BeWater

Making society an active participant in water adaptation to global change

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Executive summary

Shifting priorities within Europe indicate that climate change is to be increasingly considered in the River Basin Management Plans (RBMPs) developed as part of the implementation of the Water Framework Directive. The BeWater project responds to this challenge by testing innovative *bottom-up approaches* to integrating global change in river basin management. A key objective of the project is to move away from expert dominated adaptation planning towards a process that will support the co-design of River Basin Adaptation Plans (RBAPs) by stakeholders and experts in BeWater's four Mediterranean case study areas.

As a first step towards developing the RBAPs, this deliverable was foreseen to compile best practice examples and experiences with existing adaptation plans. While many initiatives have started to integrate climate change in water management at multiple scales, few attempts have been made to integrate climate change in *river basin management*. This deliverable thus represents, to the authors' knowledge, the first attempt to learn from initiatives integrating climate adaptation into water management planning processes at river basin or sub-catchment level.

Accordingly, the research underpinning this deliverable was mainly explorative, first guided by broad objectives, and subsequently refined as the main themes and issues emerged from the analysis. The research process was also designed to be participatory and encouraged consortium members to take an active part in the global RBAP screening process.

On the basis of established criteria, sixteen examples of RBAPs were identified from around the world. An in-depth analysis served to identify and illustrate key areas of interest for the preparation of the four foreseen BeWater RBAPs. More specifically, five main observations have been translated into recommendations for consortium agreement and action. These findings lay the foundation for a collective discussion within the consortium on the appropriate content of RBAPs, and suitable approaches and methods to be used in developing them.

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1. Introduction

Integrating climate change in water management is a priority in Europe, with key supporting pieces of legislation such as the Water Framework Directive (WFD, adopted in 2000), Floods Directive (adopted in 2007), EU Action on Water Scarcity and Droughts and EU Climate Change Adaptation Strategy (adopted in April 2013) (Quevauviller, 2014). In addition, the European Commission encourages Member States to integrate the issue of climate change in existing legislation and policies. Climate change is therefore expected to be increasingly considered in River Basin Management Plans (RBMPs) developed as part of the implementation of the WFD (European Commission, 2012, 2009).

The BeWater project, an EU FP7-funded project taking place from 2014 to 2017, responds to the above challenge by promoting dialogue and collaboration between science and society for sustainable water management and adaptation to the impacts of global change. As part of Work Package (WP) 4 of the BeWater project, River Basin Adaptation Plans (RBAPs) will be developed for each of the project's four Mediterranean case studies (Deliverable 4.2, Month 24). BeWater is primarily interested in testing innovative *bottom-up approaches* to integrating climate change in river basin management. A key objective of the project is therefore to move away from expert dominated adaptation planning towards a process that will support the co-design of adaptation responses by stakeholders and experts.

This deliverable is part of Task 4.1, whose objective is to "design draft adaptation plans". It is the first deliverable in WP4 and described in the Description of Work as:

> *D4.1) Compilation of best practice examples and experiences of adaptation plans: Best practice examples and experiences with adaptation plans will be gathered and main issues contained in adaptation plans outlined.*

As a first step towards developing the RBAPs, this deliverable is strongly linked with the protocol[1] (deliverable D2.3, Month 18) that will guide the development of the four BeWater RBAPs. The central objective in the "compilation of best practice examples and experiences" was therefore to identify and illustrate key areas of interest for the preparation of BeWater RBAPs. Furthermore, the present document aims to lay the foundation for a collective discussion within the consortium on the appropriate content of RBAPs, and suitable approaches and methods to be used in developing them.

Many initiatives across the world have started to integrate climate change in water management at multiple scales. However, few attempts have been made to integrate climate change in *river basin management,* as is suggested in BeWater. This deliverable represents, to the authors' knowledge, the first attempt to learn from initiatives integrating climate adaptation into water management planning processes at river basin or sub-catchment level. As such, the screening of existing RBAPs worldwide faced various challenges, not only regarding the limited number of such initiatives but also with the lack of clear definitions for commonly used terms.

The deliverable is structured as follows. Chapter 2 presents a more detailed outline of the methodology applied to the survey. Chapter 3 elucidates the results of the survey and is structured around the key research questions identified to evaluate the RBAPs. The implications of the results for the preparation of RBAPs in the context of BeWater are discussed in Chapter 4, followed by conclusions and key recommendations for the preparation of the protocol and RBAPs in Chapter 5.

[1] D2.3 will present the methodologies to guide the development of the four BeWater RBAPs, homogenising the considerations, information and activities included in the plans.

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2. Methodological approach

Surveying existing RBAPs from around the world is a challenging task, in part due to the relatively recent emergence of climate change adaptation as a policy issue. One has to define search terms in the absence of a common definition for "river basin adaptation plans" as well as many terms associated with adaptation (e.g. bottom-up, vulnerability, resilience). Given the localised nature of climate change adaptation, examples and experiences vary widely in terms of e.g. scope, depth and approaches taken.

The research underpinning this deliverable was mainly explorative, first guided by broad objectives, and subsequently refined as the main themes and issues emerged from the analysis. The research process was also designed to be participatory and encouraged consortium members to take an active part in the screening process. In the following two sub-sections, the methods used to identify and select RBAPs are presented in more detail, followed by the methods used to analyse them.

2.1 Identification and selection of river basin adaptation plans (RBAPs)

The search for RBAPs was first framed openly in order to collect a wide set of initiatives and experiences of possible relevance for the BeWater project. A set of six broad criteria was prepared (Box 1) that encompassed all types of planning documents aiming to integrate climate change adaptation in water and river basin management. A participatory approach was utilized, drawing on the technical knowledge and language skills of the consortium partners (i.e. English, French, Spanish, Catalan, Arabic, Slovenian, Dutch and German). The search was primarily conducted through Google, but relevant colleagues and networks were contacted individually for additional information. The screening resulted in a total of 66 documents meeting the listed criteria.

Box 1. Criteria used to guide the RBAP search process

- Adaptation plans can be published under a variety of different terms (e.g. Adaptation Plan, Adaptation Action Plan, Adaptation Discussion Paper, Climate Adaptation Strategy or Climate Adaptation in the xx River Basin) - other titles may also exist.
- Adaptation plans can be an individual document or just a section integrated in a river basin management plan
- Plans can be focused on several relevant sectors (such as agriculture, fisheries, water management) or just focus on one relevant sector
- Depending on the frame of the development process, the documents can be published by different organisations (e.g. public authorities, NGOs) or emerge as result of a research project
- If possible, the documents should have a direct focus on river (sub)basins or river basin districts
- The plans can be from anywhere in the world and can be written in any language

The 66 identified documents were very diverse in nature, reflecting the broadly formulated search criteria. Two refinements were subsequently made by the research team to select the most relevant documents for analysis. A first refinement aimed to obtain a list of documents which could be potentially useful to the BeWater project in order to build capacity within the consortium. These documents were to include not only river basin plans, but also regional and national plans, guidance documents, academic publications, and methodological information. Based on this first refinement, 38 documents were selected from the 66 initially collected.

The second refinement process focused on selecting only those documents representing RBAPs, thereby forming the basis for the review of examples and experiences. In this view, the research team drew on their overview of collected documents to define RBAPs as being a document that:

"*1) aims to foster adaptation for climate change in water management, 2) is prepared at hydrological scale (e.g. estuary, catchment, river basin), and 3) ultimately aims at implementing concrete measures*."

The second refinement process took into account the need to have a comprehensive sample that encompassed the range of variables deemed as being central to the aims of the project. In other words, given the small sample of documents collected, the goal was to achieve a high level of diversity amongst the selected RBAPs so that the final sample could be as representative as possible of the diversity of existing plans (i.e. in terms of geographical scope and methodological approach). The second refinement process created a sample of 16 RBAPs, which formed the basis of the present deliverable and which represented a diverse set of case studies from around the world (see Map 1and Table 2 in the Results Chapter for key characteristics).

This deliverable focuses on existing on-the-ground planning processes for river basin adaptation. It has therefore discarded guidance documents, methodological papers and purely academic exercises that lack implementation considerations. These documents will nevertheless be considered when developing the protocol and methodological approach for developing river basin adaptation plans as part of D2.3.

Documents selected after the first and second refinement processes were analysed by the consortium, as described below.

2.2 Analysis of RBAPs

The analysis of selected documents was performed in a two-step process. Initially, an analysis was conducted with regards to the 38 documents obtained after the first refinement process. This step served to increase the consortium's familiarity with the selected documents and their contents. A participatory process was utilized to this end, with members of the consortium helping to fill out 38 factsheets (see Annex A). Dimensions included in the factsheets were developed on the basis of consulted climate change adaptation management and planning literature (e.g. Brown et al., 2011; ETC/ACC, 2010; UNDP, 2004; UNECE, 2009; Webb and Beh, 2013). The questions were framed broadly, so as to cover the identified themes and keywords and allow for open answers regarding the content of documents reviewed. After the research team developed an initial list of dimensions, consortium partners were invited to provide comments, changes and suggestions. The 38 documents were then divided amongst the deliverable team and the factsheets were completed accordingly.

The second step was to perform a more specific analysis of RBAPs to serve as the basis of the present deliverable. The 16 RBAPs selected through the second refinement process were analysed in more detail by the research team. The analysis was based largely on the completed factsheets, whose answers were checked for quality control against the original RBAP documents. A set of research questions (Table 1) was then developed to allow for a systemic comparative analysis, serving to inform future discussions for the development of the protocol (Deliverable 2.2). Research questions were informed by 1) typical content in *river basin management plans* as known by the research team, 2) key themes, issues and assessments arising from literature on management planning for *climate change adaptation*, and 3) results from the first analysis. Key themes were identified, including: scope of the plans (objectives, challenges, sectors targeted), participatory dimensions, characterisation of climate-related challenges, selection of measures, implementation, and managing uncertainties (Table 1).

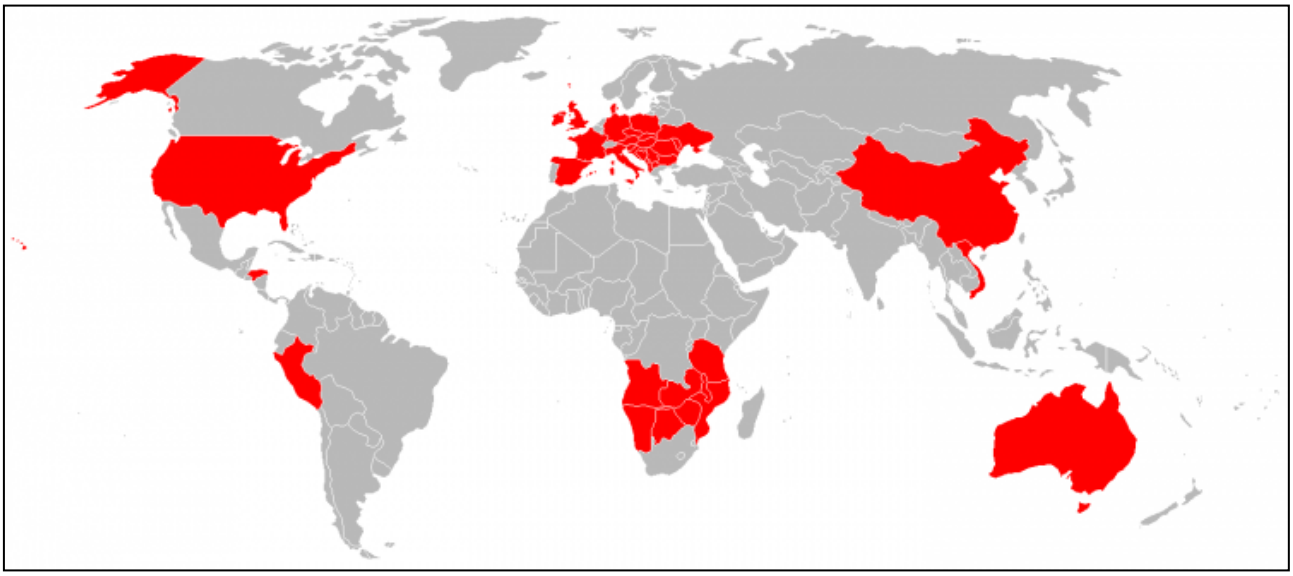
To answer the key questions, the research team performed additional content analyses on each of the 16 RBAPs. The Results Chapter presents the findings from this second analysis.

Table 1. Guiding research questions

What is the purpose of the RBAP?	What are the stated objectives of the plan?
	To what extent is the RBAP integrated into formal water planning processes?
	What assessments are included in the RBAP?
How collaborative and open was the development of the RBAP?	Are the RBAP authors representing different groups of actors?
	Did the RBAP involve the public in the development process? If yes, when and how?
How does the RBAP characterise climate-related challenges?	What impacts does the plan consider?
	What are the challenges considered in the plan?
	What are the water uses/sectors that the RBAP considers?
	What data were used and how were the assessments performed?
How does the RBAP select measures?	Which measures are included in the RBAP?
	Which information is used for the description and characterisation of the included measures?
	Which methodologies were used to prioritise measures?
	Are synergies/conflicts between measures considered?
How has the implementation been programmed?	Does the RBAP include a distribution of roles and responsibilities?
	Does the RBAP include estimates on costs and funding sources?
	Does the RBAP include a monitoring and evaluation program?
	Which uncertainties are considered? When and how?
	What strategies are used to manage uncertainties?

3. Results

The 16 RBAPs selected for in-depth review cover different geographical regions across the world (Map 1), including Europe, the Americas, Asia, Africa and Australia. The majority of plans were European in focus (7), while a total of five addressed North, South and Central America. Overall, the sample suggests that RBAPs are becoming more common. While four plans were published before 2010, 12 have been published since.



Map 1. Geographical spread of reviewed RBAPs
Source: map generated at http://traveltip.org/

Key characteristics of the analysed RBAP basins are presented in Table 2 below. Hydrological bodies predominantly addressed complete catchments and river basins, while one plan covered an estuary (Gironde). The basin sizes varied, ranging from 515 km^2 to 1,370,000 km^2. In addition to dramatic differences regarding the catchment sizes addressed, the RBAPs themselves also varied greatly in terms of the content included and level of detail provided, and thus ultimately the number of pages produced. Documents ranged from 25 (Ashuelot) to 313 pages (Yellow River). A total of 21 countries were covered by the analysed RBAPs, with five of the plans addressing more than one country.

Table 2. Characteristics of the analysed RBAP basins

	Name	Country	Catchment size (km^2)
1	Aguan	Honduras	11,005
2	Anglian	England, UK	27,890
3	Ashuelot	USA	1,100
4	Clearwater	USA	24,216
5	Danube	Germany, Albania, Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Italy, Macedonia, Moldova, Montenegro, Poland, Romania, Serbia, Slovak Republic, Slovenia, Switzerland, Ukraine	801,463
6	Elbe	Germany, Czech Republic	148,268
7	Gersprenz	Germany	515
8	Gironde	France, Spain	3,683
9	Goulburn Broken	Australia	24,000
10	Irish Western	Ireland	12,193
11	Rímac	Peru	3,400
12	Vam Co	Vietnam	686
13	Taunton	USA	1,456
14	Wiedau	Germany, Denmark	1,342

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15	Yellow river	China	795,000
16	Zambezi	Angola, Botswana, Namibia, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe	1,370,000

The following sub-sections are based on the main research questions (Table 1), starting with an analysis of the objectives listed within the analysed RBAPs.

3.1 What are the objectives of the RBAPs?

The 16 RBAPs often had the primary objective of fostering awareness and motivating action in the river basin. Stated objectives also included: supporting sustainable water use in the long-term, exploring and assessing adaptation options, building adaptive capacity and resilience to climate change, strengthening capacities and networking and improving governance for climate change adaptation.

The level of ambition of the plans also varied. Five RBAPs focused on providing a holistic assessment of climate change impacts and vulnerabilities in the river basin and on identifying the range of potential adaptation options that exist. Eleven RBAPs identified further priorities and selected measures, but only five of those actually developed a detailed implementation plan.

The sample of RBAPs could be classified into four types of documents that reflect the degree to which they were integrated into other planning processes (Figure 1). Half of the RBAPs (8 out of 16) were stand-alone initiatives focusing on climate change adaptation, including the Taunton RBAP (Box 2). More explicitly, these plans were loosely linked with water management planning processes, occurred outside statutory process and were predominantly of a voluntary nature.

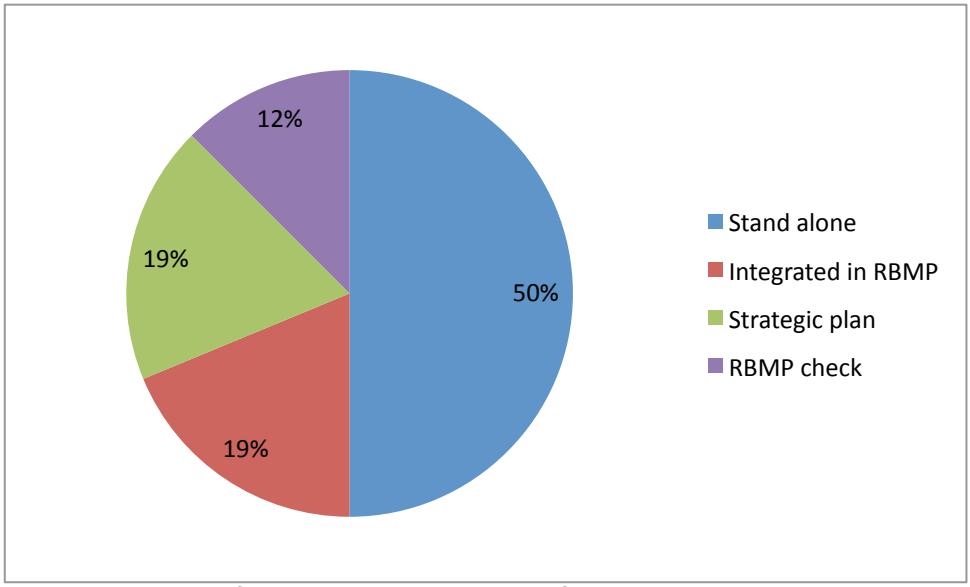


Figure 1. Type of document and level of integration in statutory water management planning processes

In contrast, three RBAPs which were also developed on a voluntary basis had a primary focus on river basin management, and climate change was integrated as one theme amongst others. For example, the Zambezi RBAP is a river basin management plan for eight riparian countries in which climate change adaptation was identified as a key priority and linked with specific measures. Three additional RBAPs were more strategic in scope, aiming to integrate climate change in key planning processes across the river basin. The ICPDR RBAP, for example, was a guiding document about

how to integrate climate change adaptation into the Danube river basin planning process at multiple levels of governance. Finally, two RBAPs were mostly "add-ons" to statutory-led river basin planning processes, but they differed in scope. While the Anglian RBAP was mainly a check on how climate change may impact the achievement of WFD objectives, the Irish RBAP went a step beyond and identified adaptation measures to be integrated in the WFD RBMP.

Box 2. Standalone climate-change adaptation plan: Taunton RBAP

Example 1. Taunton RBAP

In the United States, federal coordination for climate change adaptation is largely lacking and the proposed national adaptation strategy is currently only in draft form. However, expected climate change-related impacts have inspired regional and local action outside the scope of statutory processes to plan and cooperate in addressing such threats. One example of such 'stand-alone' action is the development of the Taunton River Watershed Climate Change Adaptation Plan (Massachusetts, USA) by the Manomet Center for Conservation Sciences. While this plan was not established to fulfil climate or water management legislative requirements, it nevertheless explicitly strove to build on the management goals of existing watershed planning documents and utilise available knowledge from previous regional

A first analysis of the contents of the RBAPs was performed by observing which assessments and information were included in the documents (Figure 2). The vast majority of RBAPs (13 out of 16) clearly included a characterisation of the current river basin status together with an "impact assessment" of climate change regarding the environmental parameters of the river basin (e.g. physical, chemical, biological, ecological). Three RBAPs did not include the basin characterisation, but examined climate change impacts. The majority (10 out of 16) also examined the socio-economic impacts of climate risks, through what this document will refer to as a 'vulnerability assessment'. Only one RBAP (i.e. Gouldburn-Broken) embedded its whole assessment in a "resilience" approach (the differences between the two approaches are presented in Section 3.3). None of the reviewed RBAPs combined both vulnerability and resilience assessments. Furthermore, no objective indications were provided as to the reasons why one approach was preferred over another.

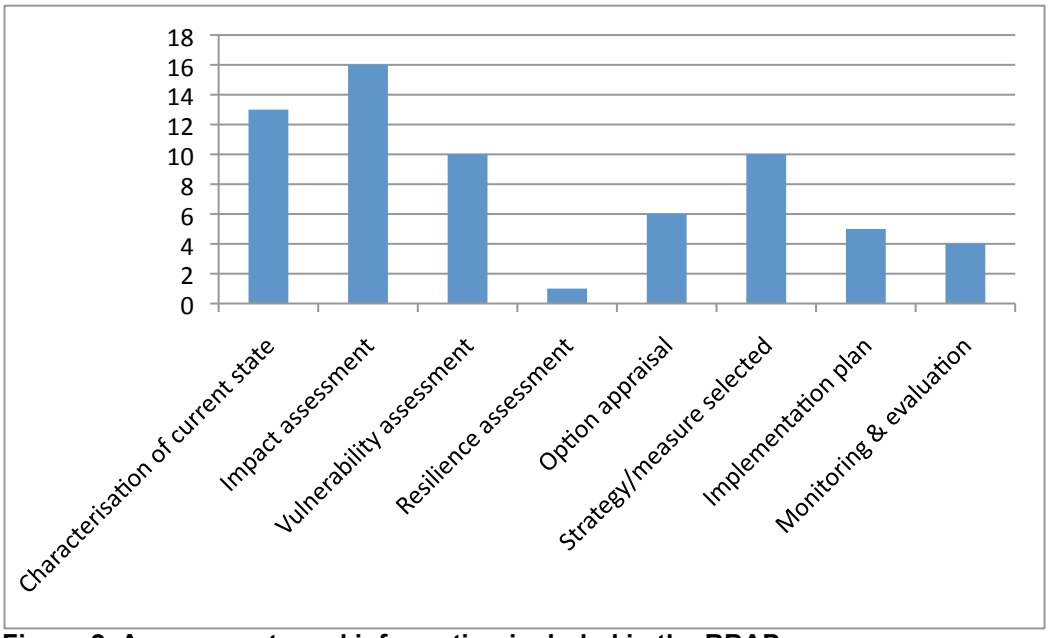


Figure 2. Assessments and information included in the RBAPs

The majority of RBAPs (10 out of 16) identified strategic objectives and prioritised adaptation measures for their river basin; six RBAPs limited their assessment to an option appraisal, i.e.

identifying a list of relevant adaptation measures. Fewer cases included an implementation plan (10 out of 16) or a monitoring and evaluation strategy (10 out of 16).

3.2 How collaborative and open was the development of the RBAP?

This sub-section presents an analysis of the form of collaboration underpinning the development of the RBAPs, in particular, the degree of leadership and partnership in writing the RBAP and the degree of broader stakeholder involvement is explored. The degree of stakeholder participation in RBAPs proved challenging to assess as it was seldom documented. Information on this component is often presented in a short summary, if at all. It was therefore difficult to judge in many RBAPs why, if, when and how stakeholder participation occurred. Furthermore, it could often not be assessed if stakeholder participation only occurred in a final stage (e.g. stakeholder input shaped the content of the final plans), or if participation was more *pro forma*. With these limitations in mind, the following observations were made.

Figure 3 presents the type of authorship behind the reviewed documents. The majority of RBAPs (9 out of 16) were written by public authorities. Public authorities ranged from river basin and environmental protection authorities to local and national governments and international bodies (e.g. UNESCO). Academic or consulting research groups authored five RBAPs. However, in coherence with our selection criteria, when academics and consulting groups authored the documents, they worked for a specific public authority (3 out of 5) or community organisation (2 out of 5). Furthermore, these plans were also expected to guide future water and adaptation action in a catchment or river basin. Our sample included only two RBAPs written by local communities, namely the Clearwater and Ashuelot RBAPs.

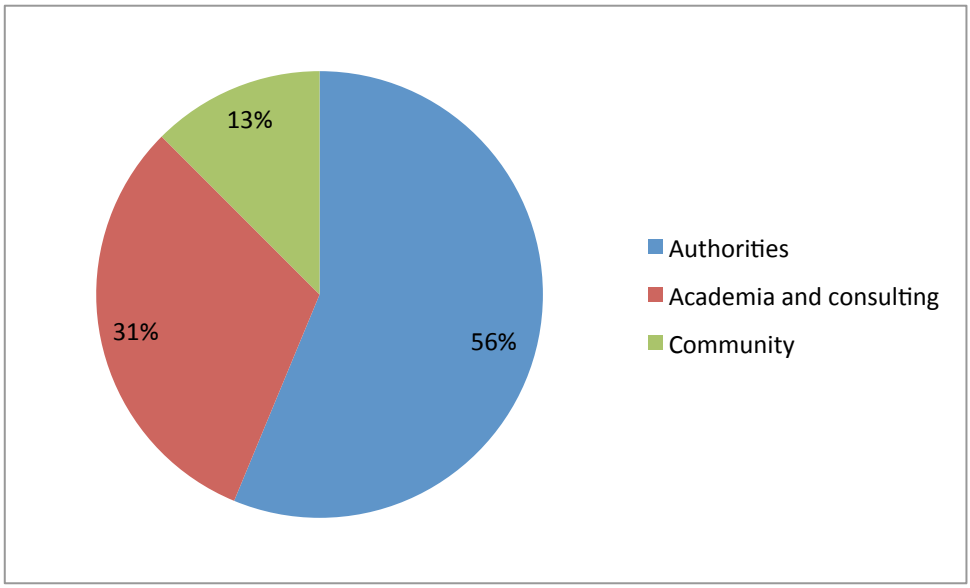


Figure 3. Authorship of reviewed RBAPs

A number of RBAP were explicit regarding the function of stakeholder involvement in their development. The most stated benefit was the improvement of the quantity and quality of (local) information feeding into the planning process. For example, the Zambezi RBAP appears to have used stakeholder consultations as a 'one-way street'. Workshops served to access stakeholder knowledge and improve the information base for the planning process, but stakeholders were not involved in the problem definition or in the prioritization of measures. More significant involvement of stakeholders in the planning process often related to the desire to gain acceptability and

encourage ownership by the stakeholders, both in locally planned/funded initiatives (e.g. Gersprenz and Clearwater - Box 3), as well as in internationally funded river basins (e.g. Vam Co and Aguan). For example, the Vam Co RBAP justified the need to involve local stakeholders in terms of local ownership of the project outcomes, increased local relevance, and ensuring sustainability beyond the project's end.

Box 3. Bottom-up development process – Clearwater RBAP

Example 1. Community-led RBAP development – Clearwater RBAP

The Clearwater RBAP was developed as an outcome of a yearlong participatory, community-led process. With funding from an educational grant, the Nez Perce Tribe – in collaboration with the Climate Solutions University: Forest and Water Strategies Program –organized a core technical team to develop the RBAP. The basin represents the largest population centre for the Tribe and its protection is one of their fundamental missions. Considering this intimate connection with the natural resources in the area and historical relationship with the land, it followed that the group selected to develop the plan was composed of local stakeholders sharing these values. To complement the process, monthly webinars were held to increase the larger public's awareness of projected climate change impacts on the region more generally and the different elements of writing an adaptation plan, specifically. Implementation of the adaptation plan will be led by the Nez Perce Tribe in collaboration with a number of partnering agencies and organizations in the subbasin.

Seven RBAPs described the involvement of stakeholders with regards to the impact, vulnerability and/or resilience assessments. Three of these RBAPs primarily based their assessments on stakeholder input. The Gerspenz RBAP, for example, used participatory vulnerability analysis, while the Vam Co RBAP used risk models for stakeholders to define local problems due to climate change. Finally, the local native tribe in the Clearwater RBAP identified the risks and opportunities associated with climate change. The other four RBAPs involved stakeholders to inform the assessments. The Taunton RBAP, for example, used an expert workshop as the starting point for the basin planning process. Here, ecosystem services were prioritised and the threats posed by climate change were discussed. The Aguan and Gouldburn-Broken RBAPs had a methodology where stakeholders were involved in complementing/enhancing the quality of the problem diagnosis and assessment of climate change impacts.

In many cases, RBAPs provided vague information on how stakeholders were involved in the identification of measures. Explanations such as stakeholders having "commented" on the documents describing the measures were used. In some RBAPs (e.g. Wiedau), stakeholders mainly provided input on measures that had been previously identified, although they were also invited to identify additional potential measures. This type of input was mainly to assess the viability and acceptability of the measures given the local conditions. However, stakeholders played a more involved role in at least three of the RBAPs (i.e. Aguan, Vam Co and Gersprenz), in which they defined the measures through numerous local workshops.

Although technically feasible, it is interesting to see that none of the evaluated RBAPs asked the stakeholders to directly evaluate individual adaptation measures. Instead, numerous RBAPs state that stakeholders were invited to provide comments on the final document at a much later stage in the development process. It is unclear, however, if stakeholder input occurring at an earlier stage would have affected the selected adaptation measures. Several plans (e.g. Wiedau) specifically used workshops in order to get feedback from stakeholders/experts on the evaluation performed. More participation-oriented RBAPs used stakeholders to evaluate the elements close to individual measures, and then matched the possibilities with stakeholder input. For instance, in the Aguan RBAP, stakeholders defined and prioritised RBAP objectives and the study authors defined the

adaptation measures on the basis of their performance against these stakeholder-defined objectives. In the Vam Co RBAP, stakeholders were asked to evaluate different 'strategies', consisting of bundles of adaptation measures.

3.3 How does the RBAP assess climate-related challenges?

This sub-section presents an analysis of the approaches taken to characterise climate-related threats to the river basins. In particular, it discusses the main challenges identified in the RBAPs, including which climate change impacts were taken into account. In addition, it discusses the approaches and methods used to identify challenges.

Figure 4 presents the key challenges identified in the RBAPs. While the majority of the RBAPs contained a large section on information about the impacts of climate change on water resources, the specific types of climate change information processed within the analysed RBAPs varied immensely. The majority of plans contained projections for the key meteorological and hydrological parameters, such as future air temperature, average annual precipitation, precipitation patterns, potential evapotranspiration, sea level rise and extreme weather events like flooding. In most cases, these impacts were based on projected climate change estimates stemming from the IPCC scenarios. Among those, the scenario families A1B and A2 were the most frequently used. In contrast, regional scenarios such as those provided by national platforms only played a minor role. The UK Climate Projections (2012) used in the Anglian river basin district is a good example of how regional scenarios can deliver useful information for river basin managers to prepare decisions for a changing climate.

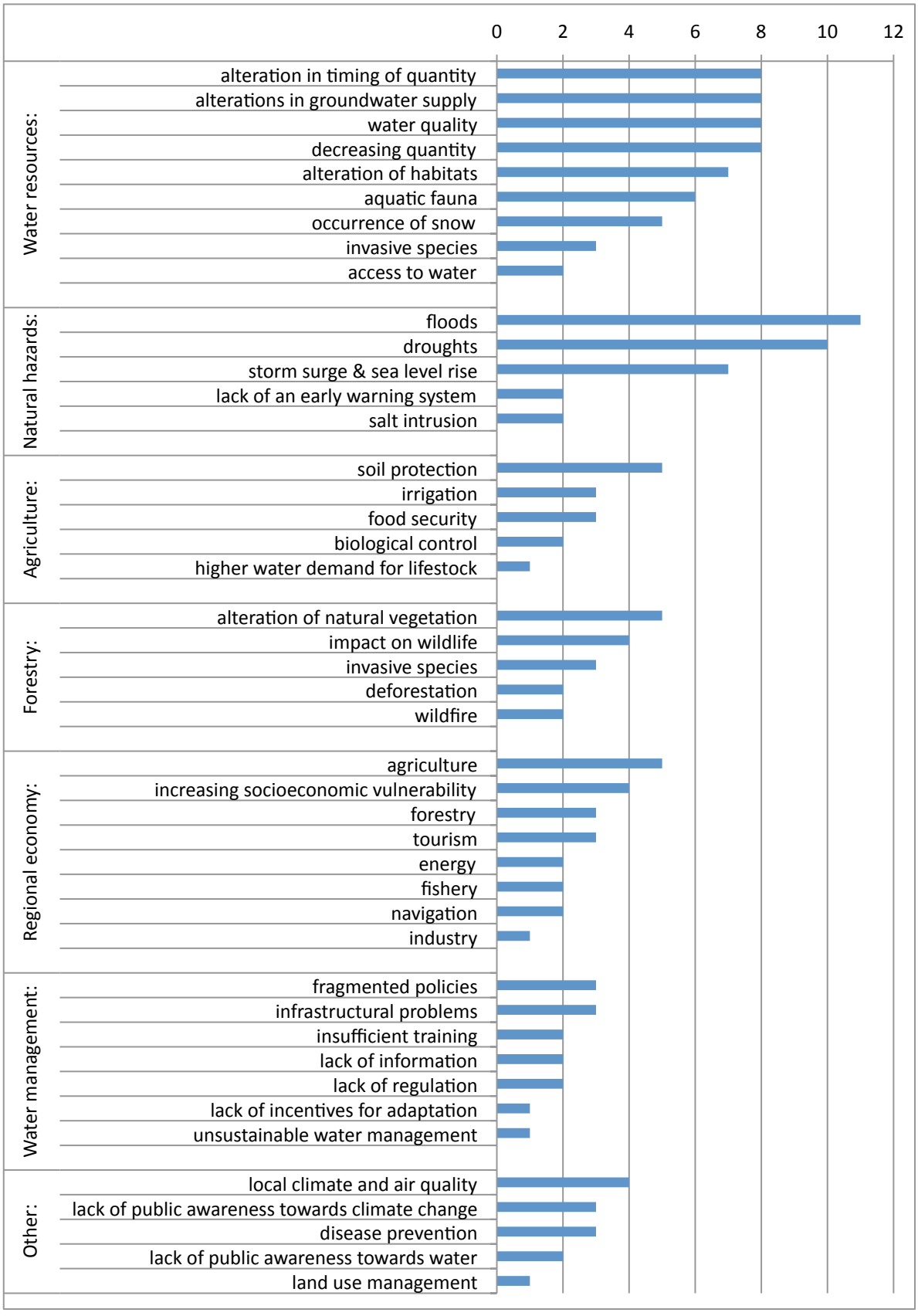


Figure 4. Challenges considered in RBAPs (based on number of times mentioned at least once in each RBAP)

Water quantity issues were expressed as a major source of concern in the RBAPs, with not only an overall decrease in the availability of water but also changes in the timing or quantity, in part due to changes in the occurrence of snow (which may reduce water availability in the summer). The management of floods and droughts in particular was the most prominent area with regards to the challenges that the river basins have to tackle. The impact of climate change on water quality was also a primary focus, encompassing issues such as changes in leaching, sediment and pollutant run-off, backlog of sewers (with extreme rainfall) and increased water temperature. Impacts on aquatic habitats and biodiversity were frequently examined, together with considerations of species migration and invasive species.

Further identified challenges concerned agriculture and forests. Agriculture included the need to maintain food security, secure water demand for irrigation and livestock care as well as the protection of soil. The latter incorporated threats like water and wind erosion, nutrient leaching, or destruction of soil structure. Forest-related challenges referred to alterations in natural species compositions (due to changing climate conditions), the spread of invasive species and increased wildfire frequency.

Depending on local circumstances, changes for several other sectors with regards to climate change were also occasionally examined in the RBAPs (e.g. tourism, energy, industry, and fisheries). Challenges for the socio-economic system, such as unemployment and increasing inequalities, were also mentioned. Additional challenges relating to the governance and practice of water management were also identified, including e.g. fragmented policies, lack of information and training, inadequate regulatory regime and lacking incentives for adaptation. These were more general challenges for water management that will not be exacerbated by climate change, but climate change is nevertheless foreseen to make their resolution more urgent.

Further attention was given to the themes that the RBAPs emphasised (Figure 5). These themes often comprised issues regarding economic sectors (e.g. agriculture, forestry), management areas (e.g. water management, nature conservation & biodiversity), or areas of public interest (e.g. health, community outreach). Within the RBAPs, these themes can be identified as clusters for which measures were developed, or for which impacts have been analysed. Themes were often used to structure the ideas that the plans presented. Logically, themes were derived from the identified challenges as areas in which action for climate change adaptation is deemed necessary. Therefore, they are similar to the challenges identified, but are more general in nature. For purposes of this analysis, the RBAPs have been analysed for such themes in the structuring of the report and the clustering of challenges or measures.

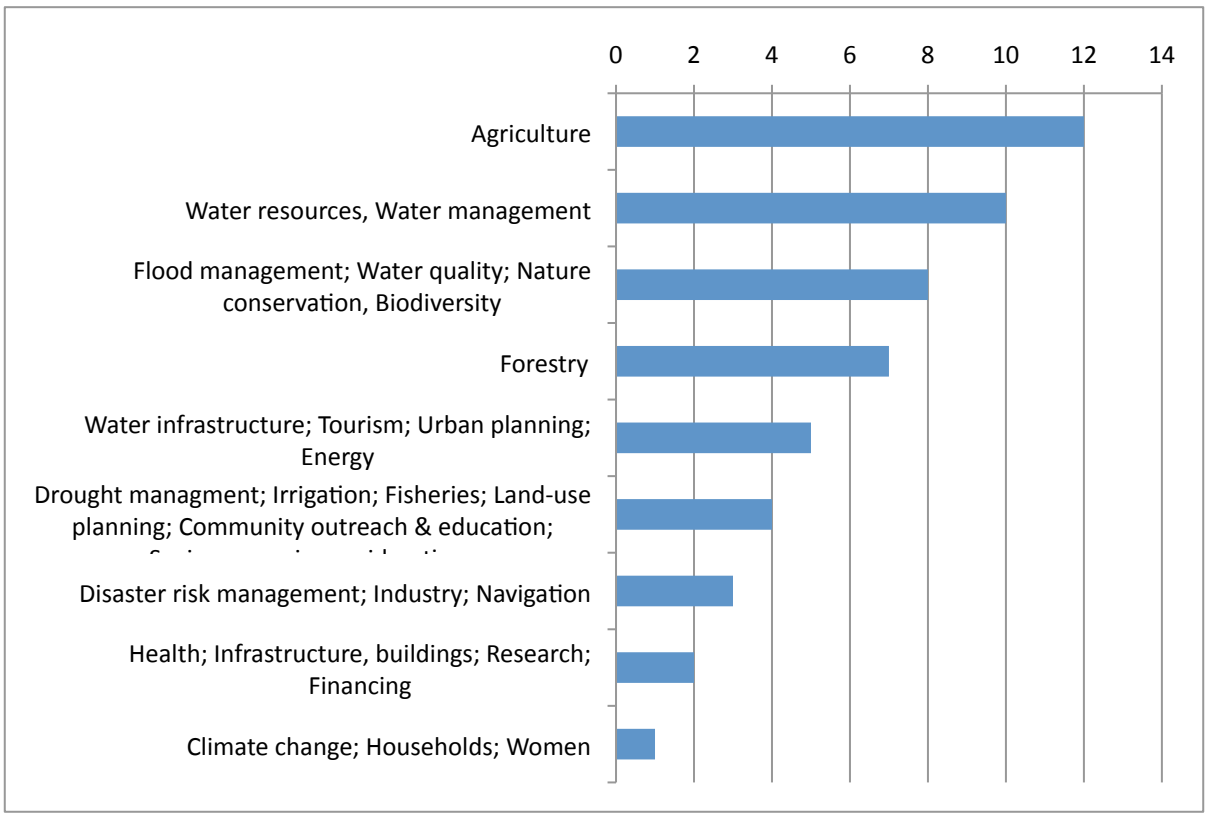


Figure 5. Themes emphasized in the RBAPs

The approach taken in the RBAPs on how to define the challenges varied widely. Some RBAPs used a strictly logical approach where the results from the analysis of climate change impacts on the natural system were directly transformed into key challenges (e.g. alterations in timing of quantity). Alternatively, these outcomes were used to develop sector-specific challenges (e.g. decreases in agricultural produce through higher inter-annual variability of precipitation). The Zambezi RBAP, for example, used a very strategic approach. Under the overall objective of the RBAP, four key challenges were distinguished, which lead to the delineation of a strategic objective, detailed issues, strategies per issue and main actions to implement the strategies. In other cases, the challenges were mentioned, but were not necessarily translated into actions, or were discarded.

The use of both qualitative and quantitative assessments to underpin the identification of challenges was split equally in the sample. The Clearwater and Ashuelot RBAPs are examples of semi-quantitative assessments, where descriptive effects of climate change on the regional economy were underpinned by quantitative estimations and predictions. The Yellow River RBAP provides detailed quantitative, model-based figures. However, most assessments seemed to have been based on a combination of existing data and expert-based judgements, sometimes supported by additional modelling assessments. Assessments involving the contribution of relevant private, public and societal organisations appeared less frequently (see also sub-section 3.2). The Vam Co RBAP illustrates an in-depth interaction between innovative participation methods, modelling and expert involvement (see Figure 6).

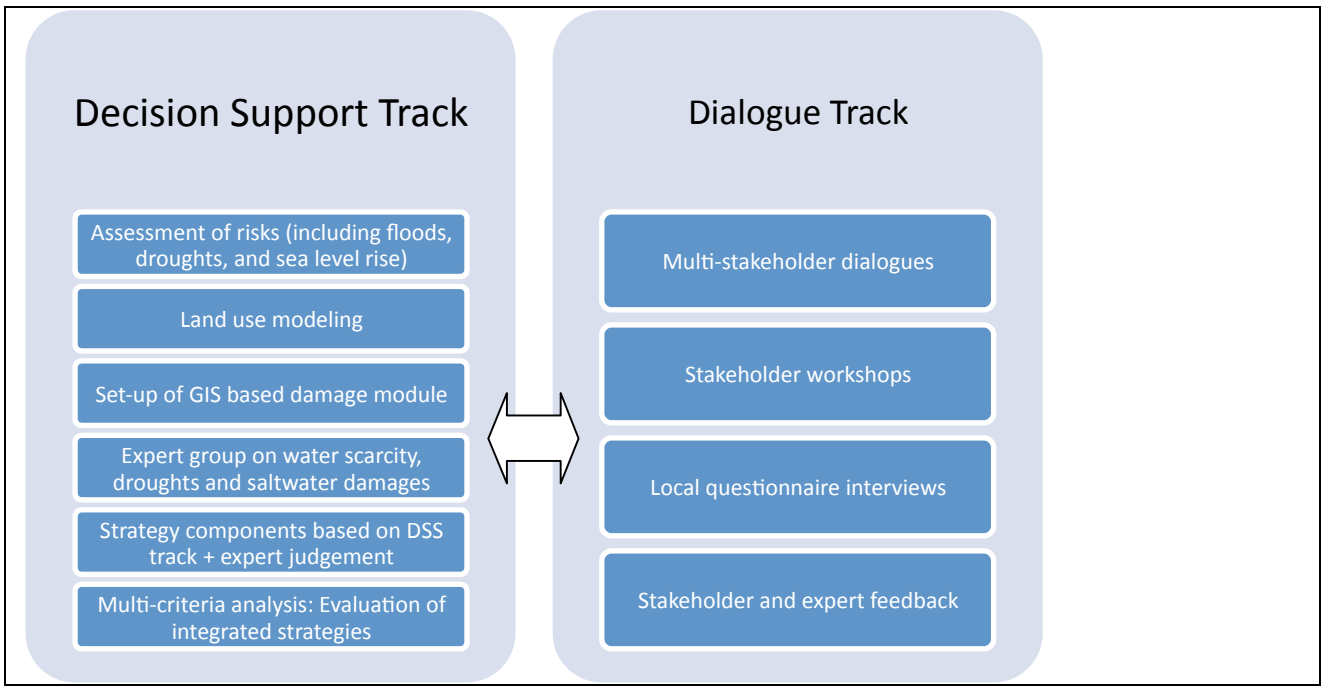


Figure 6. Simplified outline of key components of the assessments underpinning the identification of challenges in the Lower Vam Co RBAP

The vast majority of RBAPs applied a "vulnerability" approach (see Section 3.1) to identify relevant challenges. The vulnerability approach typically involves translating climate change impacts on natural system into impacts on the social system via an assessment of potential costs (e.g. mortality rates) and benefits (e.g. increased tourism frequency). The main focus is to determine how sensitive socio-economic sectors are to climate change impacts, assuming a linear relationship between pressure and impact.

A different approach was taken only in the Goulburn-Broken RBAP, which structured its assessments around the concept of "resilience". The process involved identifying eight social-ecological sub-systems in the catchment, i.e. areas defined by local stakeholders as being coherent environmental and cultural units (Figure 7). Social-ecological dynamics and potential thresholds over which specific services (e.g. food production) could not be provided were then identified (mainly based on a mix of expert and community knowledge). Finally, priorities and responses were aligned against these areas, and dynamics and thresholds were identified with the overall aim of enhancing "ecosystem resilience" and the capacity of the "social system" to adapt to changes.

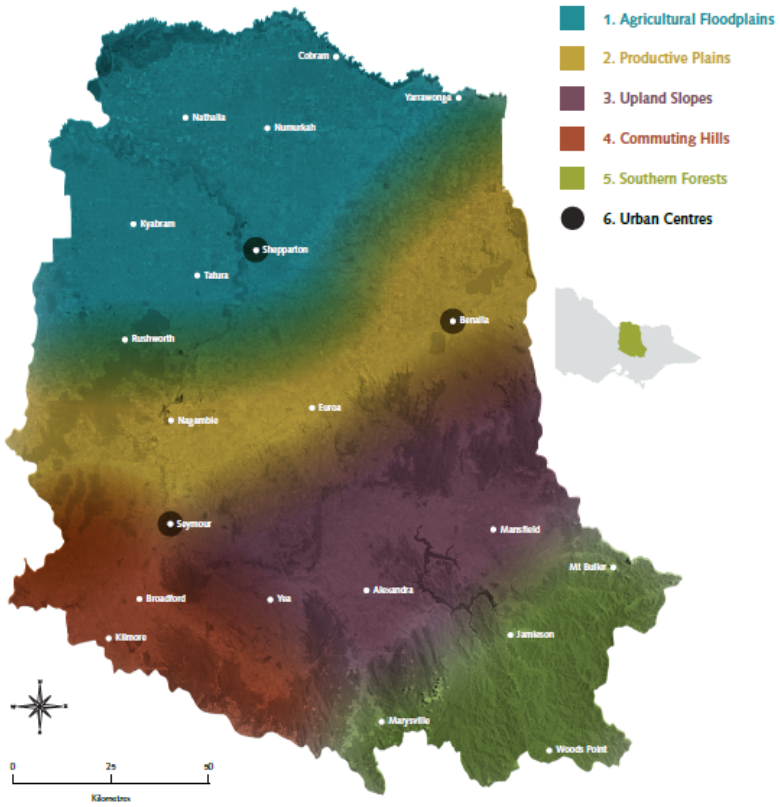


Figure 7. Social-ecological systems identified in the Gouldburn-Broken catchment

3.4 How does the RBAP select measures?

A number of dimensions regarding measures were examined when reviewing RBAPs, including the type of measures included, type of information provided, prioritisation approach and whether synergies between measures were considered. Twelve of the16 RBAPs included detailed technical and/or institutional measures, while four RBAPs remained at a more general level and provided little detail.

An assessment was made as to whether the RBAPs included grey (i.e. technological/engineering), green (i.e. ecosystem-based) or soft (i.e. managerial, preparation and policy) measures. This typology is based on that of the EEA (2013) for water management measures. More specifically, the EEA classification defines these categories of measures as follows:

- *Grey measures* as those related to the technological and engineering solutions and can include improvements to the delivery of water supply and waste water treatment or dike reinforcement for flooding and sea level rise
- *Green measures* include ecosystem-based approaches such as the installation of green infrastructure in cities for flood mitigation or river restoration to create buffer zones
- *Soft options* include managerial, legal and policy approaches such as awareness raising measures, monitoring systems or information campaigns on drought adaptation.

Almost all of the analysed RBAPs included a mix of these three types of measures. Only one plan did not include grey measures and two RBAPs did not contain green measures. Some RBAPs also showed how a combination or a cluster of measures can be created, e.g. for a sub-theme such as flooding. The implementation of technical (grey) measures was mainly accompanied by awareness-raising and informational campaigns, but also by data monitoring and concrete planning activities, e.g. increasing a dike. Flood protection is a good example for illustrating a combination of green and grey measures, such as the restoration of riparian area in rural parts of a river and an increase in dikes in the centre of urban areas. Further examples of each of these types of measures are provided in the Danube RBAP, and are outlined below (Table 3).

Table 3. Examples of adaptation measures from the Danube RBAP, sorted by type

Type of measure	**Examples of measures**
Green (ecosystem-based)	Taking environmental implications and the conservation of biodiversity into consideration in all other measures
	Sustainable management of land use practices for improving resilience, and for enhancing the capacity to adapt to climate change impacts
	Implementation of green infrastructure to connect bio-geographic regions and habitats
	Protection, restoration and expansion of water conservation and retention areas
	Rehabilitation of polluted water bodies
Grey (technological)	Adjustment of (existing) infrastructure, e.g. construction and modification of dams and reservoirs for hydropower generation, agriculture, drinking water supply, tourism, fish-farming, irrigation and navigation
	Development and application of water-efficient technologies
	Efficient waste- and sewage-water treatment and water recycling
Soft (preparation, behavioural and managerial, policy) measures	Additional, intensified monitoring activities to follow and assess climate change and climate change impacts
	Homogenous data production, digital mapping and a centralized database for data exchange and comparability among regions/countries
	Identification of potential risk areas and hot spots
	Implementation of forecasting and warning services (e.g. for extreme events such as floods and droughts)
	Development of action plans or integration of specific issues into ongoing planning activities (e.g. to deal with water scarcity and flood situations)
	Research to determine vulnerability or reduce uncertainty
	Support education, capacity building, awareness raising, information exchange and knowledge transfer
	Establishment of and support for an integrated risk management
	Support of a water saving behaviour
	Application of sustainable methods (e.g. good agricultural practices)

	Support of an institutional framework to coordinate activities
	Implementation of restrictions (e.g. to develop in flood risk areas)
	Expansion of protection areas (e.g. for drinking water resources)
	Adaptation of policies to changing conditions

Source: ICPDR River Basin Management Expert Group et al. (2013)

RBAPs were equally split between those providing very little information about individual measures (8 out of 16) and those which included further, more detailed information. Four RBAPs included, for example, responsibilities for different parties and the timeframe for every individual measure. Additional information was included on investment costs, even split by year in one RBAP. Two RBAPs mentioned the first actions required for implementing the measures and two RBAPs described the impacts the measures would have if carried out. Some RBAPs included data on synergies and the potential to deal with predicted climate changes for each listed measure. More specifically, this potential referred to the following criteria (Environment Agency, 2009):

- *Win-win:* Cost-effective adaptation actions that have the desired result in terms of minimising the climate risks or exploiting potential opportunities but also have other social, environmental or economic benefits. Within the climate change context, win-win options are often associated with those actions or activities that address climate impacts but which also contribute to climate change mitigation or meet other social and environmental objectives.

- *No regret:* cost-effective adaptation actions that are worthwhile (i.e. they bring net socio-economic benefits) whatever the extent of future climate change. These types of actions include those justified (cost-effective) under current climate conditions (including those addressing its variability and extremes) and are further justified when their introduction is consistent with addressing risks associated with projected climate changes.

- *Low-regret:* adaptive actions where the associated costs are relatively low and where the benefits, although mainly met under projected future climate change, may be relatively large.

- *Flexible adaptation:* these are actions which are designed to include a capacity to be modified at a future date as climate changes.

A list of these criteria was compiled based on the information provided in the analysed RBAPs (Box 4).

Box 4. Example criteria used to characterize measures in RBAPs

Criteria used to characterise measures in the RBAPs could broadly be grouped into those focusing on the *effects* or *implementation* of the measures; a limited number of miscellaneous criteria were also identified.

Effect:
- Impact/Benefit (e.g. higher flexibility of sewage systems, reduced sealing, increased awareness for flooding, increased knowledge exchange and cooperation)
- Synergies with other measures, targets, policy goals, etc
- Timeframe of the impact
- Spatial need and spatial impact
- Potential conflicts with other measures, policy aims, etc.
- Potential to deal with predicted climate changes (win-win, no regret, low regret, flexible adaptation)

Implementation:
- Timeframe
- Short-term costs
- Middle/long-term costs (running costs)
- Possibilities for funding
- Roles and responsibilities
- Stakeholders involved
- Feasibility
- Uncertainties

Miscellaneous:
- Concrete examples where applied

While eight RBAPs sorted measures according to priority areas or sectors, the remaining RBAPs used another categorisation for their measures. These alternative categories sometimes included priority areas or sectors, but also other categories or overall objectives formulated in the RBAPs. In two RBAPs, the measures were categorised based on the character of the measures, such as planning, technical or communication measures. Other RBAPs categorised measures according to the main climate impacts (e.g. heat, flooding, precipitation) or pressures (e.g. sediment pressure, biological pressure, abstraction). Further structuring included (1) a division of rural and urban areas, (2) separation of basic measures (e.g. meeting the requirements of existing directives) and supplementary measures (e.g. going beyond statutory requirements), and (3) a division based on the focus of adaptation (no-regret measures vs. those only targeting adaptation).

A prioritisation of measures was mentioned in four RBAPs. The Wiedau and the Irish RBAPs assessed each measure according to a criteria-led, expert-based approach. The Wiedau RBAP considered four criteria (i.e. goal achievement, costs, feasibility and uncertainties) and the Anglian RBAP considered two (i.e. win-win situations and no-regret measures). In contrast, the other two RBAPs were based on a more participatory approach. In the Aguan RBAP, stakeholder workshops and the application of indicators were used to prioritise measures. The Vam Co RBAP used a participatory multi-criteria analysis (Box 5).

The aforementioned RBAPs also examined synergies between measures. The Anglian RBAP, for example, included a short section focusing on ways in which measures may interact with one another, resulting in both positive and negative effects. Alternatively, synergies and potential conflicts were presented in individual factsheets for each measure outlined in the Wiedau RBAP. In particular, the factsheets included interactions with policies, with measures within the same policy area and with measures of other areas.

Box 5. Prioritization of measures and examination of synergies - Vam Co RBAP

Example 1. Vam Co RBAP

A full multi-criteria analysis was conducted in the Vam Co RBAP to enable the prioritisation of measures. Local and international experts carried out the evaluation during a multistakeholder workshop, following eight criteria. Four of the criteria were economic, such as the remaining area for rice cultivation and cost of the measure. Environmental quality and public health are included as environmental and social factors, while an adaptation-related criterion was the reduction of flood risk. Furthermore, potential synergies/interactions with other plans were looked at. Synergies were examined in terms of the compatibility of individual measures with other plans for the evaluation of five strategy components. With the criterion, it is analysed if the strategy component affects or is affected by other plans.

3.5 How has implementation been programmed?

Finally, RBAPs were assessed on their implementation arrangements and how uncertainties were managed, in particular how surprises and changes were dealt with. As described earlier, only five RBAPs (out of 16) provided any information regarding implementation procedures. Three RBAPs (Ashuelot, Gouldburn-Broken and Zambezi) identify relevant organisations for specific measures, while two (Aguan and Tauton) presented only a general description of responsibilities.

Four RBAPs provided some information on costs and financing possibilities. In the Rímac RBAP, an inventory of on-going investments relevant for river basin adaptation was presented, but not the cost of additional measures. In contrast, the Aguan, Vam Co and Zambezi RBAPs quantitatively estimated the cost of several measures by means of expert judgement. Funding options were not linked to individual measures, but were summarized more generally in a short discussion on generic sources (e.g. authorities, international donors). Four RBAPs included information on monitoring (e.g. indicators) and evaluation (e.g. information on revision) within the implementation component.

Links with the respective policy frameworks at different administrative levels were frequently emphasised within the RBAPs. However, the complete framework of relevant, higher level adaptation strategies (regional, national, international) was only delineated in a few cases (e.g. Elbe RBAP). The challenges of the political context were more commonly addressed, although the regional governance settings were not fully described. In contrast to information on the general political context, information on the involvement of stakeholders in the planning process, as well as the identification of responsibilities with regards to climate change adaptation strategies in water management in the region were missing in the majority of RBAPs. While the links to relevant regional policies and actors were provided in most RBAPs, only a few cases highlighted the delegation of responsibilities with regards to climate change adaptation strategies being incorporated into water management in the region (e.g. Wiedau; Vam Co).

Thirteen RBAPs referred to climate uncertainties associated with climate modelling and projections. Four of these also assessed the uncertainties of climate change impacts on water resources. Many RBAPs used different IPCC SRES scenarios (e.g. A1B and B2 scenarios) or climate models (e.g. ENSEMBLES-project). The results of the different models and scenarios were usually described in ranges (e.g. temperature or precipitation change). Sensitivity analyses were sometimes also performed. RBAPs used different approaches to visualise climate change uncertainties (Box 6). Interestingly, only one RBAP – Wiedau – examined the uncertainty of management goals by including an uncertainty criterion in the evaluation of the different measures. The uncertainty of the effectiveness of the measures was analysed qualitatively for each described

measure. Measures that were robust and demonstrated many co-benefits were evaluated positively.

Box 6. Addressing uncertainties in the Rimac and Danube RBAPs

Example 1. Rimac RBAP

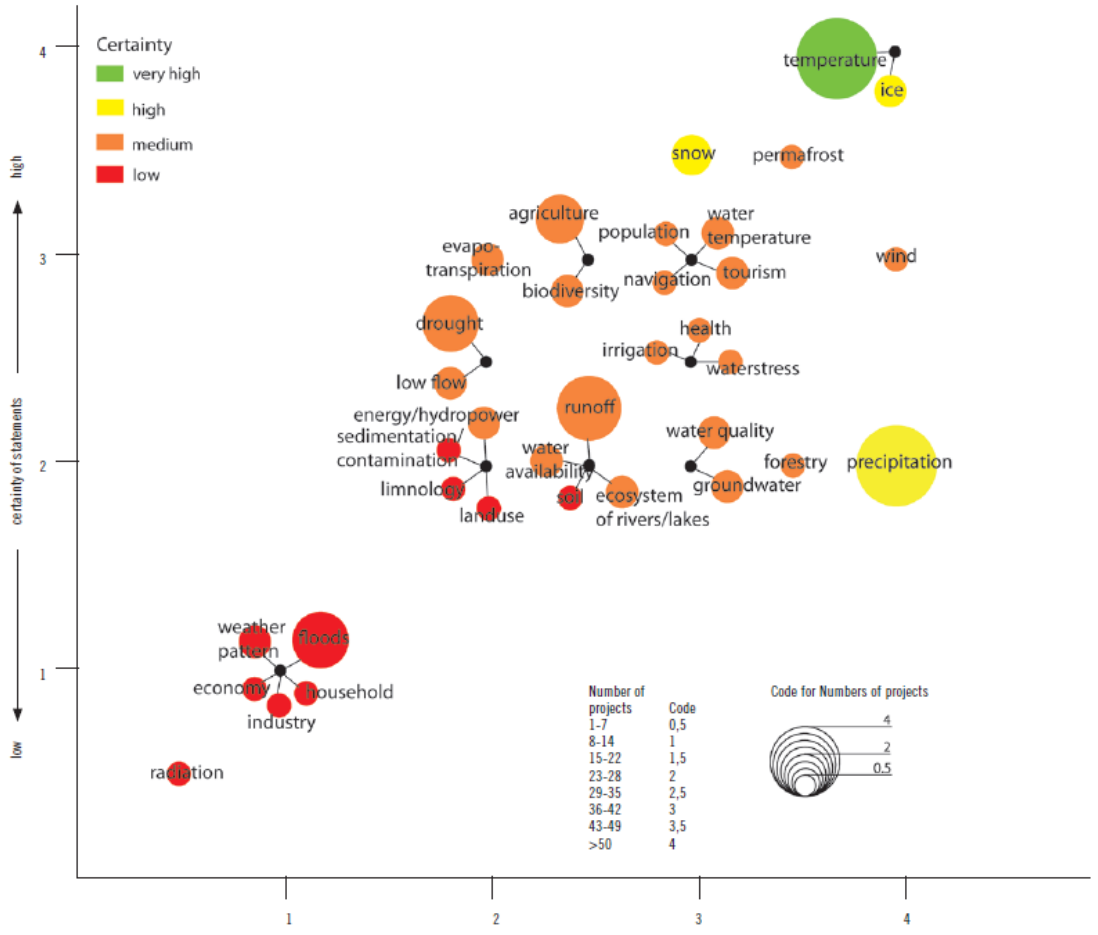
The uncertainty of model predictions was shown along the different results of the IPCC scenarios and summarized in a table with trend uncertain, trend raising, trend decreasing. The table below presents the aggregated trend and uncertainty of future climate change, expressed by the number of IPCC models projecting the same (positive or negative) change.

	Mean annual precipitation	*Runoff*	*Precipitation Intensity*	*Consecutive dry days*
Callao (Mouth)	? (10/20)	+ (8/12)	? (0/8)	? (0/8)
All others	? (11/20)	+ (8/12)	+ (6/8)	? (4/8)

Example 2. Danube RBAP

For the Danube RBAP, three variables were used to determine a certainty category for climate parameters and impacts: certainty of statements, level of agreement between different statements and number of analysed studies. The first and second variables were assigned to one of eight values within the range 0.5 and 4. The uncertainties were summarized in the following graph.

Overview of certainty for the impacts in the Danube River Basin due to projected climate changes FIGURE 9



4. Lessons learnt from adaptation planning in river basin management – Implications for BeWater

The objective of this deliverable was to present and illustrate key areas of interest for the preparation of RBAPs, to feed into the consortium's exploration of the appropriate content of the foreseen BeWater RBAPs and to highlight appropriate approaches and methods to be used to develop them. Furthermore, the deliverable should act as a first step towards the development of the protocol (deliverable D2.3). The results build on a sample of 16 RBAPs, representing a diverse sample of initiatives worldwide. Overall, an in-depth analysis of the RBAPs suggests five main observations, which have been translated into recommendations for consortium agreement and action.

The first observation made early on in the research was the lack of a common understanding on the meaning of key terms, such as 'River Basin Adaptation Plan'. The search for RBAPs of relevance to the objectives of BeWater helped to narrow down its meaning to the definition provided in Section 2. Further definitional issues arose with the factsheets used to characterise RBAPs, in particular with regards to related concepts, such as "bottom-up", "risk assessment", "vulnerability" and "resilience". Differences in understanding and interpretation by different consortium members became evident from the filled-in factsheets, but also from the RBAPs themselves. Many of the RBAPs used these terms interchangeably, or for different purposes.

Definitional issues are not surprising given the diversity of backgrounds and disciplines within the consortium, project more widely (including external stakeholders) and types of documents analysed. While efforts have been made within the consortium to work towards a glossary of key terms, further agreement and work in this regard remains relevant to solidify a common and interdisciplinary understanding of the key terms to be used in BeWater, and to systematically defining new terms as they arise.

Recommendation 1: To agree on the definition of key terms to be used in BeWater

Examination of the RBAPs objectives and scope brought light to a second observation. More specifically, RBAPs had many different objectives, ranging from raising awareness about climate change adaptation, to fostering networking, building adaptive capacity or supporting regulatory processes. Some were fully integrated in existing river basin planning processes (sometimes statutory ones like the WFD RBMP), while others were stand-alone initiatives. RBAPs also varied in terms of how they integrated and addressed climate change adaptation issues. For example, some RBAPs focused on how to reach specific water management objectives while taking climate change into account. Others focused on how to adapt to climate change. Furthermore, some RBAPs mainly aimed to scope measures, while others were intended to act as a strong incentive to take action. Consequently, the RBAPs varied significantly in the level of detail provided on implementation arrangements.

The above observations suggest a number of open questions for the BeWater project: are RBAPs meant to be explorative? Or do they aim to have a strategic impact on policy? Do they aim to foster specific local action? How should RBAPs inform regulatory processes?

Recommendation 2: To clearly identify the level of ambition of the RBAP when defining the scope and objectives of the RBAPs

The third observation comes from examining stakeholder participation in RBAPs. While most RBAPs are based on collaborative initiatives, the type of organisations involved tended to focus on

public administrations and academia. Fewer cases exist of RBAPs whose development was led by community-based organisations. Broader participation also varied significantly, ranging from RBAPs that involved other public administrative bodies to comment during the development process, to those involving local communities in the characterisation of the basin, setting of objectives and evaluation of measures.

While it is difficult to ascertain reasons, it is likely that the level of participation may depend on the scope and objectives of the RBAP. For example, more local involvement may result in higher local acceptability and ownership, which increase the likelihood of implementation being achieved. These observations suggest that the BeWater consortium should reflect on the following questions: what is the desired scope of the RBAPs? Will they respond to a specific demand (e.g. particular focus on a challenge, sector)? Given that a high level of participation of stakeholders in the planning process is desired, it should be clarified at what stage(s) this is most appropriate and the means by which to achieve this. Finally, how should these stakeholders be selected and in what way can they be best included?

Recommendation 3: To determine the means by which to involve stakeholders, according to target-oriented considerations

The fourth observation relates to the way that RBAPs deal with the complexity of managing social-ecological systems in the long-term. It is well known that uncertainties permeate the whole adaptation planning process. In the reviewed RBAPs, uncertainty assessments mostly related to climate information. A few RBAPs translated those uncertainties into impacts, and still fewer into management options. When estimating uncertainties, RBAPs mostly used qualitative assessments rather than quantitative ones. It is likely that such an approach was chosen for its simple application in what are often complicated exercises.

More strategically speaking, vulnerability and resilience approaches are potentially two different ways in which RBAPs can manage risks and uncertainties. While RBAPs are clearly dominated by a vulnerability approach, the resilience approach has also been applied; these approaches do not necessarily have to be exclusive. Vulnerability aspects, for example, may be relevant to better characterise impacts and sensitivity to climate change impacts, especially when adaptation challenges in a basin are unknown. The resilience perspective, on the other hand, may help to focus more on adequate responses, and is therefore already a first step towards developing a management strategy.

While the integration of vulnerability and resilience approaches may be desirable from an academic point of view, the choice for real planning processes may be more pragmatic and depend on e.g. resources, interest and expertise. Finally, and most importantly, the management of uncertainties may also occur through the prioritisation of measures together with an assessment of synergies and conflicts with other policies. These assessments may include consideration of such topics as e.g. the reversibility of measures and the use of no-regret and win-win measures. Overall the above observations point out to the need to clearly identify early in the planning process which strategy for dealing with risk and uncertainties best suits the objectives of the BeWater RBAPs.

Recommendation 4: To identify a general strategy for dealing with risk and uncertainties early on in the RBAP development process

A final observation can be made regarding the specific data and methodologies used to support decision-making. RBAPs commonly described future climate change conditions since data is now readily available from global or regional scenarios and models. The majority of RBAPs also

included assessments of river basin vulnerability for different sectors. In most cases, however, consistent and homogenous vulnerability assessments are lacking or are extremely limited in scope. Interestingly, most RBAPs did not rely on models to conduct these assessments, but used expert judgement and participatory processes.

No common prioritisation method for measures existed across RBAPs. Most RBAPs did not present quantitative data on costs and benefits of measures, but sometimes included qualitative evaluations, possibly expressing major data gaps and limited available resources. Overall, the above observations suggest that, in the short term, the methodological approach used should be consistent with the available data and foreseen capacities. In the long term however, the RBAP should outline the steps to build knowledge and capacity in order to improve projections and planning.

Recommendation 5: To define a methodological approach that is consistent with available data and current capacities of the planning team, but that also allows for future developments and capacity-building.

The five key observations and resulting recommendations presented in this chapter are visually summarized in Figure 8. These aspects should be considered as suggestions for guiding the next cycle of discussions about RBAPs in the BeWater project which will accompany the work of WP4 (development of adaptation plans) and, more generally, the BeWater approach.

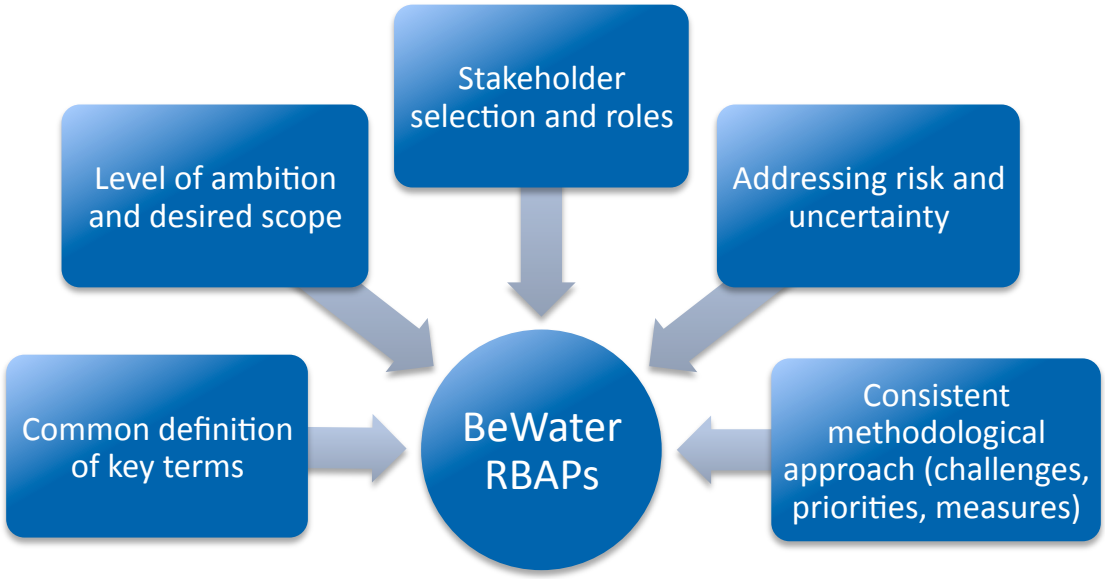


Figure 8. Key areas for further discussion for the development of RBAPs

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Annex A. Factsheet for the assessment of adaptation plans

1. Title of the plan/strategy	
2. Authors of the plan/strategy	
3. Institution(s) responsible for developing and implementing the plan/strategy	
4. Publishing date of the plan/strategy:	
5. Geographic or administrative level of the plan	☐ river basin ☐ local ☐ regional ☐ national **Name:** **Country:**
6. Status of implementation of the plan	☐ implemented ☐ approved ☐ under development ☐ other:
7. Is a revision or update of the plan/strategy envisioned?	☐ yes ☐ no **If yes, for when? (year)**
8. Does the plan address priority areas or sectors? **(Priority areas refer to topics, which were described in high detail or extensively.)**	☐ yes ☐ no **If yes, which priority areas/sectors are addressed in the plan?** ☐ Water resources ☐ Hydropower ☐ Flood management ☐ Drought management ☐ Irrigation ☐ Water quality ☐ Tourism ☐ Transport ☐ Agriculture ☐ Forestry ☐ Water management ☐ Industry ☐ Irrigation ☐ Nature conservation ☐ Fisheries ☐ Mining ☐ Navigation ☐ Energy **Other**
9. Are the goals/objectives of the plan included?	☐ yes ☐ no **If yes, which ones?**
10. Is the political context of the local/regional situation considered	☐ yes ☐ no **If yes, what is described (e.g. actors, policies,**

in the plan?	**responsibilities)?**
11. Is it described how the document was developed?	☐ yes ☐ no **If yes, which steps have been taken?** **How was collaboration amongst the different stakeholders organized or taken into account?** **Which obstacles arose and how were they overcome?**
12. Is information about climate change impacts included?	☐ yes ☐ no **If yes, which information is processed (e.g. risk posed by weather & current climate, projected climate change estimates)?** **Which scenarios were used?**
13. Does the plan/strategy address vulnerability and/or resilience?	☐ yes ☐ no **If yes, for which receptors has vulnerability/resilience been addressed? (Please specify in the table.)** **Has vulnerability/resilience been assessed according to a methodological approach?** ☐ yes ☐ no **If yes, how does the methodological approach assess vulnerability/resilience?**
14. Are key non-climatic drivers and impacts mentioned? (e.g. socio-economic scenarios including future changes in demographics, economic development, etc.)	☐ yes ☐ no **If yes, for which drivers is information included?**
15. Does the document include measures? How detailed are the	☐ No measures are included (proceed with question 20)

	Resilience/Vulnerability
Society	
Infrastructure	
Ecosystems	

measures defined?	☐ Yes, very concrete measures are included ☐ Yes, but only general measures are included
16. If measures are included: Are they sorted …	**…according to priority areas/sectors?** ☐ yes ☐ no **…according to other categories?** ☐ yes ☐ no **If yes, which distinctions are made?**
17. If measures are included: Are interdependencies (synergies) between measures addressed?	☐ yes ☐ no **If yes, how are they described in terms of the document structure (e.g. each sector is assigned a separate chapter; information is outlined for every measure; an extra chapter is dedicated to synergies; etc.)?**
18. If measures are included: Is the efficiency and/or effectiveness of measures regarded?	☐ yes ☐ no **If yes, how is this described/analysed?**
19. If measures are included: Have the measures been prioritized?	☐ yes ☐ no **If yes, which method was used (e.g. expert judgment, cost-benefit-analysis, cost-effectiveness-analysis, multi-criteria analysis, decision tree, mapping tools, etc. – others?)**
20. Is information regarding financing/budget included…	**…for the whole plan/strategy?** ☐ yes ☐ no **If yes, which information (e.g. costs, needed financing, planned budget, financial sources)?** **...for the individual measures?** ☐ yes ☐ no **If yes, which information (e.g. costs, needed financing, planned budget, financial sources)?**
21. Is an approach to monitoring & evaluation of the implementation of the plan included?	☐ yes ☐ no **If yes, how is this process planned?**

22. Have uncertainties been addressed?	☐ yes ☐ no **If yes, how have they been addressed?**
23. How is the plan structured? Which chapters are included in the plan? **(If in English, you can copy/paste the table of contents here. Otherwise, please translate into English.)**	
24. Further comments:	

This factsheet has been completed by:

- **Name:**
- **Organization:**
- **Email address:**