

HANDBOOK



to Integrated Water Management in the Alpine Region
– for the Conservation of Riverine Ecosystems and
Sustainable Development

Title: Handbook to Integrated Water Management in the Alpine Region – for the Conservation of Riverine Ecosystems and Sustainable Development

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The scope and methods of water management evolve over time, in particular in line with the evolution of society and increasing intensity of utilisation of waters and water space. Occurrences of water scarcity, disasters, and conflicts have led to an increased awareness of inter-dependence between human impacts and activities and the availability of water resources and their ultimate scarcity. The awareness and know-how of the need to conserve the natural environment as a precondition for the utilisation of different resources today and tomorrow is yet another compass to direct the future evolution of human society and its welfare. As a rule, the striving for direct benefits of water and water space utilisation makes the environmental component the first victim in cases of conflicts. Hence, this field will also need systemic regulation and development to provide balance between the short-term needs and the long-term sustainable goals, even if this may downshift the economic development in the short term. Thus, it is important to incorporate the conservation of the good condition of water and water ecosystems into the management as an equal development opportunity, together with water utilisation goals and utilisation protection. Equal treatment of all the identified needs and goals provides the guarantee of sustainable water management and of long-term prevention or at least mitigation of negative interactions and conflicts. The purpose of this handbook is to furnish the reader with basic information on what approach to take in implementing practices to comply with the principles of integrated water management, where the conservation of the good condition of waters and water ecosystems is one of the equitable driving forces of the development. The handbook lists the bases to understand the concept of integrated water management and key aspects to consider in order to correctly plan our own practice or to recognise practices in line with the concept of integrated water management in all the phases from the conception to the implementation in the space. Thus, it provides essential guidance and cases of good practices, including the guidelines on the areas requiring special attention when planning new activities, covering the phases from implementing policies and strategic planning to planning and implementation of particular projects. Over recent decades, the field of understanding and implementing of integrated water management has been the subject of many texts. Nevertheless, one should keep in mind that this is a concept that remains, in essence, only an ideal, pursued more or less strictly. To facilitate this pursuance in the future, it is vital to raise the level of awareness of the interdependence of waters and human needs and to assume one's individual and social responsibility for the impacts on the condition of waters and water ecosystems. Namely, assuming responsibility can guarantee the preservation of a broad range of ecosystem services for the future.



dr. Sašo Šantl,
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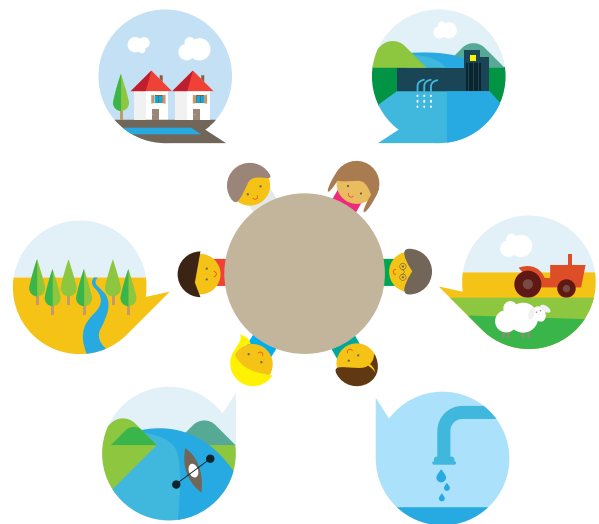
Water Management Concepts Over Time

Water is vital for overall life on Earth, as well as an essential precondition for the development and welfare of society. At the same time, it is a scarce resource, more so in some places and less so in others, hence, its condition and availability require constant attention and care. Precisely for this reason, sound water and riparian areas management should provide for the good ecological status of waters, sustainable use of water resources, protection against extreme phenomena and thereby facilitate sustainable subsistence of society and its security. Due to the need for economic and just management of waters, concepts have been defined in the past to encompass visions of proper water management and to support the implementation of integrated water management.

Thus, the first concept to take hold was the “[integrated water resources management](#)” (IWRM). Its definition was presented by the Global Water Partnership (GWP), which defined the integrated water resources management as [a process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.](#)

This is an empirical concept, conceived in the basis of practical experience and, due to “over-utilisation” of water resources and in light of new findings, in fact requires an upgrading in the system and social development. In 1992, at the Earth Summit on Sustainable Development in Rio, the Agenda 21 document was tabled and the concept entered a broader proliferation.

The integrated water resources management is a cross-sectoral political/agreement approach aiming to replace or upgrade the traditional, fragmented sectoral approach to water resources management. Although indirectly, the concept reinforces the perception of water resources as a constituent component of ecosystems and the body of natural resources, the good condition of which is also vital for the welfare of society and for the sustainable economy.



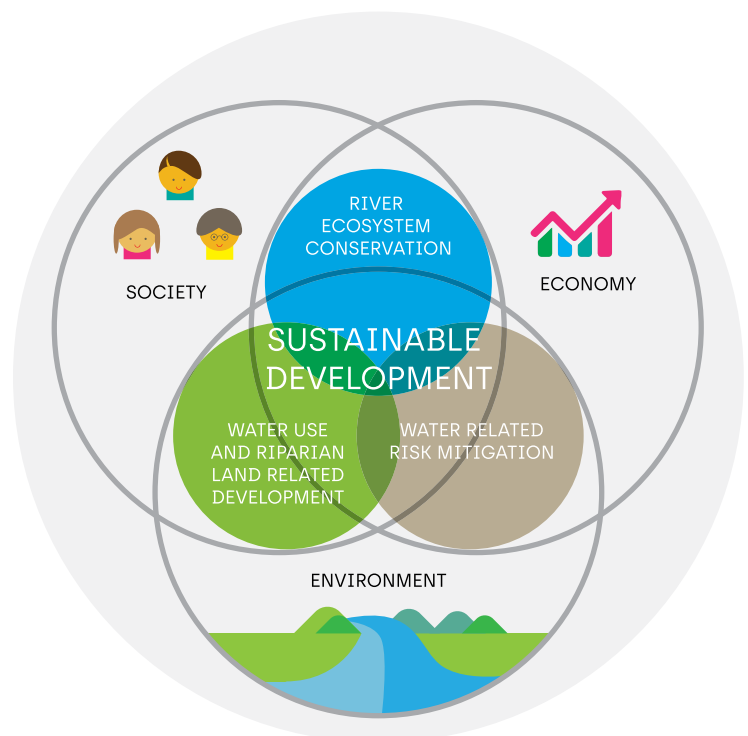
INTEGRATED MANAGEMENT REQUIRES HARMONISATION OF ALL THE RECOGNISED GOALS AND NEEDS

To further promote integrated management, a new concept was proposed at a later stage – “integrated river basin management” (IRBM). The integrated river basin management is identified as a process to promote the coordinated development and management of water, land, and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. (World Wildlife Fund – WWF)

River basins are dynamic ecosystems and any intervention affects the system as a whole as well as locally, therefore, the implementation of IRBM envisages the involvement of the following elements (according to the World Bank aspects): setting up of an institutional framework including an agreed and accepted vision and decision-making process at the river basin level, involvement of different water-dependent sectors (industry, agriculture, urbanism, navigation, fisheries and environment protection) in the development policy and strategic planning, implementation of the principle of “polluter or user shall pay” (liability for costs), active engagement of the interested stakeholders and of the public in a participative process, good knowledge of the river basin, of the natural and social-economic inter-dependencies as well as appropriate monitoring of efficiency, both in technical terms and in terms of the processes.

Water management must rest on the principles of sustainable development, which equitably pursues the goals of all the three identified principal pillars of water management, i.e.:

- a) good ecological status of waters
- b) water use and riparian land related development
- c) water related risk mitigation



WATER MANAGEMENT PILLARS BASED ON THE SUSTAINABLE DEVELOPMENT PRINCIPLES, WITH AN EMPHASIS ON THE PRESERVATION OF ECOLOGICAL QUALITY OF WATERS

To ensure successful integration of conservation and development goals, it is important to recognise that the improving ecological quality of waters is also a development opportunity that, in the planning process, should be treated on equity terms with other development goals and ambitions. To this end, functions and benefits provided by riverine ecosystems should be properly emphasised.

With regard to the concept of integrated water management and to further promote the objective of improving ecological quality of waters and conservation of riverine ecosystems a new term has been defined – “integrated river (ecosystem) management” (IR(e)M). IR(e)M is a process of harmonisation of conservation, restoration and management of waters aiming to conserve riverine ecosystems and their ecosystem services, with due respect of other development goals depending on waters and riparian areas. IR(e)M rests on the principle of sustainable development and integration of other spatial development policies at different decision-making levels. A key element of IR(e)M is the engagement of a broad range of interested stakeholders and of the public in the participative process to guarantee its success. (SPARE Project, 2018). In formulating the concept, the guidelines of the Organisation for Economic Cooperation and Development (OECD) on improving water governance have also been taken into account, namely: (I) **effectiveness**, which relates to water management according to clear sustainable water development goals pursuing accepted water management policies and meeting expected targets; (II) **efficiency**, which relates to water management aiming to maximise the benefits of sustainable development and welfare at minimum costs to society; (III) **trust and engagement**: to ensure effective water management, engagement of the stakeholders and of the public in the decision-making and participative process is of vital importance, as it

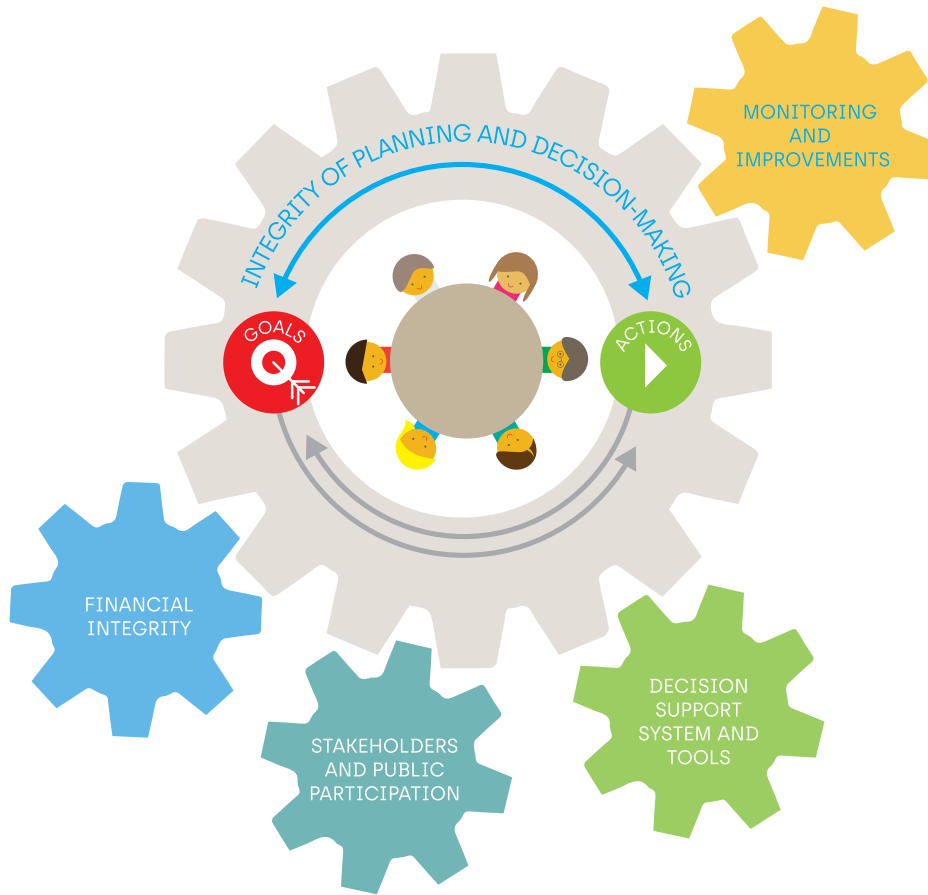
strengthens the trust in water management policies. The deciding on harmonised measures and further activities based on all the identified goals and needs constitutes the core of any planning process. The principal basis of the IR(e)M concept is an equitable treatment of all the interests or water management pillars. This basis must be clearly defined and adopted as a water management vision. Notwithstanding the introduction of a new concept, it is our opinion that the basic concept, the integrated river basin management, already involves the goals of achieving good water condition and conserving riverine ecosystems. Hence, all the listed terms, such as sustainability, integrity, stakeholders and public participation, treatment of the river basin as a management entity and equity of all the three identified pillars can be properly accommodated under the established concept, i.e. **integrated river basin management** (IRBM).

The aim of proposing a new concept, IR(e)M, is to emphasise the significance of ecological objectives in the scope of water management. A further “strengthening” of ecologic objectives in the scope of the integrated planning and deciding on water management should ensure a more equitable incorporation of a good ecological condition, compared to other uses of waters and riparian areas and to objectives of mitigating harmful water impacts.

IRBM is based on the following aspects that have been identified and “inferred” in the course of the development of the paradigm of the integrated management and the already identified elements:

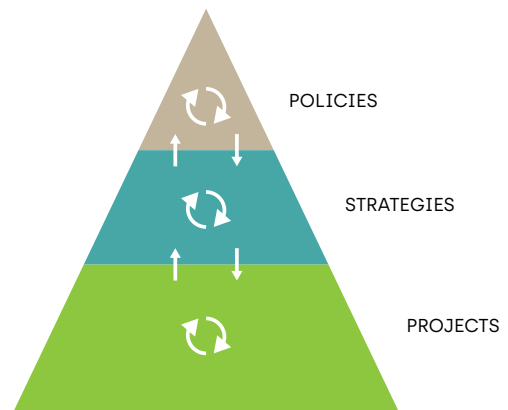
1. **integrity of planning and decision-making,**
2. **stakeholders and public participation,**
3. **decision support system and tools,**
4. **financial integrity,**
5. **monitoring and improvements.**

These are the vital aspects / contents that must be incorporated in the procedures, decision-making and development of measures or activities at



INTEGRATED RIVER BASIN MANAGEMENT (IRBM) ASPECTS

different levels, both in terms of regions and stages. Incorporating all the aspects into the practices contributes to a more integral, and in turn sustainable, water management. At the same time, it guarantees objectivity, appropriate degree of participation, clear definition of the goals, harmonised decision making on actions and measures with funding and implementation secured and the monitoring of the effectiveness and efficiency of the process as well as of the follow-up phases is in place. Planning and decision-making occur at different levels, at the policy and strategy design level, and at the specific spatial and project planning levels. As a rule, the needs are identified and transferred in the bottom-up direction; at higher levels, they are harmonised, and then, the harmonised and adopted rules "of the game" are implemented in the opposite direction, i.e. top-to-bottom direction. The process is commonly dynamic and undergoes constant harmonisation.



DIFFERENT DECISION-MAKING LEVELS: POLICY DESIGN, STRATEGIC PLANNING, SPATIAL PLANNING, PROJECT PLANNING, AND THEIR VERTICAL INTERCONNECTION



INTEGRITY OF PLANNING AND DECISION-MAKING

Any water management must rest on the principle of equity of all the three identified pillars. Equitable incorporation of goals from all the three pillars ensures mutual harmonisation of the selected and planned measures. Such planning and water management does not prioritise any of the pillars and provides for sustainable development without any harmful impacts on other pillars or specific water related goals, and is in line with the concept of integrated water management. The principal reasons underlying the planning in the field of water management, as defined in the time sequence include:

- **interests in the use of water and water space,**

E.g. technological progress in the field of electricity consumption that led to an expansion of utilisation of water energy through the construction of hydro power plants that, to operate, need vast amounts of water and water heads as well as facilities.

- **extraordinary events (floods, pollution etc.) having harmful impacts on the human health and safety or on the existing use of waters and water space as well as on the dependent economy,**

E.g. severe floods threatening human health and property and economic activities. The primary goals are to improve flood safety of the public and of the property in the future. The measures and goals under other pillars are aligned with the primary goal.

- **reconciliation of conflicts between the existing users of waters and water space,**

E.g. increasing quantitative needs for water for irrigation where this is developing into a primary economic activity in an area, without appropriate reconciliation or measures (e.g. increasing water retention capacities) might result in disturbances in water supply to all the existing water consumers.

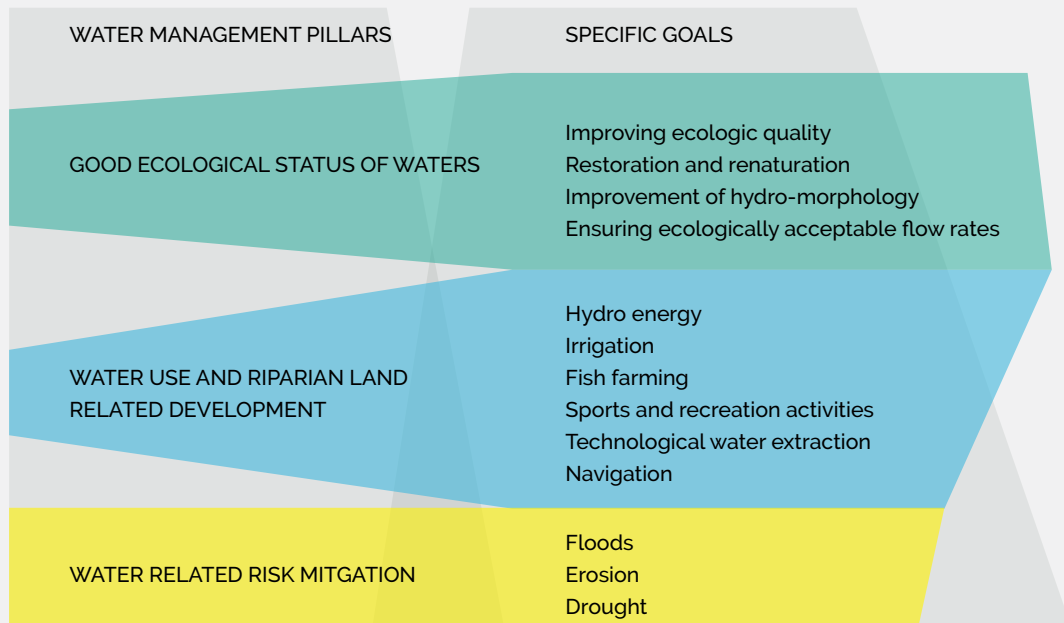
- **improvement of the condition of waters and water ecosystems and reconciliation of conflicts with the existing users of waters and water space.**

E.g. implementation of the measures under the Water Framework Directive in order to improve the condition of water, which may affect the existing uses. Here, the Directive proper envisages mechanisms for reconciliation, e.g. through comparison between the benefits of good condition and the benefits of a particular use based on an assessment of the impacts on the human health and safety or on the sustainable development.

To ensure equitable consideration of all the three water management pillars, we must raise the following questions when reviewing existing practices or planning new practices:

1. Which water management pillars are (have been) the primary reason underlying an initiative for or introduction of a practice and which are the main basic reasons for the implementation of a practice?
2. Which pillars or their specific goals are (have been) included indirectly? Which specific goals have also been considered in the development of a practice and actively involved in the final decision-making process?

WATER MANAGEMENT CONSISTS OF ROUGHLY THREE PRINCIPAL PILLARS WITH SPECIFIC GOALS:



There is no magic solution or single correct way to go about achieving the right degree or level of integration, nor is there one specific institutional model that is applicable to all cases. What is required is a change in how individuals and agencies think about their water-related activities. Often, strong political will and leadership are needed to get all players on board and move the process forward.

The World Bank



STAKEHOLDERS AND PUBLIC PARTICIPATION

In the European water policy as well as in general, the process of participation is one of the key factors for the success of a decision-making process. Approaches and practices involving intensive cooperation between participants with different interests are ever more present in the field of environment management.

Namely, the implementation of a participative process notably increases the potential of cross-sectoral harmonisation and alignment of views towards the achievement of the set goals.

Proper preparation of water management strategies translates in broad support among the professional and general publics and interested water space stakeholders. The objective of the participative process is thus to adopt goals at different management levels (strategic planning, local goals), those goals being set in an integral way and with consideration of the needs of all the stakeholders, of the public and, last but not least, of the natural capacities of the water space itself.

As regards this aspect, we ought to pay attention to the composition of the stakeholder group in the process (representative sample) and the degree of engagement of the public in the process. The following points explain why it is of vital importance to engage stakeholders in the process of decisions related to water management (IRSTEA):

- sustainable development involves democratic participation;
- dealing with issues related to water requires a civil society that is aware of and familiarised with water related issues;

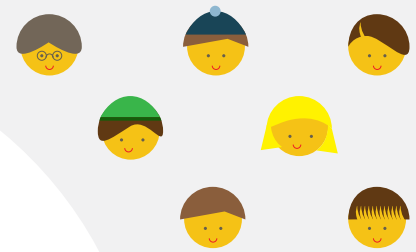
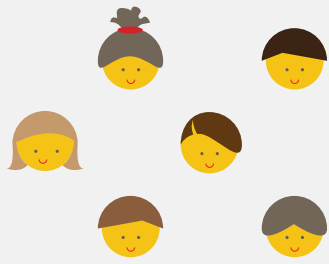
- the development and reforms of water related policies: consultation is vital to properly meet the needs and expectations of water users, with due consideration of existing property rights;
- understanding, recognition and alignment of the existing water and water space management;
- most of the riverine basins are faced with water management challenges;
- regulatory requirement; Water Framework Directive, national legislation;
- the social component of water is widely recognised (as an important, i.e. equitable element in the water management process).

The groups of participants to be included in the process of planning of water and water space management:

1. policy and strategy planners at the national, regional and local levels;
2. interest groups (economy, agriculture, tourism, nature protection);
3. experts/scientists/researchers;
4. non-governmental organisations;
5. general public/citizens.

Regardless the degree of involvement, either in the role of officers of competent bodies, or holders of water rights, or merely consumers of potable water from water supply network, we all, as inhabitants, are directly or indirectly affected by the decisions in the field of water management. Hence, we should be treated as stakeholders in fact, this is our right.

Boyden, 2008



The essential feature of the process is to leave space and time, and to provide methods and means, for the preparation by all stakeholders of the future procedure of decision: who, when, how and why each category of stakeholder will participate to the various decision phases, how it will be regulated and facilitated. Thereby this future process will be better accepted and respected by its participants, and should improve alignment between the existing institutional process and the stakeholders' expectations. In summary it means that "actors decide the participation plan".

Ferrand, N. et al., 2017

WHAT MAY BE THE INFLUENCE OF THE PUBLIC IN THE PLANNING AND DECISION-MAKING PROCESS?

DEGREE OF PARTICIPATION	IMPORTANCE OF THE ENGAGEMENT IN THE PROCESS
INFORMING	The public is furnished with balanced and objective information that are of assistance in understanding the problem, the alternatives, the opportunities and/or solutions.
CONSULTING	In the process of participation, feedback information is obtained from the public on the analyses, alternatives and/or decisions.
ENGAGEMENT	Direct cooperation with the public throughout the process to ensure examination and consideration of any concerns on the part of the public.
COOPERATION	Partnership with the public, which stands for cooperation with all the aspects, including the development of alternatives and identification of the preferred solution.
EMPOWERMENT	Adoption of final decisions concerning water management is in the hands of the general public / citizens.



DECISION SUPPORT SYSTEM AND TOOLS

The planning process is provided with a support system consisting of efficient tools serving participative processes as well as tools and methods to assist in obtaining corresponding social, environmental and economic assessments and risk assessments for the purpose of assessing effects and provide assistance in decision making. A good planning process is characterised by its openness for discussion and accessibility of applied data, analysis procedure and final results.

Criteria to determine whether a particular practice is equipped with a quality support system and tools may include:

1. ACCESSIBILITY AND AVAILABILITY OF DATA

Data applied and results produced in a particular practice as well as information on the implementation of the practice are accessible to all the process participants and the public (on the web – the practice has in place its own web page and a local information point or office). Data, working methods and analytical tools applied are properly described. Contact details (institution or the project leader) are available to provide additional information.

2. DEVELOPMENT AND DISCUSSION OF SEVERAL SOLUTION SCENARIOS

The planning and decision processes consider several scenarios. Those scenarios are developed by experts; all issues at hand, goals and natural potentials and restrictions have been considered in the development of solutions/measures. A practice under which the choice of possible solutions derives from a pool of available options (developed scenarios, measures) or which actually explores a set

of different potential scenarios, including extreme ones, supports a broad discussion and efficient implementation of the subsequent phases.

3. APPLICATION OF TOOLS AND METHODS IN THE ANALYSIS AND ASSESSMENT OF POTENTIAL SOLUTION

Methods applied in the planning phase must be objective and reproducible. Where a study, analysis or cost assessment exercise applies methods and tools such as [cost efficiency analysis \(CEA\)](#), [cost and benefit analysis \(CBA\)](#) or [multi-criteria analysis \(MCA\)](#), this allows transparent comparison of effects of different scenarios. It also promotes clear insight and understanding of inter-dependence of the effects of different measures or actions.

One of the objectives of the SPARE project is to promote the understanding and incorporation of the [concept of ecosystem services](#) in the assessment of different scenarios of measures. People are in direct or indirect relations with ecosystems, which provide us a number of vital benefits: a range of services from pollination of crops to spiritual values. All the benefits that we draw from ecosystems are collectively called ecosystem services.

Through identification and classification, ecosystem services become open to comparison with traditional economic values. This is an important step towards integrating ecosystem services in the decision processes. Ecosystem services may be classified in a number of ways.

As an example of the concept of ecosystem services, we may take the concept of environment serving as green infrastructure. Green infrastructure is a strategically planned network of natural and semi-natural zones with environmental characteristics designed and managed to provide a broad range of ecosystem services. This network comprises green [land] and blue [aquatic] zones that potentially improve living conditions and in turn contribute positively to the human health, thereby having positive effects on the quality of life and enhancing biotic diversity of the area.

Under the SPARE project, ecosystem services are classified in four categories:

1. PROVISIONING SERVICES:

They provide water, food, wood and fibres. They support growing of plants and breeding of animals as well as economic uses (fisheries, agriculture).

2. REGULATING AND MAINTENANCE SERVICES:

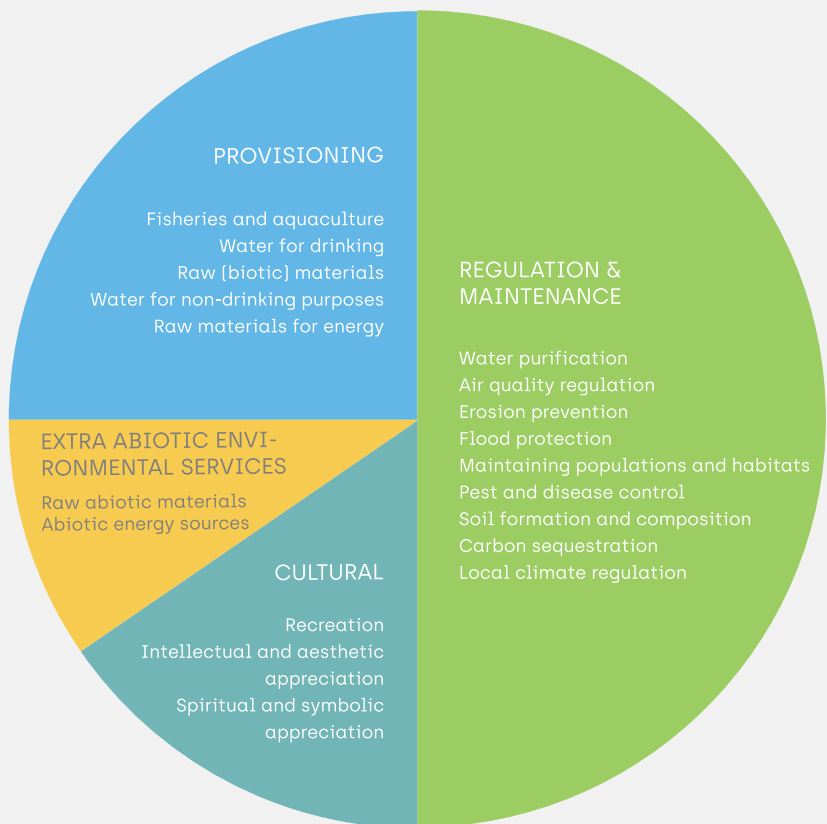
These services keep ecosystems in balance. They influence the climate, floods, diseases, waste and water quality (purification of water and air, prevention of erosion, flood safety, carbon sequestration, generation of soil, photosynthesis and nutrient cycle, ...).

3. CULTURAL SERVICES:

They provide the environment with non-tangible values (recreation, aesthetics, spirituality).

4. EXTRA ABIOTIC ENVIRONMENTAL SERVICES:

They enable utilisation of materials and resources from the environment (extraction of gravel, energy generation).



OUTLINE OF ECOSYSTEM SERVICES IN THE ALPINE REGION (GRIZZETTI ET AL., 2016)



FINANCIAL INTEGRITY

One of the key aspects of successful integrated water management is financial integrity demonstrated as adequate funding of the adopted and approved strategy and the ensuing agreed measures. In fact, in most cases, funding can be seen as “fuel” in implementation of practices and adopted measures. The “financial integrity” aspect is often a weak spot of strategic documents (GWP, 2015). Such a deficiency can also be noticed in the financing of implementation measures in the scope of the Water Framework Directive and the Floods Directive (FD, 2007/60/EC), as the delays in the implementation of the directives are often a consequence of financial limitations (EC, 2014).

To provide “financial integrity” in the scope of integrated water management, the following bases should be observed:

1. FINANCING FROM ALL THREE WATER MANAGEMENT PILLARS

Such financing provides for equitable consideration and treatment of the goals under all three water management pillars. It strives for transparency, ensures objective and sustainable decision making and mitigates suspicions concerning fairness. In turn, the planned measures will gain wider acceptance among different spatial sectors and stakeholders.

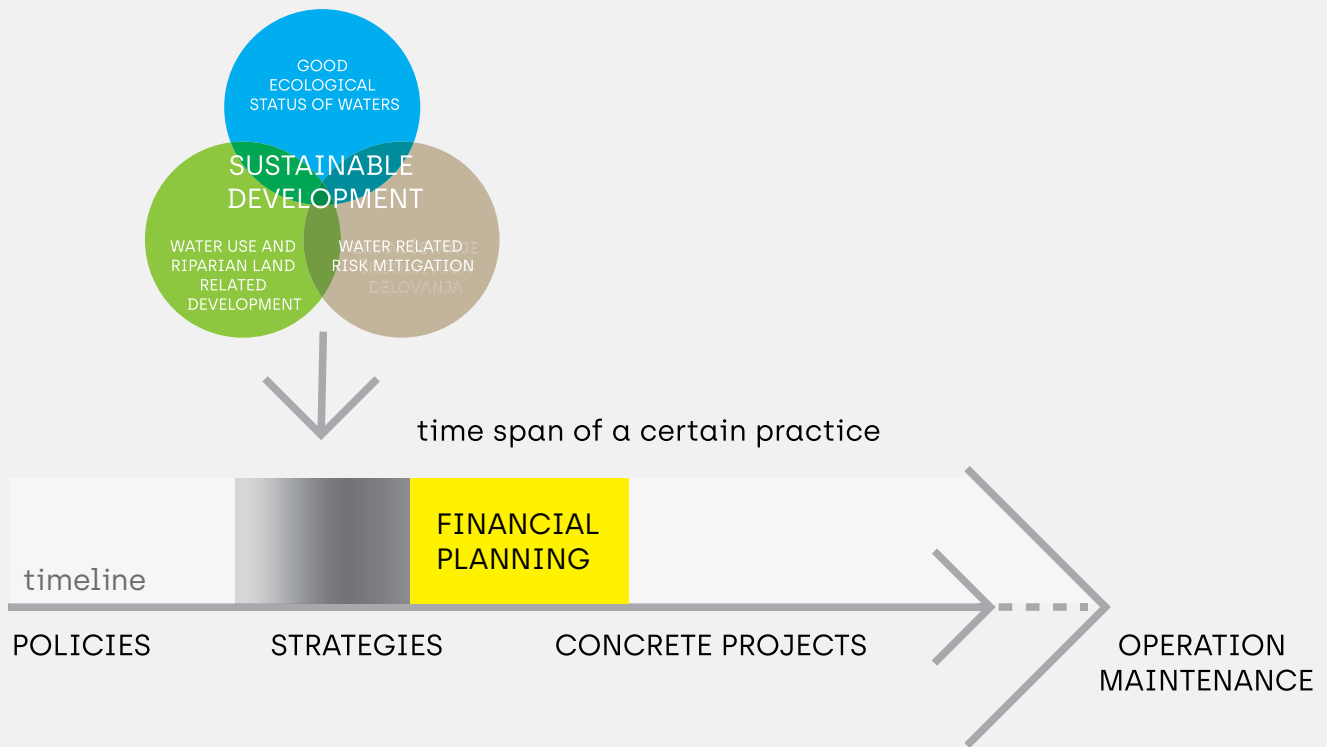
2. AGREED STRATEGY AND MEASURES TO ACHIEVE THE SET GOALS

Reaching an agreement and its approval by as many stakeholders as possible is another important factor of successful implementation of measures set under the planning process. Broad acceptance of the measures removes obstructions to the implementation process and establishes preconditions for its success.

3. APPROVAL OF THE FINANCIAL PLAN AND ALLOCATION OF FINANCIAL RESOURCES

The planning process must be completed with the planning and allocation of the financial resources to implement the adopted decisions and measures. This ensures their successful realisation, and, in most cases, allocation of financial resources for efficient maintenance and operation are also required.

Respecting of the guidelines of “financial integrity”, whereby financing is allocated from the different water management pillars and diligent development of the financing structure to make it sustainable and agreed by all stakeholders make the implementation of the planned and agreed measures and their operation notably a more realistic proposition.



INCORPORATION OF FINANCIAL PLANNING FOR THE IMPLEMENTATION OF ADOPTED MEASURES IN THE STRATEGIC PHASE IN A PRACTICE CASE (IWRS)

SOME GENERAL FINDINGS:

In reviewing different reference practices in the field of water management implemented under the SPARE project, one notices deficiencies or poor transparency of presentation in the field of financing the practice or some of its measures properly. This is in particular noticeable in the cases of practices related to environment protection or in the cases where measures do not directly impact the economy.

When assessing whether the financial resources for the implementation of a practice have been provided from different water management pillars, ambiguities may arise in the cases of financing from public funds or programmes. Namely, a number of European programmes and structural and

investment funds offering finance to practices may pursue several goals.

Transparency may be enhanced at the national level by developing a common strategic document in which all the national bodies competent for the adoption of environmental policies are involved. This enables a clearer identification of the sources and financial amounts to be drawn from different water management pillars, i.e. contributes to a "fairer" financing structure, e.g. through the introduction of the principle "user, polluter or beneficiary is to pay".



MONITORING AND IMPROVEMENTS

Monitoring and efficiency monitoring are constituent elements of any planning or implementation process, starting with the design of policies through strategic planning to concrete measures and implementation actions. Monitoring enables us to learn from the past successes, problems or challenges, and to utilise the obtained information in a constructive way in planning future initiatives and projects. Furthermore, efficient monitoring often discloses current problems and avoids future ones. This also reduces the risk of accumulation of severe cost overruns or consequential delays.

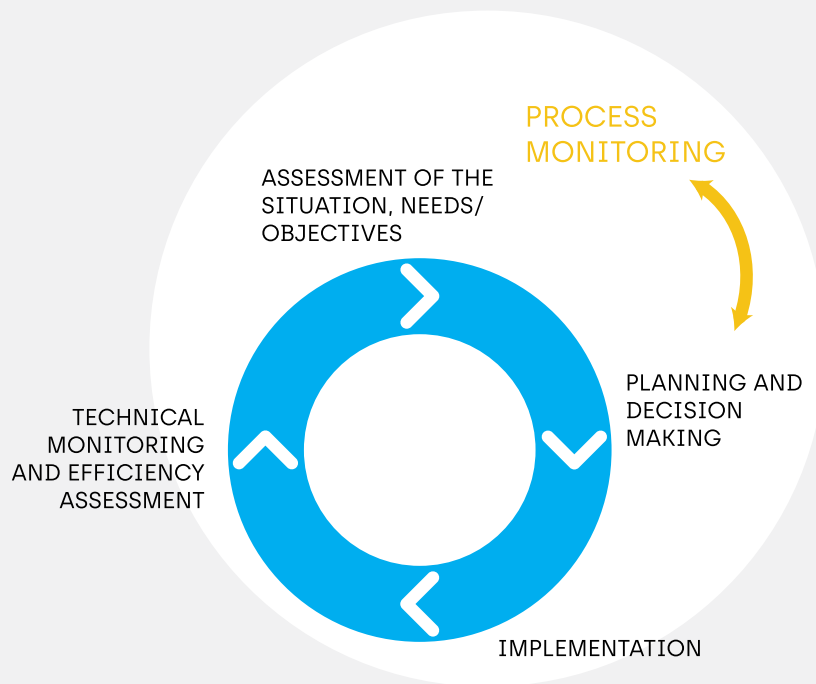
Monitoring may be defined as a continual process in the scope of the management cycle, to obtain feedback: (I) on whether the work is progressing in the right direction; (II) on the progress in achieving the set objective; and (III) on potentials of improvement of particular measures and/or phases. In most cases, monitoring is defined as supervision, reviewing progress in terms of positive effects of the implemented measures based on selected indicators. This is the so-called technical monitoring, whereby, e.g. efficiency of the implemented measures aimed at improving the ecological quality of waters is determined through monitoring the trends in biological, chemical, physical and hydro-morphological parameters. Another classical type of technical monitoring concerns the field of construction and operation of facilities and safety. In the case of uses of water and riparian areas, monitoring of the stability of dam structures is an example of such monitoring.

Appropriate monitoring may yield a host of information on the performance of particular processes (e.g. monitoring of the efficacy of participation) and

of the applied support tools in the planning and decision-making processes (e.g. the application of multi-criterion analysis methods for the assessment of efficiency of examined scenarios). Quality monitoring may assist in determining whether and which new approaches and measures should be adopted to ensure progress in achieving the set goals. This is the so-called process monitoring, which examines the effects of specific decisions and procedures on the ultimate goal and may also provide guidelines to adjust the ultimate goal. It provides assessments of progress, identifies any restrictions and guides the process and provides feedback on the efficacy of parallel processes.

There is no standardised procedure for the process monitoring. Therefore, it is important to incorporate the plan of monitoring as early as possible in the planning phase, since monitoring is closely correlated with the programme or project implementation time schedule. Hence, planning involving monitoring should be set up in a flexible and cyclical manner. This means that any modifications resulting from the monitoring of participative processes and applied tools should be a part of the process. For the implementation of a proper practice and its follow-up phases to be efficient, it is vital:

- 1. that it includes a developed plan of**
- 2. monitoring in all the process phases,**
- 3. that, based on monitoring, it undertakes the necessary amendments and improvements to enhance efficiency in achieving the set objectives and to provide the necessary support to the professional and general public.**



INCORPORATION OF MONITORING PROCESSES IN THE CYCLE OF INTEGRATED WATER MANAGEMENT (IWRM)

Routine monitoring combined with evaluation is instrumental in measuring and assessing the progress, identifying constraints to the progress, deriving lessons and at all times identifying the most efficient way forward. The monitoring provides information on how resources are spent, how outputs are produced, and provide administrators, managers, politicians and donors with the justification for expenditure. UNEP-DHI

At the end of the handbook, a checklist is available. You can check any practice through all five aspects. The practice can be already finished or is in the process of being implemented or is it still in plan phase. In this way, you can find out how well the practice follows the concept of integrated river basin management.

CASES OF GOOD PRACTICES

This chapter presents some practices that may contribute to enhancing our understanding of different aspects. We strived to assort practices that differ in terms of implementation levels and active stakeholders, as well as applied tools and methods, which may either be proven and established or currently in a testing phase and likely to enter the body of established practices sometime in the future.

The presented practices have been recognised by the authors of this handbook as representative cases for the purposes of presenting particular aspects. Obviously, they present a small segment of the varied body of practices having been implemented in the region of the Alps and in the broader region.



Project SEE River: Sustainable Integrated Management of International River Corridors in SEE Countries – Drava Case

<http://www.see-river.net>

Contact: Aleš Bizjak (ales.bizjak@gov.si)

The aim of the SEE River project was to reach an agreement on the management of the river corridor of the Drava river, which is an international river. Namely, national legislations, EU directives and international treaties closely regulate the management of local, national and international river corridors. The main criterion favouring the selection of the pilot corridor of river Drava (its leg from Maribor to Zavrč) in Slovenia was the vast diversity of sectoral

interests in all three water management pillars (water management, environment protection, energy, agriculture, tourism and recreation and other fields). The work in the pilot area, extending over several years, yielded a notable body of knowledge, experience and data on the technical and ecological topics in the Drava river corridor area. In the frame of the project, information was gathered and stored in a database that will be made available as a tool in

the future. In collaboration with the stakeholders, the project assessed the measures undertaken within the pilot region in the course of the past 20 years, and the impacts of these measures on the Drava river. New measures were designed, to be implemented in the coming decades. Under the project, characteristics of the river corridor were defined, to serve as a basis for collaboration with different

sectors. Then, charts were produced presenting environmental issues and development interests by sectors. In collaboration with the stakeholders, the "Drava 2030" vision was conceived, to serve as a basis in developing a unified development concept for the river corridor. An action plan was developed to determine, in combination with the concept, concrete steps towards the realisation of the goal.



New Ways to Solve Water Conflicts – Strategy for Hydropower Development in Switzerland

https://www.icpdr.org/main/sites/default/files/nodes/documents/annex_-_case_studies_and_good_practice_examples_final.pdf

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The more numerous the existing interests in an area become, the more expressed are the needs for cross-sectoral solutions and for common development concepts, which should be adopted and confirmed at the top decision-making levels. "Water Strategy Canton of Bern, Switzerland" is a practice case where the objective was to develop a water management strategy in the Bern canton, focussed on HPP uses. The practice is distinguished for its highly methodological approach. In order to achieve the objectives, set for the Bern canton, interests in the water space were evaluated. Ensuring transparency for all the interested space stakeholders (potential investors, planners and developers of environmental policies and strategies, water and space users) was a keystone element of the practice. In order to ensure a high degree of transparency, a map was produced that defined in detail water zones to be

under protection and zones in which HPP uses are allowable; according to their potentials, these latter zones were classified in three categories: (I) HPP use allowable, (II) HPP use restricted, (III) HPP uses not allowed. The produced map was discussed with the interested stakeholders with the aim of achieving an agreement on the strategic development goals. Since the entire strategy was agreed in a participative process that involved all the interested water space stakeholders, it met a favourable acceptance and support. By adopting the strategy, guidelines and objectives were set for the defined river basin as well as the measures to achieve the objectives. The key strength of this practice stems from the fact that conflicts had been addressed and resolved at a high level, which spared the need to address them in the scope of each individual project.



The River Dialogues

http://www.partizipation.at/fileadmin/media_data/Downloads/Praxisbeispiele/praxisbeispiele_oebt_finale_150dpi_18022014.pdf

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The main motto of The River Dialogues project reads: "Only those who talk with each other are capable of bringing projects to success". The River dialogues project is a practice case from Austria in which a participative method was applied with a focus on regional and individual approach; the practice can easily be adapted to the particular needs of regions or areas. Dialogue, which this practice applies as the principal methodological tool, facilitates the involvement of interested stakeholders and the general public in the decision-making process. The purpose of this process is to enhance the comprehension of planned measures and of the future plans for managing particular river basin areas. Focus on river ecology and co-natural measures was mandatory in Austria, since the uses of water for hydro power generation and the need for measures to mitigate harmful effects of water have had notable impacts

on the shaping of water space; this was also taken in consideration in developing the methodology; as a result, the methodology also complies with the requirements of the Water Framework Directive (2000/60/EC), which seeks to improve ecological quality of waters. The methodology is aimed at advancing communication, obtaining/providing better information, promoting participation of the public and advancing comprehension of the issues and solutions in the field of water management, as these concern common good. This can be achieved through: (I) open contacts with the public through formal channels (web site, workshops, information points, etc.) that promote awareness and presentation to the public; (II) intensive work with the interested stakeholders and the public, and (III) application of clear methodologies in the participative process.



The proposed method for the Tinella Torrent River Contract

<http://www.inase.org/library/2015/zakynthos/bypaper/ENG/ENG-58.pdf>

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In accordance with established European practices, different approaches may be applied in participative processes, defined as participation "models", "levels" or "degrees". In essence, these are different methods to attract participation in practice and may also be applied separately. They relate to four categories: communication, animation, consultation and empowering (Ciaffi, Mela, 2006). The presented method of engaging stakeholders in the participative process falls principally within the category of consultation and, to a lesser degree, within the category of

communication. Engagement of the public started with the application of the "casual selection method" and formation of a representative sample, which, however, was not further divided into specific social-demographical categories. Hence, the consultation procedure relied on three important activities with clearly defined objectives and different methods were applied with an aim of increasing efficiency: (I) engagement of younger individuals (elementary school and grammar school pupils); (II) engagement of the active working population (intermediate age

group), and (III) engagement of the senior citizens. Traditional questionnaires were handed out directly to young and senior group members, while virtual questionnaires were accessible to the intermediate age group members through web communities. Facebook was applied to distribute the questionnaire since it is a broadly used web channel, not only in terms of the number of hits but also in terms of the frequency of hits. In this way, the questionnaire was distributed in a reasonably short time. Consultation activities for Tinella River took approximately seven

weeks. In the final sample, 16,226 persons were registered, i.e. 2.1% of the reference population, which is perfectly in line with the average degrees of engagement in the processes of this type. One of the purposes of the questionnaire was to establish "whether" and "to what degree" the citizens are willing to assume an active role in the procedures. In general, the responses expressed commitment to actively participate in such procedures and associated activities on the part of the citizens.



Vecht river - Improved regional cooperation in design and financing of river restoration measures by using the Ecosystem Services Approach

<https://www.deltares.nl/en/projects/restoration-vecht/>

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"Vecht Vision" outlines an approach to developing a strategy of balanced management of a river basin through integration of ecosystem services (ES) in the decision-making processes. In this way, this practice pursued the latest guidelines concerning the development of water management strategies, whereby the nature and its systems are positioned equitably in comparison with other uses of the water space. One of the initiatives was to undertake a practical verification in the form of a pilot study of an innovative (ES) concept. Namely, ecosystems provide a host of services beneficial to society (flood protection, food production, biotic diversity etc.). To promote awareness on (ES) and their appreciation by the space users, two scientific concepts have been developed: "determination of ecosystem services" and "payment for ecosystem services" (PES). Drawing of a list of ES has been initiated; the list is to contain the services recognised by the local population in the area of the Vecht river in the Netherlands and in Germany. The action was carried out through surveys among interested stakeholders in the sectors of agriculture, water economies, tourism, municipalities and nature protection, both

in Germany and in the Netherlands. As was to be expected, valuations of ecosystem services vary among the stakeholders. The surveys were followed by the examination of the obtained information and new cycles of interviews aimed at aligning the interests. The stakeholders finally recognised that more space allocated for the river (necessary retention areas) means enhanced biotic diversity and in turn attractiveness of the river and attraction of tourists in greater numbers (increased income from tourism). However, this also means that farmers will lose use of some land, which translates into a need for compensation mechanisms to gain a cost-benefit balance for the involved stakeholders. In its course, the project demonstrated that the ES approach can be instrumental in seeking: (I) refined integral solutions for the problems in the area under consideration; (II) new ways of financing measures, and (III) stronger support to planned measures among the land owners and the public. It was also demonstrated that the ES concept has a sound potential, since the stakeholders expressed their interest in payment fees in exchange for the use of ES.



Planning instruments to balance hydropower development and protection or restoration of aquatic environments in France

<https://circabc.europa.eu/sd/a/85a4834a-5733-4474-9686-d6d94d722b95/Presentation-Planning%20instruments%20for%20hydropower%20and%20preserved%20rivers%20in%20France.pdf>

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In France, the year 2008 saw the outset of discussions on the strategic development of river basins, with the focus on hydropower (HPP) uses. The dialogue followed the guidelines on integrated water management and two objectives were set: to achieve an annual production of 3 TWh from HPPs by 2020 and to bring 66% of the total water body surfaces to a good ecological quality level by 2015. Two lists of rivers to enter protection were drawn up. The first list comprises protected rivers where dams are not allowable. These are known as so called "continued flow rivers" or "preserved rivers". No construction of any new obstacle to the rivers from this list is allowed, and any already existing dams must provide for a statutory ecologically acceptable flowrate at the time of extending the concession. In this way, water flow continuity is preserved, i.e. the situation does not deteriorate in time. This list of rivers includes: (I) rivers of high biological value (they may also fall within the network of Natura 2000 habitats), (II) rivers rich in migratory fish species (often also with the N2000 status), and (III) so called "biological reservoirs". These are sections of rivers rich in water life species necessary to achieve or maintain good

ecological quality. The second list contains rivers with existing dams where flow continuity should be established within five years. Dams should be fitted with fish passages in order to achieve continuity for migratory fish species. Furthermore, provisions for transport of sediments should be arranged to improve hydro-morphological conditions. New dams are allowable provided that passages for fish species and sediments are in place. Both lists, with their restrictions and/or measures are also incorporated in the "Green and Blue Infrastructure" programme, which has been under way at the regional level since 2012. The objective of the green and blue infrastructure is to restore and preserve land (green) and aquatic (blue) ecological continuity through abolishing fragmentation of natural environments or habitats, with a particular focus on migratory species. The lists have evolved into a tool for the purposes of participation of stakeholders in determining strategic objectives harmonised between the uses of water for hydropower production on the one hand and environment protection and ecosystem services on the other.



CAMIS project - Coordinated activities for management of Isonzo - Soča

<http://www.camisproject.eu/model-primernosti.html>

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The principal aim of the CAMIS project is to seek compromises between different stakeholders and to set up advanced cross-border governance and management of a river in terms of sustainable use of strategic resources and preservation of water courses. Under the analytical and research part of the project, analyses of river morphology and hydraulics were carried out and water quality and suitability of water uses were analysed. A support method was developed for the purposes of assessment of suitability of the water and adjacent space for particular types of uses, for the upper section of the Soča river basin (hydropower, fish farming, bathing and arrangements for fishing activities) based on a multi-criterion approach, spatial analysis and cross-relating different relevant data. The method

supports sustainable and harmonised planning of actual water uses in the selected pilot area, and its results enable comparative cross-border transfer of knowhow across the entire Soča river basin as well as to other river basins. The development of the method and approach sought in particular the following objectives: (I) introduce state-of-the-art management of water and adjacent space; (II) provide support to integrated management of water and adjacent space at the local, regional, national and international levels, (III) harmonise solutions through active engagement of stakeholders at all levels, (IV) stimulate and promote interdisciplinary knowhow and approaches, and (V) develop support methods and information tools.



Murerleben – “Inneralpine River Basin Management River Upper Mur”

<http://www.murerleben.at/>

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The project overall objectives were restoration, amelioration and long-term protection of floodplain forests and riverine landscape. In pursuing these objectives, requirements of the Water Framework Directive (WFD) were considered, in order to improve ecological quality of waters, which in turn is a precondition for the preservation of rare and endangered animal and plant species. The inve-

stment in an amount of approx. 2.2m EUR could not be made without a 50-percent EU co-financing. The state participated in the investment through a federal ministry (Federal Ministry for Land and Forestry, Environment and Water Management), a federal land (Styria) and the organisation Murauer Stadtwerke (municipal utilities), in collaboration with persons eligible for fisheries. Success of the

implementation of measures rests on positive engagement of all the project stakeholders.

The project was co-financed by the following bodies and organisations:

- Federal Ministry for Agriculture, Forestry, Environment and Water Management,
- owner of fishing rights Elisabeth von Pezold,
- market community Pöls,
- municipality St. Peter ob Judenburg,
- community of fisheries management Thalheim-Knittelfeld,
- owner of fishing rights Mag. Klemens Hatschek,
- municipality Apfelberg,
- municipality Feistritz bei Knittelfeld,
- owner of fishing rights H.M.Z. Liegenschaftserwerbs-, verwaltungs- und Handels-GmbH,
- municipality St. Lorenzen bei Knittelfeld,
- market community Kraubath an der Mur,
- owner of fishing rights Horst Sigbald WALTER,
- Naturschutzbund Steiermark.



LIFE - Project: The Upper Drau – revitalization project

http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3149&docType=pdf

http://www.life-drau.at/palm-cms/upload_files/Downloads/Drau_LIFE_Laymans_report_EN_End.pdf

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The upper Drava river in Carinthia, Austria is rich in natural resources. As early as in 1998, the river and its bank areas entered protection under the Natura 2000 scheme. Since 2011, the upper Drava river has also been an area holding a European level of protection. The principal objective of the LIFE project was to follow up and enhance successful measures aimed at revitalising the Drava river. The practice focussed on the improvement of the statuses of habitats characteristic for Alpine rivers and to set up retention areas. The aim of the practice was to promote public awareness of the significance of the incorporation of the area in the Natura 2000 network. In compliance with the requirements of the EU LIFE programmes, the project examined, through monitoring, the effects of measures undertaken between 2006 and 2011. The monitoring covered several water environment subsystems, as follows: riverine morphology and inflow of sediments in relation to the hydrological characteristics of the water stream and inventories of fishes, amphibians, arachnids and insects, which served as parameters in measure-

ment of variations in conditions for fauna. The results were very favourable; however, they indicate that much remains to be done. The monitoring of the river bed revealed that the measures aimed at increasing the river width significantly contribute to the stabilisation of the Drava river bed. Flow velocities and shear stresses within the river flow have decreased, which has had favourable effects on the river morphology and inflow of sediments. Within the first year after the reconstruction of the dam, the depth of sediments at the river bed bottom upstream the dam increased. The stabilisation of the river bed has also had positive effects on the stabilisation of the underground water table. The results indicate that conditions for fauna have also improved. The number of insect species within the pilot area has notably increased, e.g. in the St. Peter/Amlach area, where, prior to implementing the measures, only one species was recorded, even six animal species have been recorded after the implementation of the measures. This practice is an example of quality "technical" monitoring of the effects of implemented measures.

CHECKLIST

1. INTEGRITY OF PLANNING AND DECISION-MAKING

	Which are the principle objectives of the practice?	Which other objectives are considered in the scope of the practice?
GOOD ECOLOGICAL STATUS OF WATERS	<input type="checkbox"/>	<input type="checkbox"/>
Improvement of ecological status	<input type="checkbox"/>	<input type="checkbox"/>
Restoration and renaturation	<input type="checkbox"/>	<input type="checkbox"/>
Improvement of hydro-morphology	<input type="checkbox"/>	<input type="checkbox"/>
Ensuring ecologically acceptable flow	<input type="checkbox"/>	<input type="checkbox"/>
Habitat and biodiversity	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>
WATER USE AND RIPARIAN LAND RELATED DEVELOPMENT	<input type="checkbox"/>	<input type="checkbox"/>
Water supply	<input type="checkbox"/>	<input type="checkbox"/>
Hydro energy	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>
Fish farming and fisheries	<input type="checkbox"/>	<input type="checkbox"/>
Sports and recreation activities	<input type="checkbox"/>	<input type="checkbox"/>
Technological water extraction	<input type="checkbox"/>	<input type="checkbox"/>
Navigation	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>
WATER RELATED RISK MITIGATION	<input type="checkbox"/>	<input type="checkbox"/>
Floods	<input type="checkbox"/>	<input type="checkbox"/>
Erosion	<input type="checkbox"/>	<input type="checkbox"/>
Draught	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

2. STAKEHOLDERS AND PUBLIC PARTICIPATION

Which groups of stakeholders are engaged in the participative process in order to actively participate in the planning of solutions?

Policy and strategy planners at the national, regional and local levels

Experts/scientists/researchers

Interest groups (economy, agriculture, tourism, nature protection)

Non-governmental organisations

General public/citizens

What is the flow of information and the influence of the public on the final decisions under the participative process?

- INFORMING** The public is furnished with balanced and objective information that are of assistance in understanding the problem, the possible solutions, the opportunities and/or solutions.
- CONSULTING** Obtaining feedback information on the applied analyses, selected solution scenarios and/or final decisions on the part of the public.
- ENGAGEMENT** Direct cooperation with the public throughout the decision-making process to ensure examination and consideration of any concerns on the part of the public.
- COOPERATION** Partnership with the public, standing for cooperation throughout all the phases of the decision-making process, including the cooperation in the development of solution scenarios and selection of the final solution.
- EMPOWERMENT** Adoption of final decisions concerning water management is entirely in the hands of the general public/citizens.

3. DECISION SUPPORT SYSTEM AND TOOLS

- Are the data and methods applied in the scope of the practice accessible to the public, properly presented and described?
- Is there a contact point / contact person provided, to offer additional information on the practice?
- Does the practice, in its measure planning segment, envisage the development and valuation of several scenarios of potential measures and solutions to achieve the set objectives?
- Does the analysis and evaluation of the scenarios of measures apply analytical tools to verify their efficiency (such as cost efficiency analysis (CEA), cost and benefit analysis (CBA) or multi-criterion analysis (MCA))?
- Does the scenario analysis and evaluation phase also incorporate the concept of ecosystem services (e.g. green infrastructure)?

4. FINANCIAL INTEGRITY

- Is the practice financed from all the three water management pillars (improving ecological quality, water and water space uses, mitigation of harmful effects of waters)?
- Have follow-up measures been agreed and recognised as efficient instruments to achieve the set objectives?
- Is there a plan for financing the planned and approved measures in place?
- Are the financial sources for the implementation of the agreed and confirmed measures allocated?

5. MONITORING AND IMPROVEMENTS

- Is there in place a plan of monitoring in order to supervise and evaluate the decision-making processes, participation, transparency etc. throughout the practice lifecycle?
- Have there been, in the course of the implementation of the practice, any adoptions and confirmations of any initiatives for amendments as a result of efficient and effective monitoring? (in the case of practices already implemented)
- Has monitoring contributed to the efficiency of the implementation of the practice and its positive acceptance? (in the case of practices already implemented)

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HOW TO PROCEED FROM HERE?

Integrated water management remains and will remain a challenge. The concept of integrated water management presented in this handbook introduces a fresh perspective of water management with the aim of seeking balance between the water environment capabilities and the needs of our society. New findings are presented in the field of water and water space management and planning, dictating balanced and sustainable water management and flexible social-economic systems as parts of the process.

The SPARE project has led to the conclusion that integrated water management relies on at least five aspects: integrity of planning and decision-making, engagement of stakeholders and of the public, system and tools to support decision-making, financial integrity and monitoring and improvements. These aspects complement each other and mutually improve the effects.

It was proven that in practice, the processes of planning, decision-making and participation are reasonably well incorporated and represented. The application of different methodologies and tools is also very common. New ideas arise on how to encourage the public to actively engage in the participative process. A lot of work remains to be done in order to improve financial planning and to effectively introduce monitoring. The main challenges in our future work are how to provide for balanced co-financing of the envisaged measures/solutions and how to set up a transparent and acceptable system of efficient surveillance of the process, and also provide assistance to it. The authors wish that all those actively involved in the field of water management or relying directly or indirectly on these activities might find this handbook a handy tool for integrated water management, thus contributing towards sustainable development and preservation of riverine ecosystems. Every new experience in this direction is a new contribution to integrated water management.

Remember, your job is to help the river be what it wants to be.
Dave Rosgen

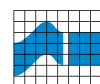
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