is somewhat surprising for a more environmental friendly scenario. It also has a very high share of management strategies, which can be related to the large share of management obstacles. It also shows that much needs to be changed to be effective in a bottom up society.
Sustainability Eventually does not have any strategies under cooperation. This is also difficult in a strongly bottom-up, regionalised world. One could wonder why in the Policy Rules scenario so little cooperation strategies were developed.

Table 9; Most common strategies by scenario and category

Type\scale	Economy First	Policy Rules	Fortress Europe	Sustainability Eventually
legislative / policy	taxes, stimulation of industries and environmental protection by economical and regulatory means	taxes, standards, improvement of legislation	rules for water use	increase participation
management	work on infrastructure implement technologies	regulations and plans, implement technologies	infrastructure,	water saving, technological measures
economic	create conditions for investments, taxes		subsidies	
social		awareness raising / education	education, control	awareness raising, public participation
environmental	technologies	environmental regulations pollution taxes	fish protection	awareness raising, increase water quality
research cooperation	technologies cross border projects		technologies	

Overall one can conclude that the strategies reflect the context of the underlying scenarios. Conducting backcasting exercises within the framework of different

scenarios leads to different strategies, which gives a better overview of the diversity of actions that can be taken. This leads to a better overview of the choices that are available for policy makers, and the robustness of these choices, as will be shown in Section 2.5.

Main strategies by region

The main strategies can also be compared by region. This can show the difference between a water quality oriented region like the Baltic and water quantity oriented region like the Mediterranean. Lower Danube and the Black Sea region are intermediate regions in which both water quality and water quantity objectives were used. It might also show other differences related to for example cultural background and history.

Table 10; Number of strategies by region and percentage per category

Category	Eastern Baltic	Lower Danube	Black Sea	Mediterranean
legislative / policy	17%	8%	25%	12%
management	27%	17%	31%	44%
economic	13%	33%	14%	15%
social	10%	8%	19%	21%
environmental	17%	25%	8%	6%
research	8%	0%	3%	3%
cooperation	6%	0%	0%	0%
other	2%	8%	0%	0%
total number	*79*	*9*	*23*	*24*

In regions with a focus on water quality, a higher share of strategies is environmental oriented (see Table 10). Where water quantity was the focus of the backcasting exercise there is a higher share of strategies aimed at management, mainly consisting of management of water infrastructure and water availability. It seems that also the cultural background and history have an influence on the strategies developed. The two regions with former Soviet-Union countries, for instance, have more legal and policy oriented strategies.

2.5 Main actors

Actions need to be taken by actors. Most of the main actors identified by the Pilot Areas have a role on the local and national level (see Table 11). Main actor groups were the government (e.g. ministries, parliament and local communities) and authorities and institutions (e.g. water boards, monitoring agencies and law enforcement agencies). Appendix 2 shows a list of the actors.
The EU or its institutions were not mentioned as main actors in the Pilot Areas. This is probably due to the large scale difference. International companies, NGO's and 'different international organisations' were mentioned. International organisations like the International Commission for the Protection of the Danube River can for instance play a role in improving water quality. Similar organisations in other areas should of course also be taken into account on the EU level. Other 'actors' that were identified were the market and science.

Table 11; Number of main actors by category and level

	local/regional	national	international / EU	*total*
politicians	1	4	0	*5*
government	5	13	0	*18*
authorities and institutes	12	9	1	*22*
businesses	4	7	2	*13*
NGO's	3	6	2	*11*
'society'	9	1	0	*10*
other	1	6	3	*10*
Total	*35*	*46*	*8*	*89*

2.6 Robust actions

The wide range of strategies shows the diversity of options that policy makers have. However, not all of these strategies work equally well. As actions have been developed for four different scenarios, one can look for those actions that are present in all four scenarios, or that can be effective in all four. These actions are the so-called robust actions. That they can work in all of the four scenarios increases the likelihood of the robust actions to be effective in the actual future.

In total 59 robust actions have been identified. They have been categorised by the same categories as the main strategies (see Table 12). The division of robust actions per category resembles the division of main strategies per category. In Appendix 3 the full list of categorised robust actions can be found.

Table 12; Percentage of robust actions per category and level

	Local / regional	National	International / EU	*per category*
legislation/ policy	19%	27%	16%	*21%*
management	29%	19%	14%	*20%*
economy	7%	13%	11%	*10%*
social	31%	13%	16%	*20%*
environment	10%	19%	22%	*17%*
research	5%	8%	11%	*8%*
cooperation	0%	2%	11%	*4%*
total per level including doubles	*42 (33%)*	*48 (38%)*	*37 (29%)*	

In principal all the robust actions were devised for the Pilot Area, but there were references to the European Union (e.g. changes in the Water Framework Directive or Common Agricultural Policy). There were also actions that clearly needed international cooperation (e.g. for trans-boundary river management). The author has fitted the robust actions not only to the categories, but also to three levels. As the data is from local (and one regional) workshops, it is logical that many of the robust strategies best fit the local and national. However, almost thirty percent of the robust action could use involvement from international institutions and the European Union.

Robust actions across Pilot Areas

There were robust actions that were identified in three or more regions, and robust actions that were identified with objectives covering water quality and water quantity. In other words some actions are not only robust on the Pilot Area level, but also robust across Pilot Areas.

One robust action was noted in the four regions; the development, improvement and integration of legislation and policies. Other actions like monitoring, financial incentives (taxes, subsidies, etc) and increasing awareness were identified as robust actions in three of the four regions. None of the robust actions, however, were noted in all Pilot Areas, which might be partly caused by the fact that some Pilot Areas had only very few robust actions. Table 13 gives an overview of robust actions that were present in two or more regions, and includes the number of Pilot Areas in which that robust action was identified.
Not only the regions were different, but also the ultimate, desired objective that needed to be reached. It can be expected that for different objectives different actions are needed. Updating infrastructure, monitoring and increasing awareness were the robust actions that were found under both water quantity and water quality oriented objectives (see Table 13). Of course the exact nature of these robust actions might change from situation to situation (e.g. what needs to be monitored) but it does show that they are very important.

Table 13; Overview of actions that are robust across Pilot Areas and across desired objectives

Category	**across regions** (number of regions / number of Pilot Areas)	**across objectives** (number of objectives (max 3))
legislative / policy	develop / improve /integrate legislation (3/5)	develop / improve legislation (2)
	improve governance capacity (2/2)	improve governance capacity (2)
management	waste water treatment (2/3)	waste water treatment (2)
	update infrastructure (2/3)	update infrastructure (3)
	governance (2/2)	governance (2)
	monitoring (3/4)	monitoring (3)
economic	development of tourism sector (compatible with the environment) (2/2)	
	financial mechanism, taxes, subsidies and investment programs (3/6)	
social	increase awareness (3/5)	increase awareness (3)
	education (3/4)	governance (2)
	governance (2/2)	
environmental	environmental education (3/3)	environmental awareness (3)
	waste water treatment (2/3)	waste water treatment (2)

research	new technologies (2/4)	new technologies (2)
	monitoring programs (2/3)	monitoring programs (2)
cooperation	cooperation (cross border and sectoral) (2/3)	cross border cooperation (2)

If we compare the robust actions from workshops that used a desired objective focussed on water quality with the workshops with a water quantity or combined objective there are some differences, although not very clear. There are indications that there were more environmental actions in water quality oriented Pilot Areas, whereas there was a larger share of management related actions in those that are water quantity oriented (see Table 14).

Table 14; Percentage of robust actions by desired objective and categories

Category	**water quality**	**both**	**water quantity**	*both and water quantity combined*
legislative / policy	14%	10%	0%	*10%*
management	24%	31%	60%	*33%*
economic	8%	16%	0%	*14%*
social	16%	21%	20%	*21%*
environmental	24%	10%	20%	*11%*
research	8%	7%	0%	*6%*
cooperation	5%	5%	0%	*5%*
total number	*23*	*31*	*5*	*59*

3 Process related learning points from PAWS3

Although participants and organizers alike were enthusiastic about the backcasting method, there were also some difficulties encountered.
It was often difficult to define one specific desired objective that made sense for all the four scenarios. Good water quality is for instance easier feasible in a Sustainability Eventually future than in an Economy First future. The desirable objective can be opposite to the previously developed scenario, and it was often difficult for participants to deal with this. However, most groups did manage relatively well. The idea that parts of the previously defined scenario could be changed was not always clear. The main idea is that although the backcasting exercise uses existing products (the scenarios) it results in new products that can be used independently from these scenarios. So although the exercise had to stay within the main assumptions of the different scenarios, there was room for manoeuvring within these main assumptions. This should be communicated better in futures exercises.
The distinction between actions and milestones gave some difficulties. This division was mainly made to first lay out the general lines for actions (as a series of milestones), which could then be made concrete by assigning the actions needed to reach the milestones. Sometimes it was not really clear if something was a milestone or an action, and it might also depend on the exact wording (e.g. 'setting up education programs' as action, or 'education programs set up' as milestone). The distinction between milestones and actions is, however, not very important for the overall process and should therefore not be given too much attention.
Some Pilot Areas also reported that the policy aspect was difficult for non-policy makers. It is therefore advisable to include more policy makers in backcasting workshops. However, the input from other stakeholders is just as important, as they help to come up with new, original actions that are not policy related. Many of the actions identified are also of a non-policy nature.
Pilot Area coordinators further reported that some participants found working backwards difficult. As backcasting is an iterative process, it is normal that sometimes the focus is already more on short and middle term actions. However, the overall process should focus on working backwards from the desired objective. In order to make this process a bit easier we introduced the milestones to first make some larger steps backwards from the desired objective. Thinking backwards is difficult because it is not our normal way of thinking. Because thinking backwards is different it makes it possible that new, unexpected ideas can arise. It also forces participants to come up with more creative solutions, in order to reach the desired objective, even in circumstances in which they would not easily envision such an objective to be reachable.

Notwithstanding the learning points mentioned above, overall, PAWS3 was very successful and led to rich results. The vast majority of the participants were enthusiastic. Both the participants as well as the organisers stated that PAWS3 delivered interesting results. Some ideas were mentioned as needed to have follow up (like the idea of setting up a Narew River Council). Participants were interested in the use of a new methodology, after the PAWS2 that used mainly the same methods as PAWS1. Backcasting was new to most, if not all, participants. This made the workshop extra interesting. For a full analysis of the process of PAWS3 we refer to Deliverable 5.10.

4 Synthesis

In this chapter we will first show the implications of the meta-analysis for (pan-) European level. The second part reflects on the goals that were set beforehand for PAWS3.

4.1 Results for the (pan)-European level

Main strategies for the (pan)-European the level

Although the Pilot Area backcastsings were mainly focused on the local and national level some strategies addressed the international and EU level (see Appendix 1, Table A1.2 for the full list of strategies on the EU level). The main strategies that related to the EU were on creating clearer criteria for the 'good water status' in the Water Framework Directive (WFD) and changing the Common Agricultural Policy (CAP). The CAP changes mainly addressed agro environmental schemes, and changes of subsidies to support less polluting technologies and crops. Some Pilot Areas further saw the need to establish an EU panel or institution directed on water quality. They also saw the need for more cross-border projects and agreements on trans-boundary river basins, not only within the EU, but also with countries outside it such as Russia.

Robust actions for the (pan)-European level

Although many robust actions should be taken into account during policy making processes on the European level, the ones categorised under the EU level are specifically important. These robust actions address a number of interesting questions. Within the Pilot Area workshops there were for instance a number of remarks on the WFD. Besides some more broad remarks there were also more specific remarks on shortcoming in the WFD, such as a perceived need for better guidelines, more specific targets and relevant indicators. More transparent information on the implementation process was also needed. There further was a plea to delete exemptions and derogations from achieving the good status and to review criteria for heavily modified water bodies.

The CAP subsidies were also mentioned in several Pilot Areas. The agricultural subsidy system would need to be revised, in which water quality and quantity aspects need to be taken into account better.

Other robust actions needed on the EU level include support for the development of new technologies. Technologies were often seen as one of the key methods to reach a better water quality or lower water demand. Support from the EU to innovative companies and research institution can help to make these technologies become available sooner, for instance via establishing investment programmes and grants. Not only should there be support for new technologies, but also for monitoring programs which was another often mentioned robust action.

Many water issues can only effectively be dealt with on the river basin level. As there are many trans-boundary rivers within and on the border of the EU, (financial) support is needed from the EU for cross-border cooperation on these trans-boundary waters.

Awareness raising programs are another action that got much attention in the Pilot Areas. Setting up or financing programs that promote the WFDs 'good water status', more general educational environment programmes and establishing and financing stakeholder panels are relevant actions for the EU level.

In the Baltic panel a session was dedicated specifically to recommendations for the pan-European level. See Deliverable IA2.4 for the results of that session.

4.2 Concluding remarks

In Section 1.1 the goal of PAWS3 was described as follows: "*The goal of the workshop is to define several (policy) actions to reach a specific (desired) objective within each of the previously defined scenarios, via a backcasting approach. The focus is on the short and middle term actions.*" The workshops resulted in a very large amount of (policy) actions with a clear focus on short and middle term actions (see Section 2.2). Most of the exercises managed to reach the desired objective.

The results included more than only the large list of actions; 135 strategies and 59 robust actions were identified. The main strategies included a wide range of different levels, from local communities to the EU, and a wide range of fields, from legislation to education and monitoring to economic incentives (see previous sections). The range of strategies showed the diversity between the regions and the scenarios used, but there were also a large number of common strategies, such as the development and implementation of new technologies, increasing awareness and stakeholder participation.

Each Pilot Area also identified robust actions; actions that work under each of the different future scenarios. Some of the robust actions were the same in three or four of the regions, showing that they are likely to work in very different contexts. Part of the robust actions was addressed by groups that worked towards very different desired objectives. Monitoring and increasing awareness (for instance via education) were robust actions that proved robust for different objectives and across regions. Updating infrastructure, integration and improvement of legislation and policies, and financial incentives were other very robust actions.

Results show that the approach of using well defined scenarios as background of the backcasting exercise lead to a wide range of strategies, as it forces participants to think out of the box. The use of scenarios also made it possible to look for robust actions, which resulted in a wide range of robust actions. A number of these robust actions are also robust across regions and can be used to reach a better water quality as well as a better water quantity.

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Appendix 1; Main strategies

This Appendix contains two tables, one give the main strategies grouped by scenario (table A1.1) and the other gives the main strategies grouped by category and further divided by the level they work on (table A1.2).

Table A1.1; Overview of the main strategies, grouped by scenario

scenario	main strategies
Economy First	1. Cross-border projects 2. Cross-border private incentives 3. Exchange of technologies 4. Infrastructure planning 5. Property taxes 6. Spatial planning 7. Pollution taxes and charges 8. Environmentally friendly technologies 9. Social policies 10. Legislation act on temperature of cooling waters to be released into natural waters 11. Installation of artificial basins for cooling waters 12. Development of alternative cooling technologies 13. Information on products and labels 14. Financial instruments 15. Education measures 16. Social equity 17. Good status of water ecosystems 18. Agricultural sustainability and multi-functionality – 19. Economic development 20. Energy 21. Management and Policy 22. Water consumption decrease 23. First part follows EcF assumptions, second part is very similar to SuE 24. Whole environmental and water quality infrastructure is built for the Tisza-valley 25. Actions focused more on improvement of infrastructure and technologies 26. Pushed from the private sector towards the government to 27. Create more favourable conditions for investments 28. Gradually improve water management system by 29. Implementation of new technologies, 30. Stimulation of environment friendly technologies use economical and regulatory means and 31. Overcoming of economical and administrative obstacles by 32. Implementation of improved water resources governance system and 33. State support of "proper" business

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Policy Rules

1. More legal and institutional building character
2. Upgrading and research for irrigation
3. Re-use of waste water
4. Better control
5. EU support returns several times, this is more about administrative and professional support than financial
6. EU panel on water quality
7. Polluter pays principle implementation
8. Property taxes
9. Awareness raising on tourism impact
10. EU subsidies
11. CAP reform stimulates less polluting technologies
12. Lower direct payment increases agro-environmental schemes
13. Land use plans
14. New industry standards
15. Creating set of indicators
16. EU pollution guidelines
17. National pollution law changes
18. Trans-boundary agreements
19. Monitoring new technologies
20. Buffer zone regulations
21. New technologies at home
22. Control of pollution from private houses
23. Taxes for sewage amount
24. Increased connection to sewage treatment system
25. Involvement of Russian side
26. Improving management capacity
27. Changing demographic policy
28. Implementation of new technologies
29. Improvement of legislation
30. State support of environment-friendly businesses
31. Environmental education
32. Major driving forces: administrative (legislative and executive powers)

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Fortress Europe

1. Establishing one EU institution
2. Monitoring system
3. Rules for water storage
4. Rules for distribution of water
5. Subsidies at the beginning
6. Infrastructure
7. Planning
8. Education
9. Promotion
10. Promoting markets
11. Innovations in technologies
12. Fish support (spawning ground)
13. Research
14. Educated farmers
15. The same right for all countries
16. Education at schools
17. Competition & award
18. Infrastructure
19. Supporting subsidies
20. Consumer education
21. New technologies
22. Promoting (eco) fishing
23. Forbidding straightening rivers
24. Creating artificial lakes
25. Polluter pays principle
26. Cooperation
27. Infrastructure development
28. Aim was in some kind of contradiction with the Fortress Europe approach
29. Provide stronger regional policy
30. Actions for policy implementation with stricter control from the society
31. Introduction of a strong dictatorship
32. "Closed societies of rich" spend money on new technologies for themselves and to some extent for poor classes
33. Can be achieved only via strong control of the labour class and
34. Good education for the reigning class
35. Optimization of water use
36. Decrease w demand
37. Increase awareness
38. Increase w availability
39. Research on nuclear waste

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Sustainability Eventually

1. Establishment of coherent legal system
2. Change in ecological awareness
3. Reduction of pollution
4. Innovative technologies
5. Appearing of charismatic leader
6. Environmental monitoring
7. Sufficient financial support
8. People's approach is a key issue, can be followed through the whole system
9. Campaigns for raising awareness
10. Economic instrument (public sector) implemented
11. Economic instrument (voluntary) implemented
12. Technical measures
13. Setting specific criteria for "good water status"
14. WFD implemented
15. Water quality upstream
16. Water quality in Danube Delta
17. Fisheries
18. Ecotourism
19. Navigation
20. For legal actions more control from society is added and
21. Water user's association start to play a role in operation and maintenance of irrigation systems
22. Public participation
23. Policy implementation
24. Agricultural production
25. Water savings
26. Land use diversification
27. Policies lead to legislative actions
28. Determining necessary education and finally
29. The construction of the required infrastructure
30. Policies to increase the capacity of water related NGOs
31. Followed by treatment of water saving within agricultural subsidies

Table A1.2; Main strategies per category and divided in two levels

type\scale	National	international/EU
legislative / policy	1. Property taxes 2. Spatial planning 3. Pollution taxes and charges 4. Social policies 5. Legislation act on temperature of cooling waters to be released into natural waters 6. create more favourable conditions for investments 7. Rules for water storage` 8. Rules for distribution of water 9. Property taxes 10. New industry standards 11. National pollution law changes 12. Taxes for sewage amount 13. Establishment of coherent legal system 14. Changing demographic policy 15. For legal actions more control from society is added 16. Provide stronger regional policy 17. Actions for policy implementation with stricter control from the society 18. More legal and institutional building character 19. Stimulation of environment friendly technologies use economical and regulatory means 20. Implementation of improved water resources governance system 21. State support of "proper" business 22. Introduction of a strong dictatorship 23. Improvement of legislation 24. State support of environment-friendly businesses 25. Major driving forces: administrative (legislative and executive powers) 26. Management and Policy 27. Policy implementation 28. Policies lead to legislative actions 29. Policies to increase the capacity of water related NGOs	1. Establishing one EU institution 2. CAP reform stimulates less polluting technologies 3. Lower direct payment increases agro-environmental schemes 4. EU pollution guidelines 5. Trans-boundary agreements

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management	1. Monitoring system 2. Subsidies 3. Infrastructure; 4. Planning; 5. Infrastructure 6. Creating artificial lakes 7. Polluter pays principle 8. Infrastructure development 9. Optimization of water use 10. Decrease w demand 11. Increase w availability 12. Infrastructure planning 13. Installation of artificial basins for cooling waters 14. Technical measures 15. WFD implemented 16. Land use plans 17. New industry standards 18. Monitoring new technologies 19. Buffer zone regulations 20. Control of pollution from private houses 21. Increased connection to sewage treatment system 22. Innovative technologies 23. Environmental monitoring 24. Sufficient financial support 25. Improving management capacity 26. Whole environmental and water quality infrastructure is built for the Tisza-valley 27. Navigation 28. Actions focused more on improvement of infrastructure and technologies 29. Water user's association start to play a role in operation and maintenance of irrigation systems 30. More legal and institutional building character 31. Gradually improve water management system 32. Implementation of new technologies 33. Stimulation of environment friendly technologies use economical and regulatory means 34. Overcoming of economical and administrative obstacles 35. Implementation of improved water resources governance system 36. Implementation of new technologies 37. Upgrading and research for irrigation 38. Re-use of waste water 39. Better control 40. Management and Policy	1. Setting specific criteria for "good water status" 2. EU subsidies 3. Involvement of Russian side 4. EU support returns several times, this is more about administrative and professional support than financial.

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	41. Water consumption decrease 42. Public participation 43. Policy implementation 44. Water savings 45. Construction of the required infrastructure 46. Treatment of water saving within agricultural subsidies	
economic	1. Property taxes 2. Pollution taxes and charges 3. Financial instruments 4. First part follows EcF assumptions 5. Create more favourable conditions for investments 6. Stimulation of environment friendly technologies use economical and regulatory means 7. Overcoming of economical and administrative obstacles 8. State support of "proper" business 9. Economic development 10. Economic instrument implemented 11. Subsidies 12. Promoting markets 13. Supporting subsidies 14. Polluter pays principle 15. Polluter pays principle implementation 16. Property taxes 17. Fisheries 18. Ecotourism 19. Navigation 20. State support of environment-friendly businesses 21. Agricultural production 22. Treatment of water saving within agricultural subsidies	1. EU subsidies

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social	1. Social policies 2. Information on products and labels 3. Education measures 4. Campaigns for raising awareness 5. Education; 6. Promotion 7. Educated farmers 8. Education at schools 9. Consumer education 10. Awareness raising on tourism impact 11. New technologies at home 12. Change in ecological awareness 13. Appearing of charismatic leader 14. Changing demographic policy 15. People's approach is a key issue 16. Ecotourism 17. For legal actions more control from society is added 18. Water user's association start to play a role in operation and maintenance of irrigation systems 19. Actions for policy implementation with stricter control from the society 20. "Closed societies of rich" spend money on new technologies for themselves and to some extent for poor classes 21. Strong control of the labour class 22. Good (environmental) education for the reigning class 23. Environmental education 24. Increase awareness 25. Social equity 26. Agricultural sustainability and multi-functionality 27. Public participation 28. Determining necessary education 29. Policies to increase the capacity of water related NGOs	

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environmental	1. Pollution taxes and charges 2. Environmentally friendly technologies 3. Campaigns for raising awareness 4. Fish support (spawning ground) 5. Promoting (eco) fishing 6. Forbidding straightening rivers 7. Polluter pays principle 8. Polluter pays principle implementation 9. Awareness raising on tourism impact 10. National pollution law changes 11. Buffer zone regulations 12. Control of pollution from private houses 13. Taxes for sewage amount 14. Increased connection to sewage treatment system 15. Change in ecological awareness 16. Reduction of pollution 17. Environmental monitoring 18. Whole environmental and water quality infrastructure is built for the Tisza-valley 19. Water quality upstream 20. Water quality in Danube Delta 21. Stimulation of environment friendly technologies use economical and regulatory means 22. Good (environmental) education for the reigning class 23. State support of environment-friendly businesses 24. Environmental education 25. Re-use of waste water 26. Good status of water ecosystems	1. Setting specific criteria for "good water status" + 2. EU panel on water quality 3. CAP reform stimulates less polluting technologies 4. Lower direct payment increases agro-environmental schemes 5. EU pollution guidelines
research	1. Exchange of technologies 2. Development of alternative cooling technologies 3. Innovations in technologies 4. Research 5. New technologies 6. Research on nuclear waste 7. Creating set of indicators 8. Monitoring new technologies 9. Implementation of new technologies 10. "Closed societies of rich" spend money on new technologies for themselves and to some extent for poor classes 11. Upgrading and research for irrigation	

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cooperation	1. Cross-border projects; 2. Exchange of technologies 3. Cooperation	1. Cross-border private incentives 2. Cross-border projects; 3.
other	1. Competition & award 2. First part follows EcF assumptions 3. Aim was in some kind of contradiction with the Fortress Europe approach 4. Push from the private sector towards the government 5. Energy 6. Water consumption decrease 7. Water savings 8. Decrease w demand 9. Land use diversification	1. The same right for all countries

Appendix 2; Overview of main actors

Table A2.1; Main actors divided in categories and by level

	local/regional	National	international / EU
politicians	1. politicians	1. politicians 2. politicians[1] 3. policy makers 4. cabinet of ministers	
Government	1. Crimean Parliament (and information centre of), 2. Crimean council of ministries 3. local communities 4. local government 5. Crimean government	1. Cabinet of Ministries, 2. Min. of Agriculture, 3. Min of Water management, 4. Min of Environment, 5. legislative and executive powers, 6. government 7. policy makers 8. Estonian and Russian governments 9. parliament 10. Ministry of Agriculture 11. Ministry of Environment 12. state 13. Ministry of Agriculture	
authorities and institutes	1. Crimean SCWM 2. water boards 3. Crimean SCWM 4. design institutes 5. Regional Agricultural Authorities 6. water authorities 7. monitoring agencies 8. local administration 9. administration bodies of different levels 10. local authorities 11. local authorities 12. Crimean nature protection committee	1. research and design institutes 2. authorities 3. legislative and executive powers 4. law-enforcement authorities 5. competent authorities 6. legislative and executive powers 7. administration bodies of different levels 8. research institutes 9. monitoring agencies	1. ICPDR
businesses	1. construction companies 2. Investors 3. businesses 4. producers	1. construction companies 2. investors 3. businesses 4. producers 5. R&D 6. business 7. research/design/construction organisations	1. international companies 2. market
NGO's	1. NGO's 2. NGO's 3. NGO's	1. NGO's 2. NGO's 3. NGO's	1. different international organizations 2. international NGOs

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[1] Some actors are mentions two or more times, as several Pilot Areas might have mentioned the same actor. This thus gives an idea of how many times the same actor was mentioned.

'people'	1. population 2. social elite 3. water users, 4. owners, 5. consumers 6. owners, 7. farmers 8. farmers 9. investors	1. investors	
other	1. educational system	1. educational system 2. science 3. research institutes 4. universities 5. mass media 6. press	1. science 2. market 3. SCENES2 *(possible follow up project of SCENES, mvv)*

Appendix 3; Overview of robust actions

Table A3.1; Overview of robust actions, categorised into seven categories and divided by level.

type\scale	local/regional	national	EU	international (other than EU)
legislative / policy	- improvement of legislation - improvement and development of regional programs and regulations - improvement of water governance and management in organizations - implementation of Best Environmental Practices at the local level - stricter legal framework - support of rural development - incentives for tourism development compatible with the environment - implementation of the WFD	- improvement and development of legislation, government and regulations - improvement of water governance and management in organizations - development of government and public control on policy implementation - implementation of the WFD - improvement of legal frame and governance capacity - more efficient implementation of legal acts in practice - legislative measures - incentives for tourism development compatible with the environment - support of rural development - encourage of rain-fed agriculture - implementation and compliance of regulations - integration of sectoral policies - establishment and compliance with environmental flows	- keep / rework WFD - implementation of the WFD - need for guidelines, specific targets and relevant indicators - more transparent information on implementation process. - delete exemptions and derogations from achieving the good status - review criteria for heavily modified water bodies	
management	- implementation of the WFD - more efficient implementation of legal acts in practice - technical assistance to water users - territorial monitoring and control - development and modernization of infrastructures - modernization and rehabilitation of water infrastructure, implementation of new technologies - institutional development and capacity building - development and implementation of ecological monitoring - implementation of BEP at the local level - provision with WWTP sewerage and water supply network - monitoring - implement necessary monitoring programmes	- implementation of the WFD - more efficient implementation of legal acts in practice - dividing quotas, setting prices - sharing of water resources - efficient control of policy compliance - waste water treatment and reuse - establishment and compliance with environmental flows - institutional development and capacity building - implement necessary monitoring programmes	- support development of new technologies in prevention of pollution - support cost-effective measures to improve water quality - implement necessary monitoring programmes - institutional development and capacity building	- sharing of water resources

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economic	- development and implementation of new financial mechanisms - measures for improving marketing - development of local markets	- investment programs; - taxes - subsidies - financial support for cross boarder cooperation - provide funds for implementation of current policies - payments for environmental services	- establish investment programmes and grants for prevention of pollution - taxes and charges to motivate reduction of pollution - revise agricultural subsidy system - stimulate private financing for water quality improving measures	
social	- increase of awareness, through information and education campaigns - development of education - cooperation between sectors and stakeholders - provision of information for society and rising of awareness on all levels; - charismatic leader - Narew river Council - increase awareness - provide information - stakeholder panels - education - support of rural development - incentives for tourism development compatible with the environment - institutional development and capacity building	- provision of information for society and rising of awareness on all levels - improvement of environmental awareness - development of tourism sector - incentives for tourism development compatible with the environment - support of rural development - institutional development and capacity building	- awareness raising measures - promoting good water status as high priority - actively provide information to every citizen on water status - establishing and financing stakeholder panels - free of charge educational environment programmes for farmers, industry, etc - revise agricultural subsidy system	
environmental	- development and implementation of ecological monitoring - development and implementation of ecological monitoring - establishment and compliance with environmental flows - stimulate private financing for water quality improving measures	- improvement of legal frame for environmental education - establishment and compliance with environmental flows - encourage of rain-fed agriculture - development and implementation of ecological monitoring - establishment and compliance with environmental flows - incentives for tourism development compatible with the environment - technology development – to increase resource use efficiency and to decrease pollution load - taxes and charges to motivate reduction of pollution - stimulate private financing for water quality improving measures	- support development of new technologies in prevention of pollution - support cost-effective measures to improve water quality - establish investment programmes and grants for prevention of pollution - free of charge educational environment programmes for farmers, industry, etc	- decreasing of load from Russian part of the catchment

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research	- introduction of new technologies - development and implementation of ecological monitoring	- technology development – to increase resource use efficiency and to decrease pollution load - new technologies - new monitoring programs - waste water treatment and reuse	- technology development – to increase resource use efficiency and to decrease pollution load - need for guidelines, specific targets and relevant indicators - more transparent information on implementation process. - development and implementation of ecological monitoring - support development of new technologies in prevention of pollution	-
cooperation	-	- improved cooperation with Russia to deal with immediate problems	- financial support for cross-border cooperation on transboundary waters	- improved cooperation with Russia to deal with immediate problems - decreasing of load from Russian part of the catchment - cross-border water commission