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HANDBOOK ON BASIN PLANNING WITH ELEMENTS OF STRATEGIC ENVIRONMENTAL ASSESSMENT

FOR CENTRAL ASIAN COUNTRIES AND AFGHANISTAN

ALMATY, 2020

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CONTENT

PREFACE

Integrated Water Resources Management (IWRM) is one of the key approaches to en-suring sustainable environmental management under the UN-declared International Decade for Action "Water for Life" (2005-2015). The adaptation of IWRM principles represents a long process of enhancing decision-making systems on all management levels. Development and execution of basin plans are the main components of integrated water resources manage-ment.

This Handbook is an updated version of the Handbook on Basin Planning published by CAREC in 2014 and produced with the financial support of the European Union within the framework of the Transboundary Water Management Programme in Central Asia (WMBOCA) Project implemented jointly by GIZ and CAREC. The Handbook is based on review of international basin planning experience as well practices applied during the process of devel-oping basin plans (BPs) for the Kazakhstan part of the Aral-Syrdarya Basin and 15 other small transboundary and national basins in the region of Central Asia (CA)and Afghanistan. The Handbook also includes elements of Strategic Environmental Assessment (SEA) as part of the basin planning cycle allowing prioritizing ecological issues in the planning process and as-sessing all other planned actions from the point of view of their environmental consequences. In addition to the corresponding theoretical overview, the Handbook describes a wide spectrum of practical tools to assist in BP development.

The Handbook is a universal methodological instrument suited for application in dif-ferent countries and at various levels – from national down to local. It is intended for decision-makers and planners, representatives of authorized state agencies, water users, and other stakeholders.

The Handbook was updated with the support of the U.S. Agency for Interna-tional Development (USAID) under the Smart Waters Project.

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LIST OF ABBREVIATIONS AND ACRONYMS

ASB BC	- Aral-Syrdarya Basin (Basin Council)
BWM CA	- Basin water management (Central Asia)
CDS	- Collection and drainage system
ES	- Ecosystem services
EU	- European Union
GIS	- Geo-information system
IUCN	- International Union for Conservation of Nature
IWRM	- Integrated water resources management
PES	- Payments for ecosystem services
SEA	- Strategic environmental assessment
SNR UN	- 2nd National Report on Climate Change (United Nations)
WRIUPS	- Water Resources Integrated Use and Protection Scheme
WRM	- Water resources management
WUA	- Water user association

INTRODUCTION

INTERNATIONAL EXPERIENCE OF IMPLEMENTING IWRM PRINCIPLES

The concept of integrated water resources management (IWRM) was first proposed at the 1992 Dublin International Conference on Water and Environment, and was included in the Agenda XXI later on in Rio de Janeiro.

According to the Agenda XXI, the main goal of IWRM is to meet fresh water demands of all countries to ensure their sustainable development. IWRM is viewed as a process possessing specific features in each given case.

The recognition of the complementary dependence of all types of water usage serves foundation of integrated water resources management. Based on this approach, decisions regarding the use and distribution of water resources are made jointly by all stakeholders considering the impacts each type of water use has on other usages. A watershed's socio-economic and environmental development objectives ensuring its sustainable development are considered as well.

Thus, IWRM targets sustainable management and development of water resources on all levels.

The following basic principles of integrated water resources management (or the Dublin Principles) became the basis for subsequent water management reforms in multiple countries:

- **Principle 1:** Fresh water is a finite and vulnerable resource essential to sustain life, development and the environment;
- **Principle 2:** Water development and management should be based on a participatory approach involving users, planners and policymakers at all levels;
- **Principle 3:** Women play a central role in the provision, management and safeguarding of water;
- **Principle 4:** Water has an economic value in all its competing uses and should be rec-ognized as an economic good.

In 2000, based on the Dublin Principles the European Union developed the EU Water Framework Directive which, in its own turn, became the key document of the overall EU's water policy.

The Directive is a cutting-edge model of implementing IWRM and basin planning principles. It aims to avert further deterioration of water quality, protect and improve water ecosystems and related water and marsh grounds, promote sustainable water use as well as regulate the processes associated with flood and drought prevention.

According to the Directive, each EU member-state has to identify and refer all its water facilities to specific river basins/watersheds. An authorized body responsible for developing the corresponding basin management plan has to be established in each of such units. The engagement of the general public and

other stakeholders in management processes manifests one of the most important aspects of the Directive.

This Handbook capitalizes on the fundamentals of IWRM and basin planning, as well as comprises elements of Strategic Environmental Assessment (SEA) for ensuring ecological sustainability of decisions over water resources management.

During the Soviet period, respective governments of Central Asian republics regularly laid out their water resource management (water) policies – the so-called Water Resources Inte-grated Use and Protection Schemes (WRIUPS).

After the breakup of the Soviet Union, the WRM of all Central Asian states (CAS) had undergone certain changes. Nonetheless, they still share a number of similarities potentially leading to inefficient water use. For example, management based on administrative division results in the prevalence of local as opposed to overarching watershed development interests. The actual planning is still done by separate and/or independent agencies. Stakeholder opportunities to take part in decision-making are limited in spite of the fact that corresponding norms are stipulated by water-related legislation and bylaws of Central Asian countries. Such a model does not allow considering interests of all the parties involved and contributes to the inability to fulfill obligations, water losses due to inconsistent measures and, even, conflict situations. As a rule, environmental concerns enjoy only minor attention or are not addressed altogether. Since 2000's, the countries of the region have started introducing the IWRM principles and gradually changing their water planning systems.

In Afghanistan, the traditional mirab (local master on water distribution selected by local community) system was used to manage water as well as plan water use and distribution locally. In 2000's, Afghanistan has also accepted the IWRM principles and introduced corresponding changes to its water law.

Obviously, the introduction of IWRM principles is directed towards responding to the aforementioned challenges and allows creating conditions for effective water resources management.

Interagency coordination mechanism – establishment of basin councils and/or coordination groups – is among the key IWRM advantages. This approach guarantees streamlined coordination and synergy of actions on all levels of the management hierarchy. The approach is described in detail in the Handbook on Small Basin Councils developed and issued by CAREC in 2020 within the framework of the USAID-funded Smart Waters Project.

The first IWRM principle – basin-level management based on hydrographic borders – ensures stable and equal water supply regardless of water user location (up- or downstream).

Broad public participation, including via consultations, in the planning process permits entertaining the interests of all water users. Measures to shape public opinion around the need to preserve water resources and to promote incentives enhancing water use efficiency and productivity are also central.

At the same time, CAS did not reject WRIUPS as a tool to plan the development of their territories. Co-existence of WRIUPS and basin plans is quite justified since there are certain differences as to the development and contents of these documents. The main features of the two models are presented in Table 1. below.

TABLE 1
MAIN FEATURES OF WRIUPS AND BASIN PLANS

	BASIN PLANNING	INTEGRATED SCHEMES
WRM scale and style	Basins and sub-basins irrespective of their size and/or scale; mainly decentralized WRM	National and major river basins; government regulation; centralized WRM
Stakeholder participation	Participation in the plan development	Notification about the scheme's major elements
Technical decisions vs. institutional projects	Balanced utilization of both options	Dominated by technical decisions
Environmental aspects of WRM	A priority	Reviewed together with other sectors
Financial/economic aspects	Detailed elaboration for each intervention; different funding sources and economic instruments	Centralized financial support of all interventions mainly from state budget; environmental pollution pricing as one of financial tools

The table above compares the main aspects and differences of WRIUPS and basin plans. As can be seen from the table, the presence of an operational WRIUPS in a watershed does not represent an obstacle for designing a basin plan (BP). Basin plan is more of a "living" document and can be based on the research and calculations done in the course of developing a WRIUPS. In the context of Central Asian countries – where state budget funding is limited – BPs represent the most suitable option due to the opportunities for decentralizing and finding new funding sources.

On the one hand, the science underlying WRIUPS allows considering different basin development scenarios as well as designing basin plans with the account of multiple factors. On the other hand, developing BPs enables engaging in the process various stakeholders other-wise not involved in drafting WRIUPS, as well as acknowledging their views and concerns.

Whereas WRIUPS focus more on conceptual-level efforts in a given watershed, basin plans may include simple but relevant pressing issues of significance to local communities.

A combination of these two approaches represents an ideal setting for basin-level planning. The table clearly shows that there are no obstacles for developing/implementing a basin plan in a watershed which already has an operational WRIUPS. Due to limited target funding from CAS budgets, BPs appear to be the most appropriate approach as they allow decentraliza-tion of corresponding costs and efforts to locate funding.

The traditional mirab system can also exist in parallel with IWRM and help in deploying these principles locally. Afghanistan – where the traditional mirab system is co-existing with

the newly adopted IWRM system – is a good example of such a synergy. Thus, all three models – the traditional mirab system, WRIUPS (still in operation), and the novel IWRM and basin planning approach – can co-exist and complement each other.

CONCEPTUAL AND METHODOLOGICAL APPROACHES TO BASIN PLAN DEVELOPMENT AND IMPLEMENTATION

Numerous methodological approaches as to BP development exist in the world. The ones presented below have been endorsed as appropriate for application within the water sector and, to a varying extent, may be used during the process of drafting basin plans.

For instance, the main goal of the **transboundary monitoring assessment system**[1] is to identify and forge optimal strategic basin planning models with the account of political, social, economic, and environmental development needs of a given area/watershed. The system's overarching principle is the mutual beneficial nature of planned interventions for all stakeholders. As a rule, this methodological instrument is used by joint river basin organizations to in-vestigate urgent issues and locate best solutions. The matrix consists of 4 development factors and 3 sources of water resources. It is worth noting that other development factors can be add-ed in each individual case.

Strategic Environmental Assessment (SEA) is a systematic and comprehensive process contributing to informed decision-making related to both environmental protection and sustainable development. It is usually applied to plans and programmes which are likely to significantly affect the environment, especially along the water management lines. The SEA's immediate aim is to enable sound decision-making and to provide a way of resolving issues, primarily with regard to environmental, social and health effects of a particular decision. However, SEA is also directed toward achieving and/or supporting the ultimate goals of environmental protection and sustainable development.

SEA began to be employed in several countries by mid-1980's. By 2001, the EU adopted Directive 2001/42/EC specifically dealing with SEA and making it legally binding for all member-states. The SEA Protocol to the UNECE Convention on Environmental Impact Assessment in a Transboundary Context was adopted at the meeting of the parties to the Espoo Convention on May 21, 2003 and entered into force on July 10, 2010. The SEA Protocol can be considered the most complete and comprehensive international legal document in the field.

[1] Phillips, D. J. H., Allan, J. A., Claassen, M., Granit, J., Jägerskog, A., Kistin, E., Patrick, M. and Turton, A. (2008). The TWO Analysis: Introducing a Methodology for the Transboundary Waters Opportunity Analysis. Report 23. Stockholm International Water Institute (SIWI): Stockholm, Sweden.

The SEA's major objective, thus, is to integrate environmental considerations into strate-gic decision-making and support ecologically sound and sustainable development. The assess-ment of alternatives, as well as transparency and participation in the national and transboundary context constitute important elements of this process.

SEA assists authorities to take into account[2] key environmental objectives, indicators and trends, allows evaluating significant ecological effects of implementing a plan or programme as well as assessing necessary measures to avoid, reduce and/or mitigate adverse impacts.

SEA is usually applied to plans and programmes which are likely to have significant ef-fects on the environment. An environmental effect is any ecological impact, including on human health, flora and fauna, biodiversity, soil, climate, air, water, landscape, natural sites, material assets, cultural heritage, as well as the interaction among these factors. To be able to properly assess and evaluate both impacts and necessary measures, a typical SEA comprises the following steps/elements carried out consecutively.

The elements and tools relevant for river basin management plans are contained in the respective steps and will be described below.

Step 1: Screening

Step 2: Scoping

Step 3: Environmental report

Step 4: Decision-making

Step 5: Monitoring

The **Basin Planning Concept**[3] - developed within the framework of the Support of Water Management and Basin Organizations in Central Asia (WMBOCA)[4] Project sponsored by the EU – formed the basis of this Handbook, and was tested and fine-tuned under the USAID-funded Smart Waters Project implemented by CAREC.

The Concept describes several methodological models mentioned earlier. For Handbook purposes, the hydrographic watershed is used as the base unit. Integrated evaluation and baseline basin assessment serve as its underlying attributes. A lot of attention is rendered to stakeholder and public involvement in the process of basin planning.

[2] Ling, M., Coppens, L., MacDevette, M., Mapendembe, A. An Introduction to Environmental Assessment, UNEP (2015)

[3] Меры реализованные , проектом ЕС «Поддержка водохозяйственных и бассейновых организаций в Центральной Азии (WMBOCA)», осуществлены в рамках 2-й фазы Программы GIZ «Трансграничное управление водными ресурсами в Центральной Азии», проведенной под эгидой Министерства иностранных дел Германии.

[4] Хупер Б., 2006. «Ключевые показатели эффективности управления речными бассейнами». Александрия, Вирджиния: Институт водных ресурсов, Корпус инженерных войск армии США. См.веб-сайт проекта «Интегрированное управление водными ресурсами в Ферганской долине»: http://iwrm.icwc-aral.uz./ Документ можно найти на сайте Программы: http://www.waterca.org/programme/c2/isfara-kb.

CHAPTER 1.

BASIN-LEVEL WATER RESOURCES MANAGEMENT

1.1. Legal framework of basin-level management and planning

Water codes and/or water laws form the foundation of water legislation in CAS. To this or that extent, each of the legal frameworks presents opportunities for introducing IWRM and basin planning principles.

Table 2. below reflects IWRM and basin planning elements within the CAS water laws.

TABLE 2

WATER RESOURCES MANAGEMENT AND PLANNING PRINCIPLES WITHIN WATER CODES/LAWS OF CENTRAL ASIAN COUNTRIES AND AFGHANISTAN

WATER MANAGEMENT AND PLANNING PRINCIPLES	KAZAKHSTAN WATER CODE (July 9, 2003, with additions of November 26, 2019)	KYRGYZSTAN WATER CODE (January 12, 2005, with additions of July 30, 2019)	TAJIKISTAN WATER CODE (April 2, 2020)	TURKMENISTAN WATERS CODE (October 15, 2016, with additions of January 5, 2018)	UZBEKISTAN LAW "On Water and Water Use" (1993, with additions of November 2019)	AFGHANISTAN WATER LAW (October 2019)
Planning principles	Chapter 7, Article 40 "Basin Inspection and its functions"	Chapter 3, Article 20 "Basin plans on development, use and protection of water resources"	Article 31 "National Water Strategy" and Article 38 "Basin plans on water resources management"	Article 22 "Objectives of state planning on the use and protection of water resources"	Article 111 "Water resources integrated use and protection schemes"	Chapter 3, Article 17 "Design and outline of water resources management plan"
Planning and management authorities	Chapter 7, Article 40 "Basin Inspection and its functions" and Article 43 "Basin councils"	Chapter 2, Article 10 "Basin council and its authority"	Article 20 "National Water Council" and Article 24 "River Basin Councils"	Article 15 "Territorial and basin state water management organizations"	Article 10 "Participation of WUAs and other non-commercial organizations as well as local communities in rational water use and water protection activities" and Article 32 "Rights of water users"	Chapter 2, Article 12 "River basin advisory council and its duties and authority" and Article 13 "Sub-river basin advisory councils and their duties and authority"

KAZAKHSTAN

The Water Code of the Republic of Kazakhstan was the first one among similar CAS documents to incorporate such concepts as IWRM, basin councils and basin planning. The code is based on the basin (or hydrographic) management principle. Kazakhstan pays considerable attention to establishing basin councils (BCs), developing basin plans and concluding basin agreements.

By 2020, over 30 basin agreements were signed in Kazakhstan with the majority of them in the Balkhash-Alakol Basin. Fulfillment of the requirements of the Water Code is included in its state budget funding program. Since 2008, various efforts to deploy IWRM principles have been supported using state budget means.

BASIN PLANNING ELEMENTS IN THE WATER CODE OF THE REPUBLIC OF KAZAKHSTAN

(of June 9, 2003 with amendments of November 26, 2019)

IWRM ELEMENTS

Article 1 (Chapter 1): "Basin management principle – water resources management based on hydrographic characteristics and used to distribute water resources within river, lake and other water body basins among administrative and territorial units".

BASIN PLANNING

Article 34 (Chapter 5): Main principles of public administration related to the use and pro-tection of water resources:

- basin management.

Article 40 (Chapter 7): Basin inspection and its functions:

- development and implementation of basin agreements on rehabilitation and protection of water resources;
- agreement of plans by local administration on rational water use;
- development of plans on water intake and distribution via inter-district and interstate water facilities and corresponding control;
- organization of the work of basin council, analysis of basin council's recommendations and identification of measures for its implementation;

Article 42 (Chapter 7): Basin agreements on the rehabilitation and protection of water bodies:

• basin agreements shall include parties' obligations to join efforts and means necessary to implement specific water-preserving activities with specified deadlines.

Article 43 (Chapter 7): Basin council:

• Basin council shall be deemed an advisory and consultation body established within a respective basin.

KYRGYZSTAN

Foreign experts consider the Water Code of the Kyrgyz Republic (KR) to be a modern piece of legislation reflecting the best WRM international practices. The Water Code of the KR acknowledges water resources management based on the basin approach. According to the document, each main watershed shall establish a basin water administration and a basin council.

The founding of the National Water Council – which shall focus its efforts on developing proposals on the establishment of hydro-geographic borders of the main basins, drafting the National Water Strategy and other legislation, etc. – is yet another interesting fact deserving attention.

Thus, Kyrgyzstan's legal framework corresponds to the principles of IWRM and basin planning both on the national and local levels.

BASIN PLANNING ELEMENTS IN THE WATER CODE OF THE KYRGYZ REPUBLIC (of January 12, 2005 with amendments of July 30, 2019)

Article 10 (Chapter 2): Basin councils and its authority:

Basin councils' objectives include the following:

• development of... basin plans;

• drafting procedural rules regulating basin council activities...;

• coordination of water-related activities within the main basin.

Article 20 (Chapter 3): Basin plans on the development, use and protection of water resources:

"Draft basin plans shall be developed by basin councils...".

Basin plan may do the following:

- assess the quantity and quality of water resources within the basin;
- identify water needs for environmental purposes and for use by the population;
- estimate investment and financial requirements and identify potential funding sources;
- establish water use priorities and possible restrictions of water user rights in various economic sectors;

"... State water administration shall establish procedures on drafting basin plans...".

"... Operation of state water administration and relevant basin water administrations shall focus on the implementation of corresponding basin plans...".

"... Basin plans shall be revised by relevant basin councils every 5 years...".

TAJIKISTAN

The water legislation of the Republic of Tajikistan is also based on the national Water Code. A number of water resource issues, though, are regulated by over 50 other domestic legal acts.

The latest Water Code in Tajikistan was adopted on April 2, 2020. According to the Code, Tajikistan shall establish river basin organizations and river basin councils comprised of representatives of state water bodies, local administrations, water users, public authorities and other stakeholders. Draft basin plans on water resource use and protection will be gradually developed for all watersheds in Tajikistan and shall be based on the IWRM principles.

BASIN PLANNING ELEMENTS IN THE WATER CODE OF THE REPUBLIC OF TAJIKISTAN (April 2, 2020)

Article 23. River basin organizations:

River basin organizations shall be responsible for the introduction of IWRM, implementation of basin plans and water resources management within basins.

Article 24. River basin councils:

River basin council shall consider and approve draft basin plans.

Article 38. Basin plans on water resources management:

- Basin plans on water resources management shall be developed by responsible au-thority with participation of river basin organizations and other stakeholders.
- Expenses related to the development of basin plans shall be covered from state budget and other financial sources allowed in Tajikistan.

TURKMENISTAN

The Water Code of Turkmenistan aims to ensure environmentally safe and economically optimal level of water use as well as to protect water resources for improving the living condi-tions of the population and safeguard the environment. The Code does not directly stipulate for the basin-based approach to WRM. However, it refers to the calculation of water resources balances based on the quality and scale of water use in river **basins**.

It also states the requirement to draft general and **basin** (territorial) Water Resources Integrated Use and Protection Schemes identifying key water management and conservation measures aimed at preserving water resources. WRIUPS should aim to satisfy prospective water needs of the national population and economy, to use water in the most effective and rational way as well as to protect water and to prevent its harmful impacts.

According to the Code, the public may facilitate and be directly involved in activities

aimed at the rational use and protection of water implemented by state agencies, as well as in decision making on water resources use and protection.

BASIN PLANNING ELEMENTS IN THE WATER CODE OF TURKMENISTAN (October 15, 2016, with additions of January 5, 2018)

Article 19 "Public participation in the implementation of activities related to water re-sources management"

Citizens of Turkmenistan and public organizations can participate in decision making related to water use and protection.

Article 22 "Objectives of state planning on the use and protection of water resources"

The main goal of state planning is providing scientifically based water distribution and protec-tion of water.

Forecasts of Turkmenistan's socio-economic development shall be considered during planning in line with water balances and water resources integrated use and protection schemes.

Article 24 "Water resources integrated use and protection schemes"

Schemes shall be divided into general, basin and territorial.

UZBEKISTAN

Uzbekistan still follows the Law "On Water and Water Use" lacking the definitions of basin planning and basin councils. However, it includes some elements of public participation and consideration of different water-related factors during planning and managing water resources.

BASIN PLANNING ELEMENTS IN THE LAW ON WATER AND WATER USE OF THE REPULBIC OF UZBEKISTAN (1993, with additions as of November 2019)

Article 10 "Participation of WUAs and other non-commercial organizations as well as local communities in rational water use and water protection activities"

While implementing actions on rational use and protection of water resources, state bodies can consider suggestions from WUAs, non-state and non-commercial organizations.

Article 32 "Rights of water users"

Water users can participate in decision making on water resources management.

Article 110 "Water balances"

Water balances shall be developed based on river basins and irrigation system basins.

Article 111 "Water resources integrated use and protection schemes"

Schemes shall be divided into general, basin and territorial.

AFGHANISTAN

The newly updated version of the Afghanistan's Water Law considers elements of basin planning along with the need of preserving the traditional mirab system. The Law includes both basin and sub-basin WRM systems with clear division of responsibilities.

BASIN PLANNING ELEMENTS IN THE WATER LAW OF AFGHANISTAN (October 2019)

Article 11 "Duties and authority of the Ministry of Water and Energy"

Conceptualizing, developing and proposing allocation and reasonable use of water resources plan to the Supreme Council of Water, Land and Environment.

Article 17 "Design and outline of water resources management plan"

Design and outline of water resources management plan shall cover the following particulars.

1. Analyzing the potential of available and accessible water resources in main and sub-basins of both river basins and watersheds.

2. Based on the consequences of floods, droughts and other natural disasters, develop-ing a model of climate change impacts on water resources.

3. Allocation and effective use of water resources for different purposes.

4. Monitoring and evaluation of water use.

CHAPTER 2.
BASIN PLAN DEVELOPMENT. BASIN MANAGEMENT CYCLE

2.1. Water resources management: planning cycle

As we saw above, currently the integrated approach to resolving water issues receives increasing attention. It became impossible to apply solutions which do not equally cater for economic, environmental and social needs. Basin planning is an essential component of IWRM which may be applied at various levels, including in the transboundary context.

BP drafting and implementation gives water management (basin) organizations an opportunity to execute integrated baseline analysis and assessment of their respective water management situations, as well as to carry out short- (2-3 years), mid- (5-7 years) and long-term (10-15 years) basin-specific water use planning. The basin planning model takes account of potential economic trends, demographic forecasts, increasing evidence of effects due to climate change and other factors influencing basin development.

To properly draft an IWRM plan, one should observe certain key principles ensuring its sustainability and efficiency, the main one being the process also known as planning cycle.

Such planning cycles are the same for any management system, be it basin or enterprise management. Overall, the management methodology is based on the Plan-Do-Check-Act cycle. The key success factor while developing a basin plan is the widest possible involvement of stakeholders at all stages of planning and execution.

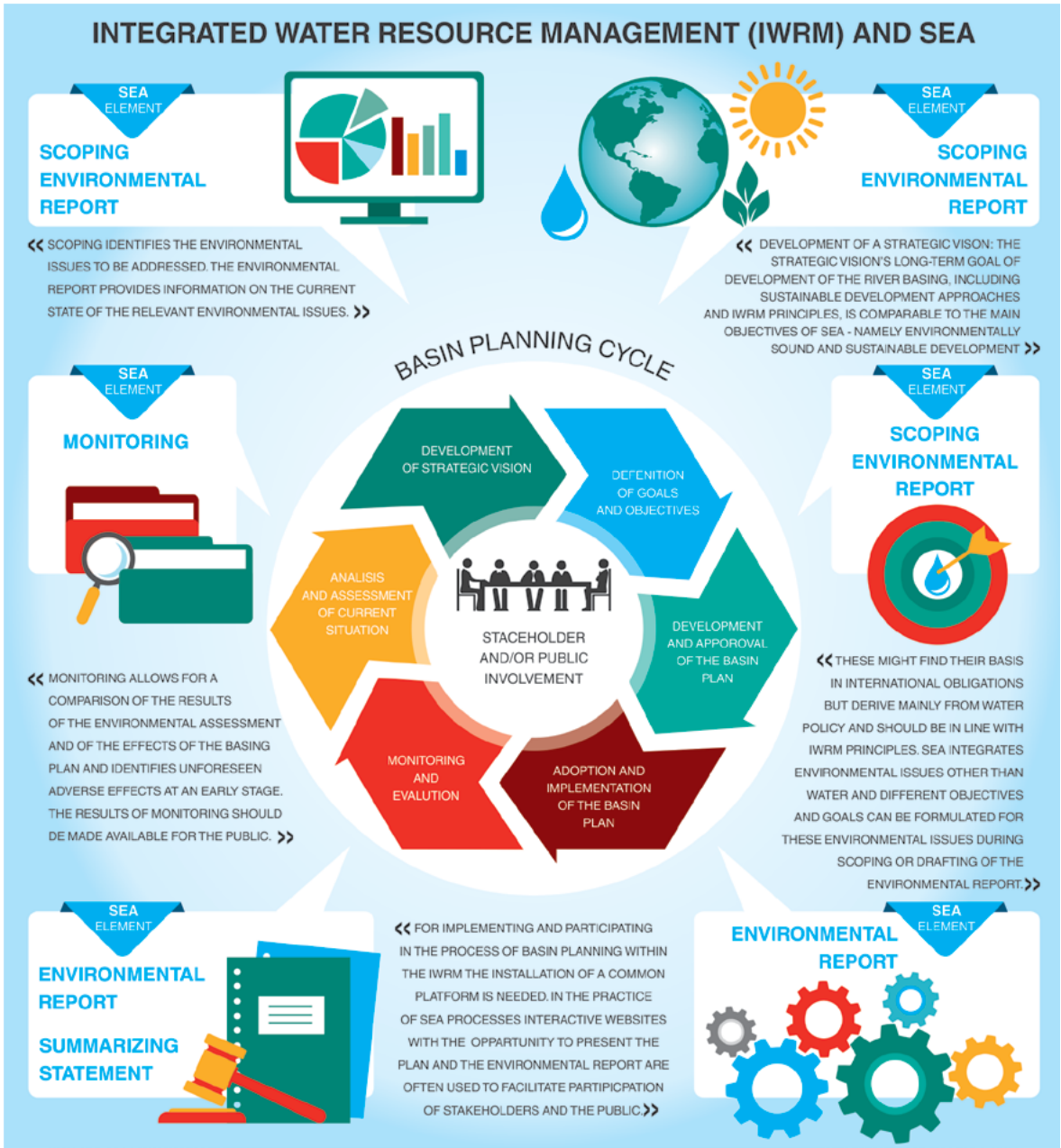
Figure 2. Shows the modern IWRM planning cycle with its 7 major phases thoroughly reviewed below.

FIGURE 1
BASIN PLANNING CYCLE

The basin planning model takes account of potential economic trends, demographic forecasts, increasing evidence of climate change related effects as well as other factors influencing watershed development.

Strategic Environmental Assessment offers a complementary tool to IWRM to intro-duce and integrate ecological considerations into river basin planning (see Figure 2. below).

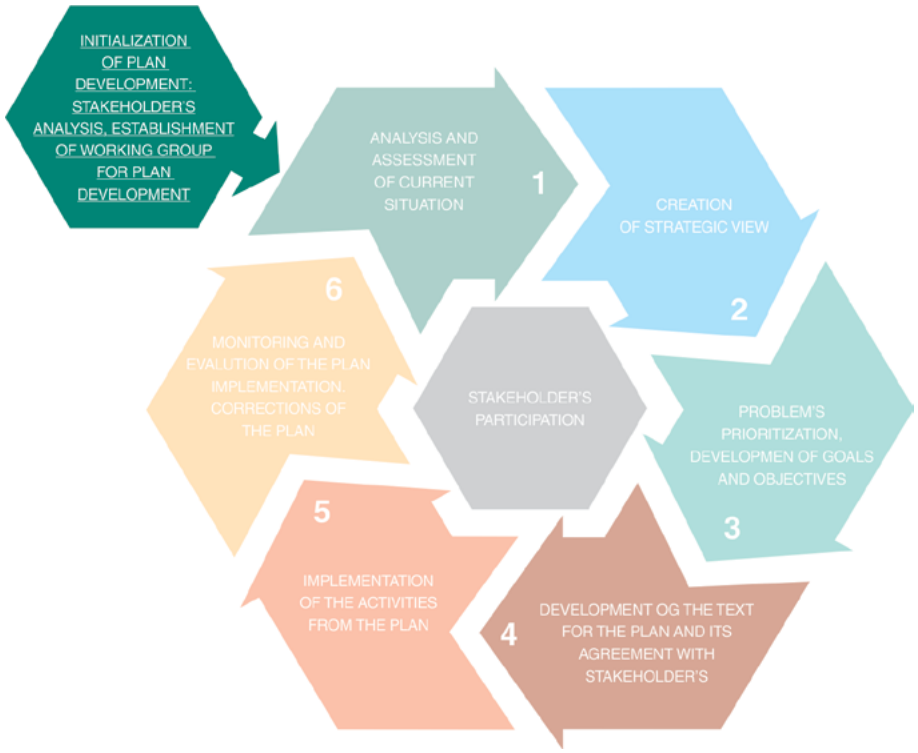
FIGURE 2



Prepared based on EU Program «Sustainable management of water resources in rural areas in Uzbekistan». Component 1 «National policy framework for water governance and intergrated water resources management» supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), International Water Management Institute (IWMI), Council for Agricultural Research and Agricultural Economics Analysys (CREA).

Before designing and implementing a basin plan, the process needs to undergo launching. As is defined in the planning cycle, this phase is called the Initialization of Plan Development. At this stage, stakeholders are identified and a working group is formed to develop BP. The initiative group considers and re-views various political commitments, identifies the main steps of developing the plan, as well as determines these responsible. By all means, stakeholder participation should be ensured even during the initialization stage. Initialization is the main step of launching the entire process.

FIGURE 3



2.2. Stakeholder analysis

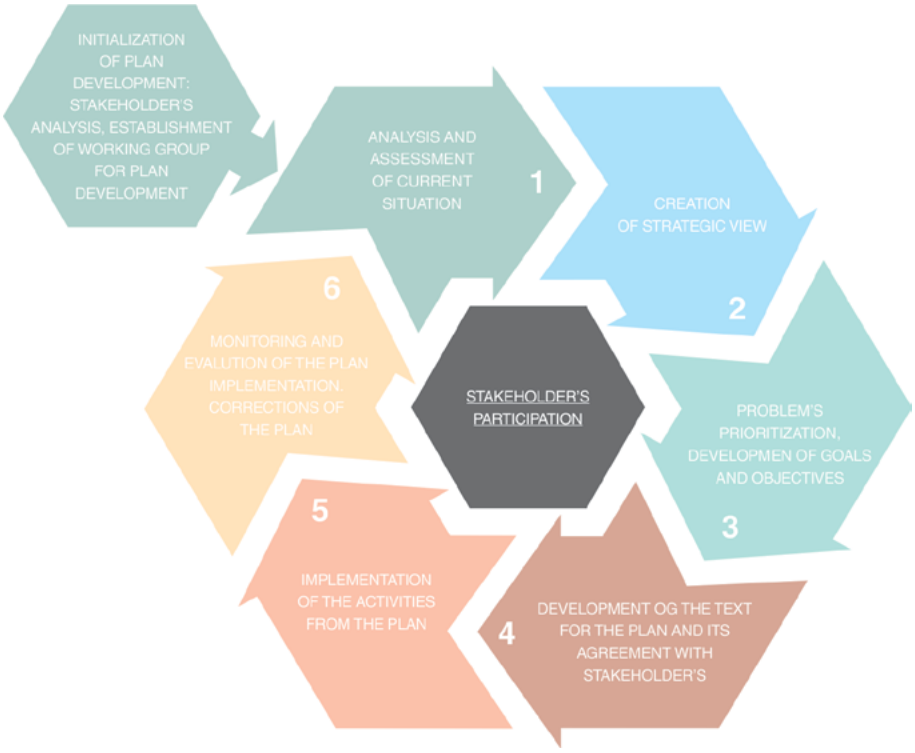
Stakeholder involvement is vital during all stages of drafting and/or executing a basin plan.

The list of stakeholders within a given country or basin may vary.

While forming a stakeholder list, one should take account of management conditions specific to the area/watershed in question as well as present industrial enterprises and public organizations, current ecological situation, potential emergencies, etc.

The widest possible stakeholder participation allows identifying, formulating and pri-oritizing existing challenges.

FIGURE 4



Every stakeholder should clearly understand the advantages of being engaged in the planning process and the proceeding implementation stage.

Stakeholder opinions and interests do not always match and may come into con-flict.

It is necessary for concerned parties to strike a compromise and agree on shared deci-sions both of which promote their more effective execution.

Benefits of stakeholder participation in the planning process:

- Knowledge-based decision-making;
- Key stakeholders suffer from the lack of water resources and/or their poor man-agement to a larger extent;
- Consensus at early BP drafting stages reduces potential for future conflicts;
- Transparency of public and private activities;
- Trust-based relations among all process participants.

FIGURE 3.

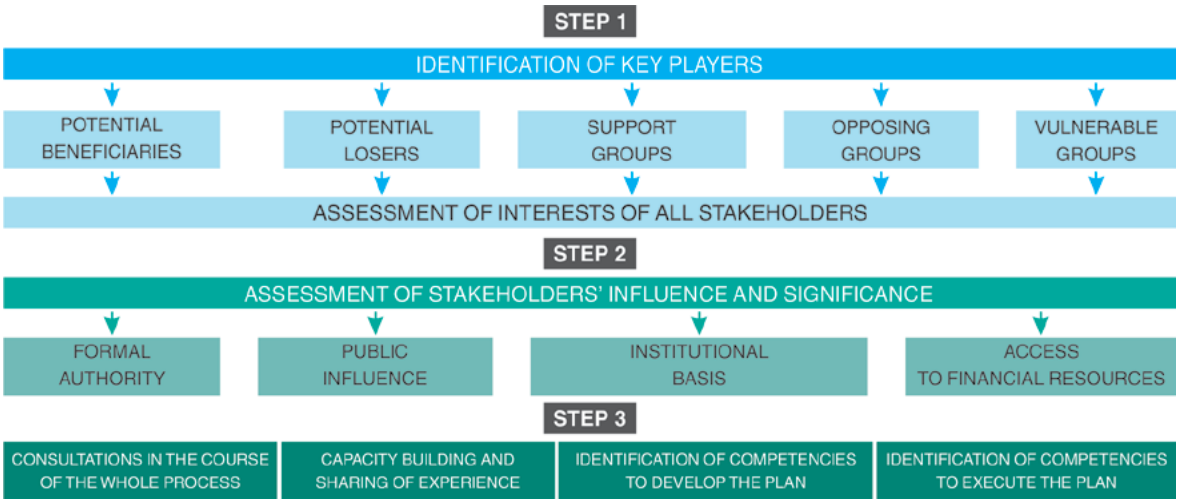


FIGURE 5

2.3. Baseline analyses and assessment

The analysis of current conditions in a basin is the second step of basin planning. The situation analysis ensures the scientific basis allowing to not only take account of the ongoing situation in the basin, but likewise to forecast potential basin progress.

A comprehensive baseline assessment serves as the basin plan development reference point. The assessment may be done either by stakeholders or with the involvement of addi-tional third experts and should include the following:

• assessment of existing WRM procedures to locate problems and possible so-lutions;

• analysis of all key aspects causing problems and demanding improvement;

• assessment of the current environmental situation. This may include related topics such as human health, flora and fauna, biodiversity, soil, climate and air, landscape, natural sites, material assets, cultural heritage and the interac-tion among these factors;

• listing problems and recommendations to resolve them;

• identification of current priority issues.

Such an analysis should first of all include an assessment of the current WRM framework and all key sectors to identify management challenges and potential solutions. The analysis allows putting together a general list of issues – Problem Register. Situational Analysis also provides a baseline for the subsequent designing of a monitoring system to assess basin plan execution.

Baseline analysis/assessment should manifest a balanced account of technical data, subjective information acquired by experts, and available statistics. The data set should be as exhaustive as possible and aimed at pinpointing the widest spectrum of challenges.

The analyses should involve all stakeholders. This can be done either directly or indirectly, i.e. by interviewing or requesting certain information. Such an approach allows revealing all issues at various levels and in various spheres.

Broad application of the following cutting-edge information and communication tech-nologies is an important aspect of conducting an assessment:

1. online databases;

2. GIS (geo-information systems);

3. remote sensing;

4. GPS systems.

Baseline analysis/assessment results should be disseminated as widely as possible which will ensure sufficient stakeholder feedback. The formats of distributing the data are numerous, inter-sectorial multi-stakeholder dialogues being just one of them.

The insert box 4 describes several examples of Situational Analysis.

Kazakhstan part of the Aspara River Basin

1. Physical and geographical conditions in the basin

2. Social and economic characteristics of the basin

3. Water issues in the region:

• challenges of water protection and use

- social and economic challenges in the region

Kazakhstan part of the Aral-Syrdarya Basin (ASB)

Assessment of the current situation:

- current state of water resources
- analyses of legal and institutional frameworks of water resource management in the ASB
- international cooperation on WRM in the Aral-Syrdarya Region
- register of barriers and issues preventing effective WRM in the region. Prioritizing challenges.

Kyrgyzstan part of the Aspara River Basin

Analyses and assessment of the current situation (basin characteristics)

- Physical and geographical conditions:

- Climate;
- Hydrology and hydrography;
- Ecosystems and biodiversity.

The analysis can be divided into three main blocks each represented in the Situational Analyses to this or that degree. The first one includes the Institutional Analysis primarily focusing on the legal framework and structure of WRM in a target basin. The analysis un-der this block allows determining the legal framework for both drafting and executing BP, as well as the means/agencies for its implementation.

The second block is thematic and can vary from basin to basin. Overall, Thematic Analyses focuses on forecasting water availability, assessing water use system, climate change impacts on water resources, as well as environmental and socio-economic situation in a given basin.

The third block is strategic and focuses on the basin's further development. Strategic Analyses focuses on existing strategies and plans associated with the overall development of a target area/watershed adopted on the provincial and/or national level. The basin plan should fully comply with and contribute to strategic development plans.

TABLE 4

INSTITUTIONAL:	THEMATIC:	STRATEGIC:
• Legal framework • Structure of water resource management (including institutional capacity and management tools)	• Water resource management frameworks (legal and institutional) • Ecological situation in the basin • Social and economic situation in the basin • Other thematic assessments depending on specific issues in a given pilot area	• Area-specific development strategies and plans adopted on oblast (province) or national level

The outputs of the Situational Analysis should be subject to wide dissemination among basin stakeholders.

A comprehensive analysis may reveal a significant number of issues and challenges requiring due attention. They should be organized into a list called the Problem Register.

Problems and issues spotted during basin planning and entered into the register may be associated with:

- public water supply and food production;
- public health;
- mitigation of adverse environmental impacts;
- increasing management efficiency;
- monitoring development;
- research and/or technical upgrading, etc.

The Problem Register is formed based on the procedure of identifying, assessing and updating all basin-specific concerns. All revealed challenges should be entered into the register. It does not include a list of solutions but incorporates a schedule of measurable indicators to monitor problem resolution.

The Problem Register is the basis for ranking and prioritizing issues. Top-priority items, then, are used to determine the goals and objectives within a given BP and to design a corresponding action plan. The Problem Register should be made available to all stakeholders and the public also entitled to making proposals as to expanding or reducing the list of prob-lems.

TABLE 5

SAMPLE BASIN PROBLEM REGISTER

IDENTIFIED PROBLEM	NEGATIVE IMPACT(S) AND RISK(S)	PROBLEM CAUSE(S)	ACTIVITY-(IES)	INDICATOR(S)	RANK SCORE
Lack of irrigation water	Irrigation water losses; decreasing land productivity	Extended use of irrigation networks; depreciation of irrigation systems; lack of regular maintenance of systems	Agriculture (irrigation, cropping)	Irrigation systems output-input ratio; water losses at intake and during supply to fields	
Pollution of water bodies with collection-drainage and waste water, as well as household waste coming from settlements along river/ channel	Decreasing water quality in water bodies; growing risk of infectious diseases	Absence of cleaning arrangements within CDSs; violation of water conservation zones and regions; low community culture	Municipal utility services	Volume of waste water discharged into rivers; river water quality indicators; number of illegal dumps	

Shallowing of delta lakes	Marsh formation; fish stock losses; decreasing productivity of lakeside pastures	Water intake for irrigation purposes	Agriculture (irrigation, cropping)	Lakes water surface; fish stock; fish species diversity; pasture land	
Land degradation	Soil erosion; pollution load on water bodies; destruction of riverbanks, habitats and natural functions; floods and mudslides	Overgrazing; overuse/inappropriate use of fertilizers and pesticides; soil sealing	Agriculture/ infrastructure development / industrial development	Soil sealing; soil fertility (general soil functions); changing land cover; soil erosion (loss of fertile soil)	

There are several mandatory columns for inclusion in the Problem Register: "Negative impact(s) and risk(s)" (list of adverse events which may occur as a result of a problem), "Problem cause(s)" (list of factors that have led to a problem), "Indicator(s)" (indicator system allowing to monitor the status of a problem: improving or aggravating trend).

The "Activity-(ies)" column makes it possible to rank all challenges by activity elements and/or economy sectors.

The "Rank Score" column is filled the last after prioritizing issues.

As was mentioned earlier, every problem entered into the register has to be rated based on its impact on the environment, basin economic and social development, potential negative aftermath and risks. All pertaining data should be inserted in the corresponding register col-umns, upon which each problems is calculated its rank score.

The results are, then, entered into the Problem Assessment Matrix (see Table 5).

REGISTER LEGEND

1. Identified problem – a negative ecological, economic or social development. All problems should be clearly identified, formulated and classified;

2. Negative impact(s) and risk(s) – a list of adverse events which may happen if a problem persists;

3. Problem cause(s) – reason(s) that have led to the emergence of a particular (ecological) problem;

4. Activity(-ies) – sphere(s) (area(s), etc.) of human involvement which are based on interaction with the environment and lead to the emergence of specific (en-vironmental) problems;

5. Indicator(s) – indicator(s) allowing to monitor the status of a particular (eco-logical) problem (growing or decreasing);

6. Rank score – a digital indicator assigned to every problem identified after ranking.

Water challenges are numerous and cannot be addressed all at once. This is the reason behind the need to prioritize them and choose the most burning one(s) at a given point of time.

TABLE 6
PROBLEM ASSESSMENT MATRIX

ENVIRONMENTAL PROBLEM	IMPACT SCALE (1-5)	COMPLEXITY/ COST OF ALTERING IMPACT (1-5)	TIMEFRAME (1-5)	PUBLIC INTEREST (1-5)	PRIORITY RATING (AGGREGATE)
Lack of irrigation water	4	5	3	5	17
Pollution of water bodies with collection-drainage and waste water, as well as household waste coming from settlements along river/channel	3	4	4	5	16
Shallowing of delta lakes	4	2	4	1	11
Land degradation	4	4	3	4	15

POTENTIAL PROBLEM ASSESSMENT CRITERIA:

• **Impact scale.** The measure of influence is estimated based on a 5-point grading scale. The maximum value (5) is awarded to issues of global nature (ex.: climate change, extinction of IUCN-listed endangered species). "4" is given to impacts covering considerable areas or several different ecosystems (ex.: impact on transboundary water resources). "3" corresponds to medium-level impacts with expressed territorial focus covering considera-ble areas. "2" means local-level impacts with a potential for gradual expansion during a long period of time. The minimal value (1) refers to single-point impacts without potential to spread by water or air and not influencing unique flora and/or fauna habitats.

• **Complexity/cost of altering impact.** This criterion is used to estimate the level of technical, financial or organizational sophistication of efforts aimed at curbing a negative situ-ation causing a particular problem. Maximum values (from 3 to 5) correspond to problems which are possible to resolve both technically and financially. Exigeant impact alterations are given lower values (1-2).

• **Timeframe.** The time criterion assesses the amount of time needed to change a negative situation causing a particular problem. Maximum values (from 3 to 5) refer to concerns which may be addressed within shorter terms. Changes demanding longer deadlines receive lower values (1-2).

• **Public interest.** The minimum value (1) is assigned to problems characterized by the lack of public interest. Problems causing local-level interest of a limited number of stakehold-ers receive the value of "2". Problems characterized by the broad public interest on the basin level are assigned values from "3" to "4". If a problem draws public attention on the national and/or international level it is awarded the highest score (5).

All assessment criteria values are, then, added up in the Priority Rating column and summed up. A high Priority Rating indicates that a particular problem is significant, and that it is possible and necessary to address it immediately.

Problem assessment can be based on the criteria provided, but in each case they may differ depending on the specific situation in given basin. The number of assessment criteria may also vary based on the decision of stakeholders.

Problems may be rated using different approaches – the one presented above is just one of many. Rating may be done separately by various stakeholders, for example, independently by the public, state agencies, scientists and experts, etc. In this case, the independently obtained rating scores are added together to get corresponding average values.

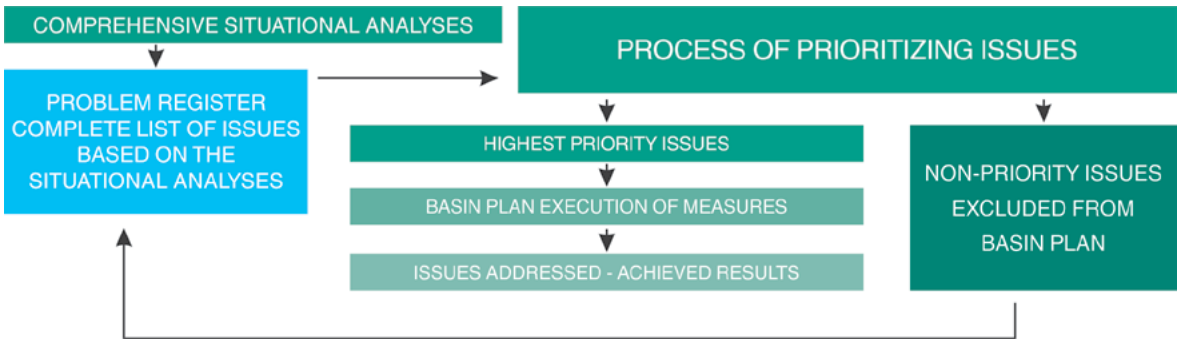
Thus, problems/concerns which received the highest score are deemed top-priority and become the backbone of the basin plan, i.e. the need to address them shapes basin-specific goals and objectives as well as corresponding actions.

The Problem Register is a "living" document which is regularly amended and adjusted in the course of BP implementation or due to updating the Situational Analysis.

The Problem Register consists of two blocks:

- **Block 1.** Top priority issue(s) included in the basin plan;
- **Block 2.** Non-priority issue(s) or issue(s) which cannot be addressed at present.

FIGURE 6



Yet, the issues and problems in Block 2. should not be neglected. As the issues in Block 1. get addressed/resolved, the issues initially listed in Block 2. gradually migrate to Block 1. and become subject to BP implementation actions. In other words, the problem register is the basis for continuous basin plan revision and development leading to gradual development of a given territory/area as well as achieving efficient water resources use.

Identification of the foremost issues does not mean that the other ones may be discarded. The problem register should be revised, and the problems should be re-ranked on a regular basis. Stakeholders decided on the review frequency.

Insignificant problems not included in the initial BP may gain scope and demand attention in the future upon subsequent revisions of the Problem Register. Thus, with and in due time all concerns within a particular watershed will be reflected in a respective plan and addressed.

The revision of the Problem Register and prioritizing should be carried out on a regular basis. Basin council members set the terms of revising the register.

The Problem Register format presented herein is the simplest and can be filled at any level.

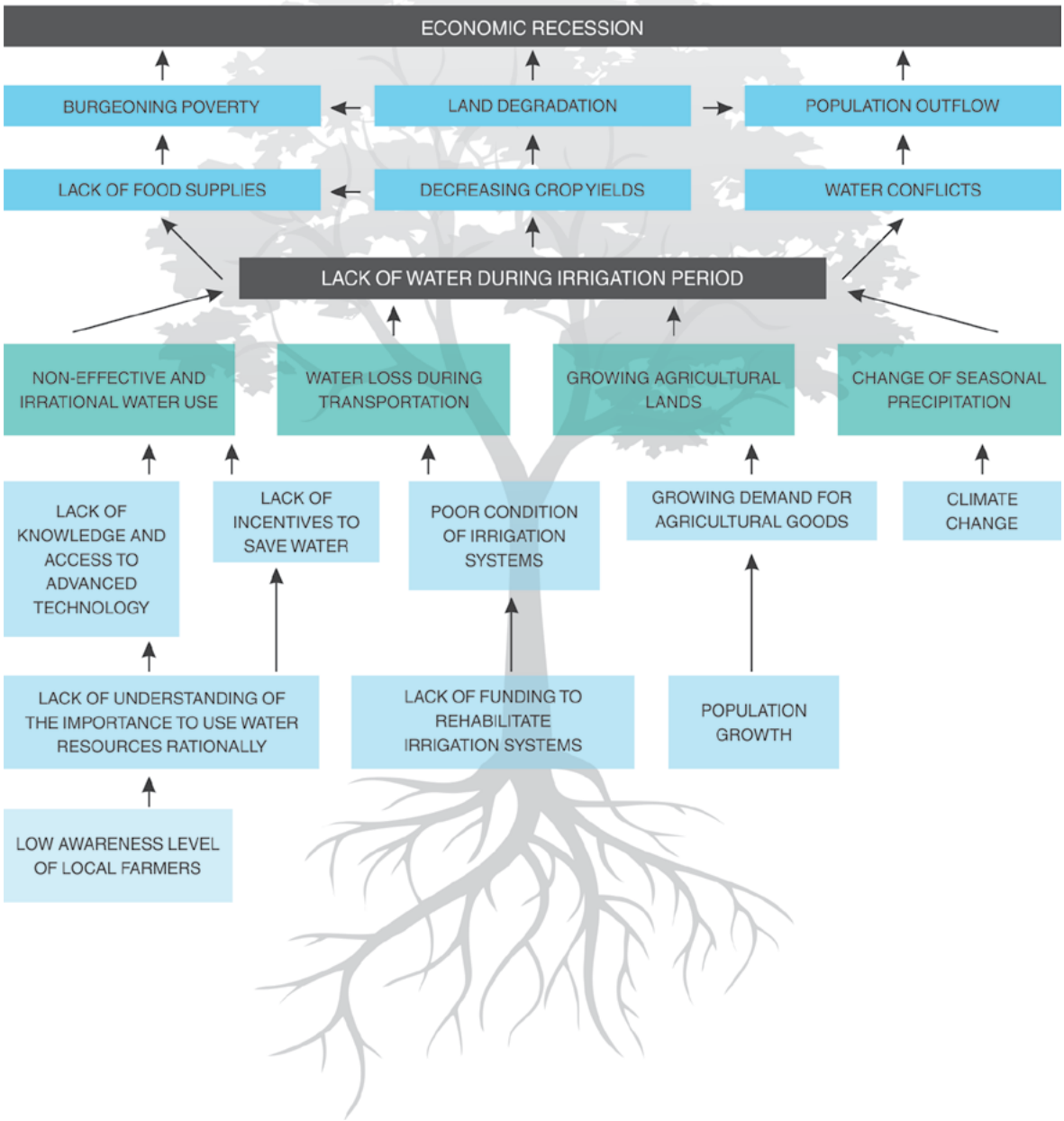
The register format may be different, contain more or less information on identified issues, as well as may comprise scientific data and/or maps. Basin council approves the register format and the method of filling it out.

The problem register should be made available to stakeholders and the general public entitled to express their opinion as to its expansion or reduction.

Please, bear in mind that it is possible to improve the overall basin situation only by addressing the root causes of challenges. The efficiency of BP implementation depends on whether the problem register was filled out correctly, i.e. whether the underlying reasons and not the consequences of problems were properly detected. Often, it is the latter which lie on the surface, and it seems that they constitute the main problems. However, attempts to merely eliminate the consequences will not allow addressing the problem at its heart and improving the situation in the basin. Therefore, in each case the Problem Register should identify the root problems from which all others stem.

A special tool called the Problem Tree permitting to reveal the cause-and-effect relations may be used to identify such root problems. A sufficiently detailed Problem Tree allows identifying the root problem and reflecting it in the Problem Register. An ideal option is putting together Problem Trees for all problems included in the Problem Register. This will allow not only pinpointing the root causes, but also grouping all the existing issues depending on their mutual linkages. Provided it is not possible to analyze all the problems in the Problem Register this way, attention should be given to the issued that got the highest Priority Rating score.

FIGURE 7
PROBLEM TREE



The Problem Tree is a diagram demonstrating the causal relationships between its blocks making it easier to formulate problems and forging solutions. It allows determining the full range of interrelated causes and consequences underlying a problem, almost completely excluding the influence of external subjective factors. The Problem Tree is one of the key tools in system analy-sis.

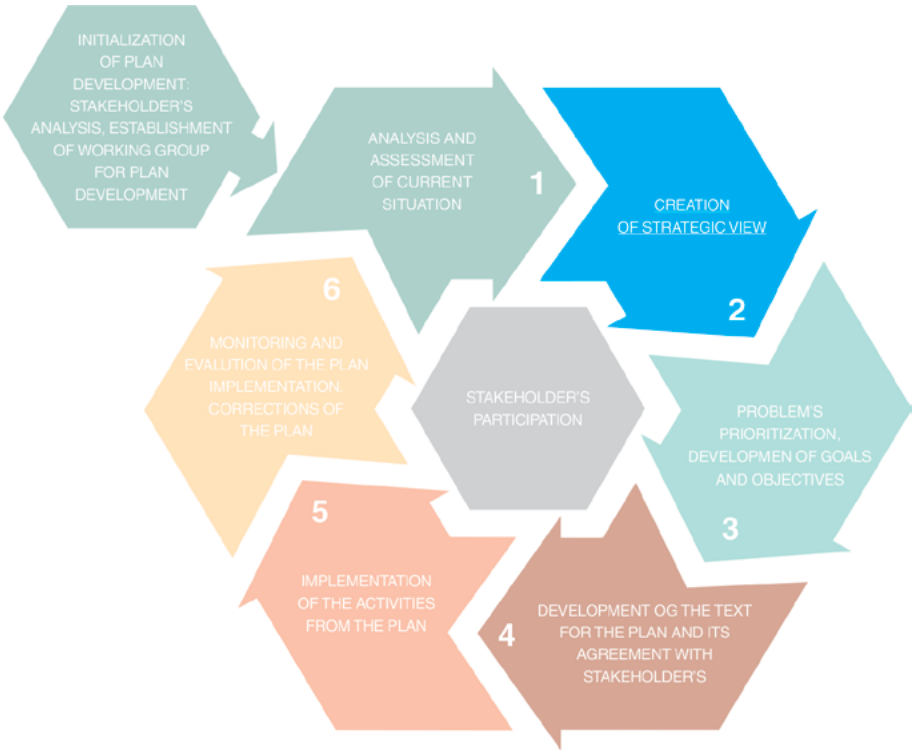
A sample problem tree is presented herein. A thoroughly built and detailed tree allows locating root causes and reflecting them in the Problem Register.

As a rule, brainstorming involving the maximum number of stakeholders – within the framework of a basin council meeting – is the best option for drawing up the Problem Tree.

The following steps are necessary to put together a Problem Tree:

Step 1. The problem Tree consists of three parts: roots, trunk and canopy. The Roots rep-resent the reasons that caused a problem. It is them which condition its existence. Addressing them will allow fixing the problem. The Trunk represents the wording, and the canopy – the con-sequence of the problem. The first thing to do is to draw the tree trunk, i.e. to formulate a problem as it exists at present, and not in the past or in the future. The problem should be formulated spe-cifically avoiding unnecessary words. It should not be

FIGURE 8



linked to some global issues which are al-most impossible to influence.

Step 2. Next, it is necessary to draw the roots, i.e. to identify all reasons leading to a problem. After that, they can be grouped, including specifying relationships among them. Try finding the maximum number of "roots", since it is their solution that will facilitate resolving a given issue.

Step 3. The last thing to do is to draw the canopy, i.e. to identify the immediate points of contact between the problem and its consequences. After that, it is required to track other negative impacts, i.e. rise to the upper level. This should be done as long as the consequences are still within the scope of the problem.

In the course of drawing up the Problem Tree, its trunk, roots and canopy may change their places, change themselves and move between levels. The Problem Tree should serve the foundation for drawing the Goals and Objectives Tree described in Chapter 2.5 below.

2.4. Strategic vision: development phases

The drafting of strategic vision is another important step in the planning process. *Vision represents the main long-term goal of basin development.* This document is based on the basin long-term development plans and stakeholder consultations.

The strategic vision provides an opportunity for taking a broader view on the basin devel-opment going beyond daily responsibilities and short-term planning.

The vision is the main long-term goal of basin development formulated and formalized in a special document. This document is called the Strategic Basin Development Vision and is an integral part of BP.

Strategic vision is a long-term (usually 20-25 years) document identifying basin devel-opment prospects. However, there are no clear rules regarding the period of time which the vision should cover. Thus, the basin council determines the actual vision duration period.

The following may serve basis for the development of strategic vision:

- official political statements in the form government-approved documents;
- informal political statements of executive officials;
- national as well as territorial development strategies and/or plans;
- international obligations.

The desire of a state to achieve a certain long-term goal forms the basis for any planning that it does. The same is true for basin planning. Thus, the overall political course of a state should form the BP basis.

BASIN VISION

Basin population is supplied with drinking water up to 70-80%.

Automatic water resource accounting is in place.

Water availability forecasts supporting crop and farm area planning for each vegetation season are based on river discharge data.

Compliance with irrigation standards is ensured. New water-efficient technologies (drip/sprinkler irrigation, etc.) have been introduced.

Environmental awareness among the population has been raised. Efforts on public environmental upbringing are in progress.

Inter- and intra-farm irrigation canals underwent rehabilitation. Irrigation network performance has increased by 30-40%.

Both official policy statements in the form of government documents, decrees, agreements, strate-gic plans and development programmes of a watershed/area and informal policy statements by members of executive authorities can serve ground for drafting the strategic vision for a basin. In case of transboundary water bodies, any international obligations relating to a watershed/ area should be taken into account as well.

The following conditions should be considered while drafting the vision:

- vision should be accomplishable, i.e. not fantastic and realistically achievable, as well as reflecting the desires for developing a given watershed/area;
- feasible in a certain period of time, i.e. during the period which the vision covers;
- focused on certain issues, in this case, on water resources management, use and protection.

As all other BP components, Strategic Vision should be disseminated and discussed among all stakeholders as widely as possible.

VISION DESCRIBES THE ULTIMATE LONG- TERM GOAL OF BASIN ENVIRONMENTALLY SOUNDS AND SUSTAINABLE DEVELOPMENT

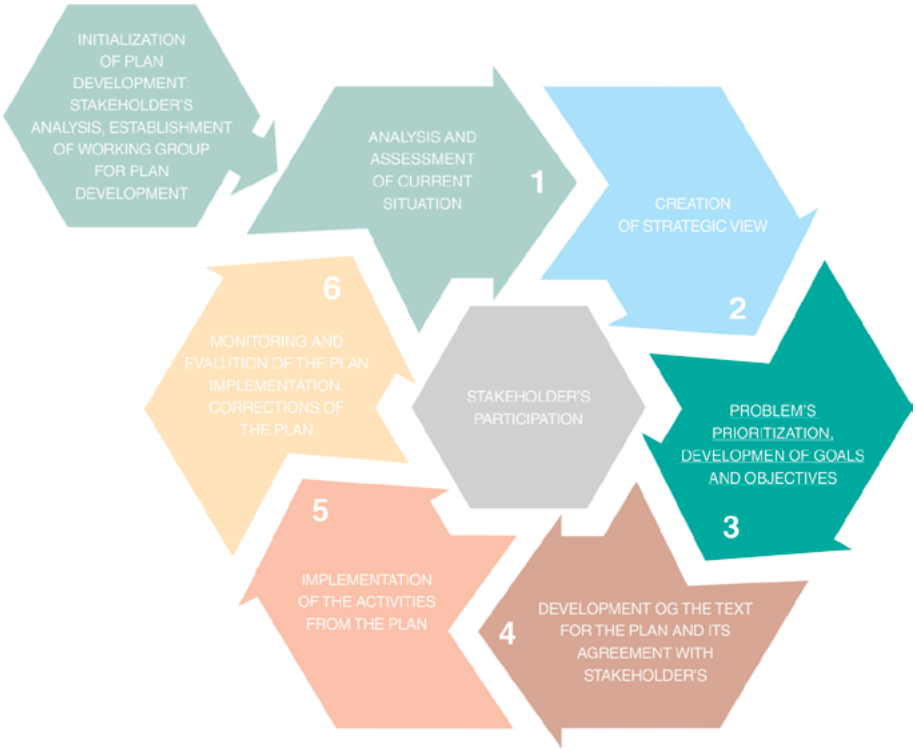
The development of Strategic Vision is primarily based on analyzing the adherence of existing water policies and strategies to sustainable development approaches and IWRM principles.

The second step is the analysis of available resources and needs allowing to identify the main priorities of a watershed/area development.

Involving all stakeholders in the process of drafting and approving the vision is the next step in its development. It requires formal and informal consultations, as well as maximum dis-semination of information to take account of the interests and views of all stakeholders.

Strategic Vision should be verified against a target country's political processes and priori-ties, as well as approved by the basin council.

FIGURE 9



2.5. Identification of goals and objectives

In order to address the previously identified priority issues, it is necessary to elaborate basin plan goals and objectives. Their careful formulation ensures effective implementation of BP later on. The goals of implementing basin plans should comply with certain IWRM principles and have the following characteristics:

- **correlation** with international obligations, mainly deriving from water and environmental policies and in line with IWRM principles;
- **specificity** (goals are set to resolve identified problems);
- **measurability** (opportunity to assess whether a goal was achieved or not based on certain indicators);
- **achievability** (possibility to achieve a particular goal by way of performing certain actions within a time period and using available resources);
- **efficiency** (achieving a particular goal allows resolving certain basin-specific problems);
- **clear timing** (possibility to set a timeframe for achieving a particular goal);
- **goal coordination** (a particular goal correlates with other basin-specific goals).

If the basin plan contains several goals, it is necessary to consider all of them together in order to ensure that the goals are linked with and do not contradict each other.

In order to clearly define the difference between goals and objectives, first of all let's analyze their corresponding definitions:

• Goal – is a dream clearly formulated, written down on paper and formalized in a clear action plan;

• Objective(s) – is (are) small step(s) (action(s)) to achieve the goal.

While formulating goals and objectives, it is vital to understand the difference between them. There is a whole array of differences between these two notions making it possible to clearly separate the two concepts.

While drafting goals/objectives it is essential to understand their differences which may be dictated including by their management and execution levels:

• **Management level** – goals are set on the national/basin level; objectives are set on the local level;

• **Quality vs. quantity** – goals are considered as quality indicators while objectives, as a rule, have specific quantitative criteria;

• **Hypothesis vs. guarantee** – goals may be hypothetical and not achievable at pre- sent. Objectives are achievable and their achievement is measurable;

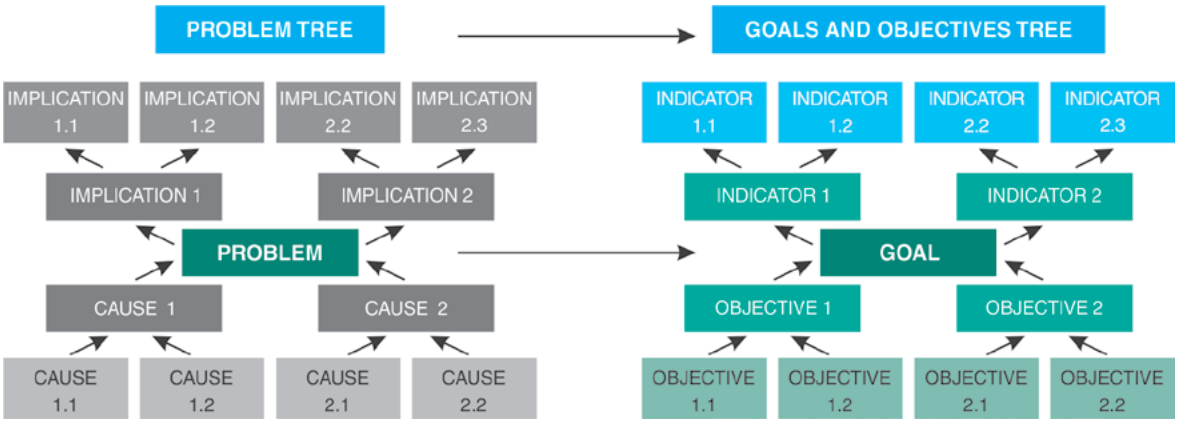
• **Assessment & monitoring** – achievement of goals is evaluated within a final assessment. The level of achieving objectives is evaluated by way of regular monitoring and the need, if required, to adjust respective interventions;

• Policy vs. program – goals are set on the level of adopting political decisions/ strategic plans/ strategic visions. Objectives are identified on the level of regional, oblast (province), local (community) programs and development plans.

Based on the IWRM principles, BP can include various aspects of water resource management, use and protection. Therefore, the goals of the basin plan may be associated with provision of water to the population and food production, as well as with provision of public health. Significant attention may be paid to reducing negative ecological impacts. Goals can be also aimed at addressing various issues in the fields of management, analysis and/or data collection. Basin plans can likewise render special attention to research and/or technical improvement of water infrastructure. This is obviously only a general review of the aspects which can be identified as BP objectives. The list may be expanded depending on the specifics of a particular watershed.

The Problem Tree developed during the baseline assessment is a good start for asserting respective goals and objectives. The root cause response may become the main goal within the plan. Second-tier problems and their solutions may be deemed objectives. Third-tier issues may help to formulate necessary actions to implement the plan. Thus, the Problem Tree may be transformed into the Goals and Objectives Tree.

FIGURE 10

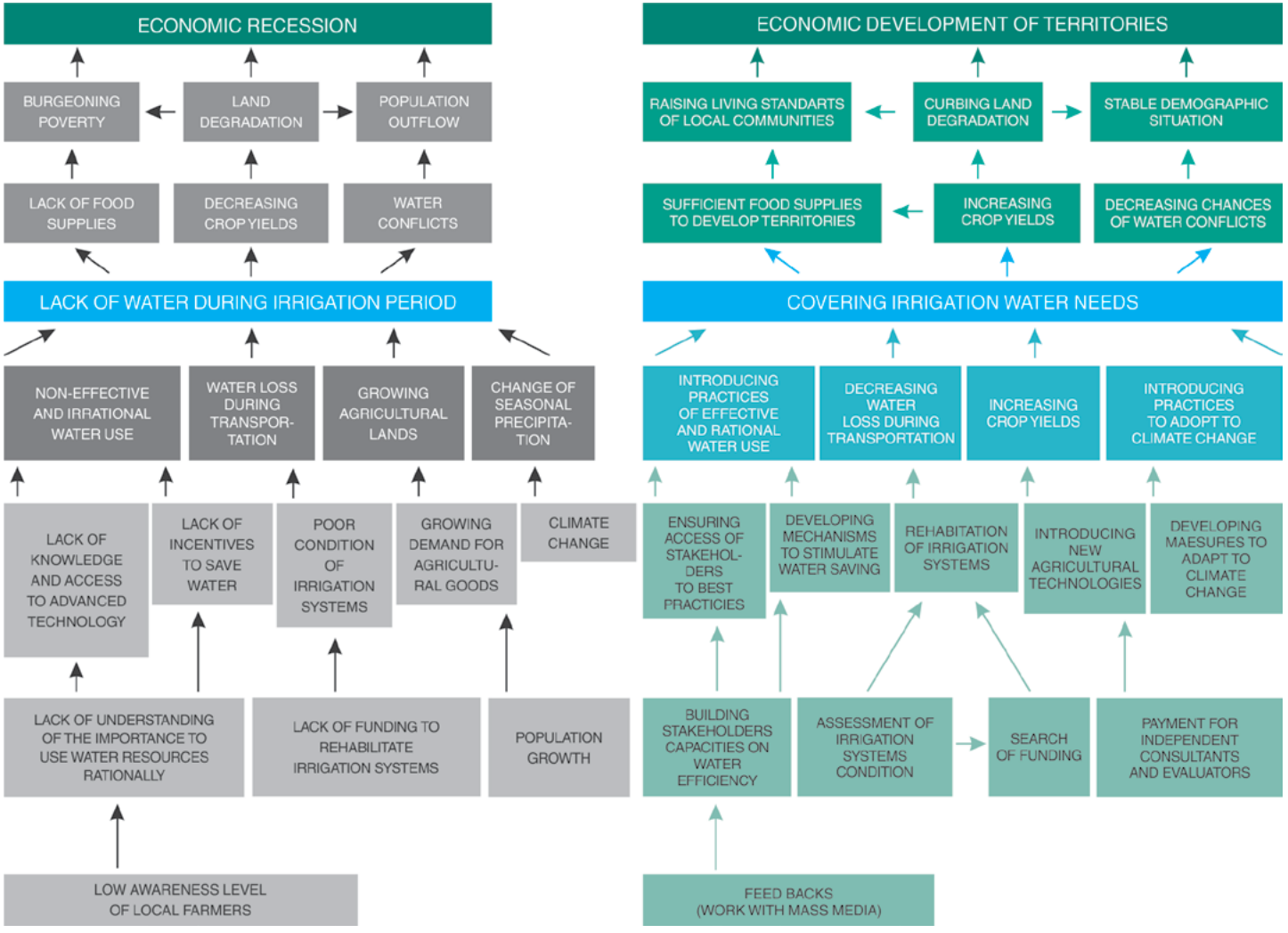


What is needed here is basically turning the negative wording making up the Problem Tree into affirmative. Then, the solution – or the goal – will emerge in the center instead of the problem. The problem roots will become the objectives for achieving the goal, and the branches (consequences) at the top of the diagram will become the indicators for measuring progress towards resolving the root problem.

Let's look at the Problem Tree that we have compiled based on the Problem Register. In this case, our main challenge is the lack of water during irrigation season. The main causes for this shortage are inefficient and unsustainable water use, water losses during transportation, expansion of agricultural land and changes in seasonal precipitation due to climate change. The consequences of irrigation water shortage may be water conflicts, reduced yields, and reduced food production. Now, we can transform our Problem Tree into the Goals and Objectives Tree.

FIGURE 11

TRANSFORMING PROBLEM TREE INTO GOALS AND OBJECTIVES TREE



In this case, the constructed Goals and Objectives Tree focuses only on one problem in a hypothetical watershed. If while prioritizing issues, several main problems had been identified, and they are all included in the BP, then the goal may be formulated broader and include several aspects.

The sample Goals and Objectives Tree herein may be used to formulate the following goals and objectives for the plan:

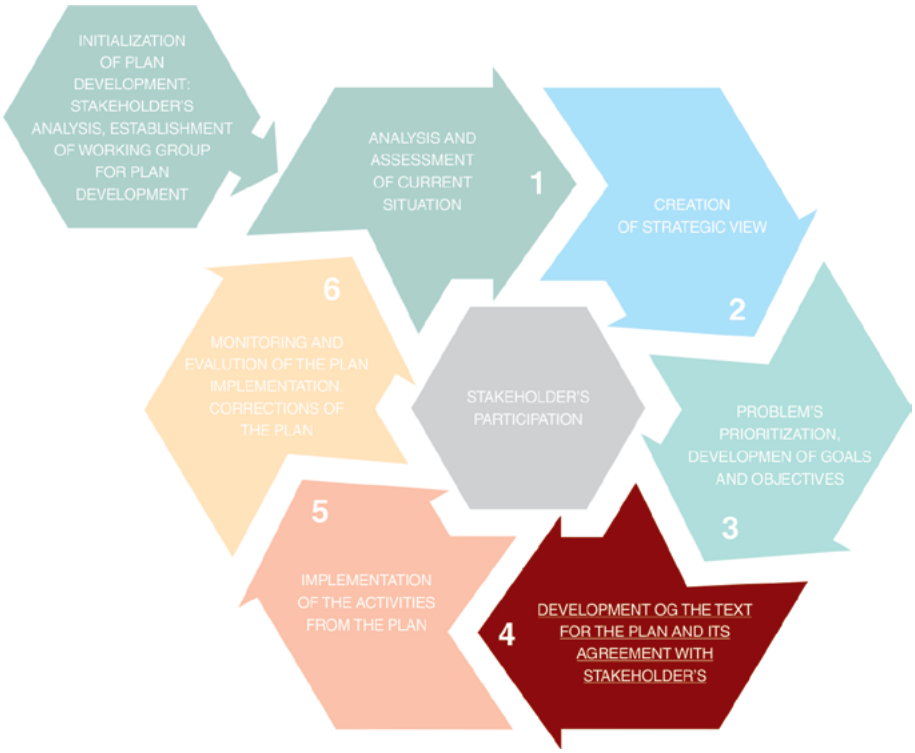
Goal: satisfy population needs in irrigation water.

Objectives:

- introduce practices of rational and effective water use;
- reduce water losses during transportation by 20%;
- increase crop yields by using advanced agricultural technologies.

As is shown in this example, the basin plan can focus on completely different interests and include objectives addressing issues in different sectors.

FIGURE 12



2.6. Basin plan development and approval

After fulfilling all preliminary steps, the obtained data and materials require integration into a single document – the actual basin plan.

When drafting the text of the plan, it is necessary to observe a number of key principles:

- public participation in the plan development, discussion and approval;
- conducting a baseline assessment of basin-specific WRM and environmental issues, affected by the plan;
- identification of specific goals/objectives, performance indicators as well as monitoring mechanisms to oversee BP implementation, including ecological effects;
- setting clear priorities;
- distribution of responsibilities related to plan execution, monitoring its implementation, drafting financial plans and setting required timeframe;
- focusing on major WRM restrictions;
- consideration of the general hydrologic cycle/ all river basins.

The plan should reflect national water and environmental strategies as well as national strategic and basin-specific development programs and plans.

Different approaches may be used to draft basin plans. The task may be delegated to one person, a team of experts, representatives of concerned line ministries and agencies or, even, external consultants. The actual choice depends on stakeholders and availability of target funding.

It bears mentioning that a person (persons) engaged in drafting the plan's actual text should be involved in all planning phases – from baseline analyses up to action plan and designing a mechanism to monitor BP execution.

While developing basin plans, it is necessary to observe the following basic principles:

- engaging the public at all stages of work is the first and upmost principle of basin planning, including BP drafting and review, as well as adoption and approval of key decisions;
- situational analyses manifests the basis for developing the basin plan; later on, it serves the foundation for prioritizing existing problems in the basin;
- at the plan development stage, it is necessary to clearly define specific goals and objectives, a system of indicators and deliverables, and a mechanism for monitoring the plan implementation;
- at the plan development and approval stages, it is also necessary to clearly distribute the roles for implementing planned actions and monitoring performance, drafting the financing plan and determining the action timeframe.

Basin plans can be cover different periods, i.e. they can be short-, mid- or long-term. In doing so, BP may contain parts relating to the short and long term in one document. As a rule, whereas short-term plans cover 3-5 years, long-term cover up to 20-25 years. Basin council determines the duration of the plan; in some countries, it is also regulated by law.

Basin plan contains a list of specific activities, identifies the corresponding timeframe and roles for the plan execution, as well as indicators to track the achievement of goals and objectives set.

The following criteria shall guide the process of designing plan actions:

- the first and one of their most important criteria for basin plans is their feasibility. A plan should include only actions which can be actually executed during the plan duration period;
- planning should take account of the availability/ absence of necessary capacities, i.e. not only financial but also human resources, intellectual potential, availability of specialists, etc.

Under the condition of executing a robust Situational Analysis as well as carefully working through the Goals and Objective Trees, basin council members can draft the basin plan themselves; this plan development stage will not require significant investment.

The first BP item to be formulated in writing is its content. All stakeholders should make this decision jointly.

The plan should reflect the national water strategy as well as national strategic and basin-specific development programs and plans.

Now, let's go back to the already developed Problem Tree. Looking below the task-level, we see the actual actions the execution of which will lead to achieving our objectives and goals. They can become a part of the basin plan.

For instance, in order to introduce sound and efficient water management practices, it is necessary to design mechanisms fostering water-saving and ensure stakeholders' access to best practices. Simultaneously, attention should be given to enhancing stakeholder capacities on efficient water use via a broad awareness-raising campaign.

The development of the plan's Content section is another step towards completing the document. The plan's Content may vary by country/basin depending on selected priorities. However, there are several mandatory sections which each plan should have. They are the following:

- situational analysis and assessment (basin council decides how detailed it should be);
- basin strategic development vision (depending on basin council's decision, it can be short- or long-term);
- goals and objectives;
- action plan (corresponding activities can also receive reflection in the plan's narrative section and/or be presented in the table format as was mentioned above. The list of activities can reflect both short-term (3-5 years) and long-term (10-15-20 years) actions;
- expected results (can be also described in a separate section and/or a common table);
- reporting procedure (performance indicators for basin plan execution should be reflected in the master action table and in the Expected Results section;
- funding sources should be defined for each planned action and should be reflected in action tables.

The actual text of each of BP's sections may be different and depend on basin peculiarities and stakeholder decision.

While drafting the BP contents, it is necessary to ensure involvement of politicians and the general public. It is, therefore, vital to develop a mechanism for collecting feedback from key stakeholders. Such a mechanism should be case-specific depending on the situation in a particular watershed and stakeholder representation. It may include consultations, general discussions, online collection of comments and proposals, etc.

Such an approach allows simplifying the procedure of mutual approval of the document in the future. Provided the participation/involvement component was organized effectively, the approval should not pose any problems later on. Active stakeholder participation during all phases makes the formal approval a mere formality, because all interests had been already reviewed at the planning phase.

The finalized BP version should be widely distributed and made available to all stakeholders. As a rule, plans are posted on the websites of basin organizations, if any, or may be presented at public hearings. The stakeholder feedback mechanism allows continuously monitoring the plan's execution and detecting the need to adjust

the document.

The opportunity to continuously and regularly update and review BP is also essential. Each basin plan is a living document which should undergo constant amending as the situation in the target watershed alters.

For this reason, BP should stipulate for a mechanism for its own revision and adjustment.

THE CONTENTS OF THE ARAL-SYRDARYA BASIN PLAN

1. Introduction;
2. Baseline assessment;
3. Analyses of the current state of water resources in the Aral-Syrdarya Water Manage-ment Basin (ASWMB);
4. Legal and institutional framework of water resources management in the ASWMB;
5. International cooperation on water resources management in the Aral-Syrdarya Re-gion;
6. Register of barriers and problems preventing effective water resources management in the basin. Problem prioritizing;
7. National strategies, programs and plans aimed at the ASWMB development;
8. ASWMB long-term vision;
9. IWRM Plan goals and objectives and expected results;
10. Implementation mechanisms and sources of funding;
11. IWRM action plan;
12. Planned interventions.

2.7. Role of basin organizations in basin plan review, approval and implementation

Due to the fact that BP implementation builds around the involvement of the maximum number of stakeholders, the process requires a general platform/advisory body ensuring coordination of joint interventions. Such a platform is a precondition to introducing the IWRM and basin planning principles as well as further implementation of basin plans.

There are different types of basin organizations each of which may function as such a venue. Platforms may be established within a basin of any level, be it national or transboundary or local targeting, for instance, a small river basin.

These can be basin councils, joint commissions, advocacy, advisory and/or other groups uniting various stakeholders whose activities are aimed at improving WRM in a particular watershed.

Each member of such an advisory body may participate in BP development in the following ways:

• protecting user and environmental interests within the basin;

• promoting modifications to legislation and regulations to improve them;

• forming the Problems Register and selecting priority goals and objectives;

• monitoring and assessing the process of BP development ensuring its effectiveness and reducing the risk of negative impacts;

• disseminating information about the phases of BP development and forming the public opinion regarding corresponding activities;

• lobbying sector-specific interests during the prioritizing of basin plan elements, etc.

Each participant of the process may be also involved in the plan execution which may take various forms – from general coordination to carrying out specific interventions.

FIGURE 13

2.8. Monitoring and evaluation of IMRM plan implementation

To succeed in BP implementation, it is vital to observe a number of basic principles ensur-ing efficient execution. First of all, there is a need to ensure broad public awareness and the maximum possible stakeholder engagement, which will help avoiding inconsistencies among various basin plan actors. Although the responsibility for coordinating BP implementation is vested with basin organizations, the responsibility for executing separate activities should be assigned

to vari-ous departments and agencies.

Both when developing and implementing a basin plan, it is necessary to keep in mind that financing of planned actions can be ensured from various sources, which expands implementation opportunities. Continuous monitoring of BP implementation and reporting to basin council is es-sential too.

Establishing a monitoring system to evaluate BP implementation should also follow several basic principles. Firstly, measurable indicators (markers) should be designed for each and every action in the plan. They will ensure monitoring of the plan performance in the future.

Each indicator should have a defined series of data sources and data collection methods, as well as information transfer channels via which data will be collected for further processing. The common monitoring system should include an information processing system. This can be done based on special data-processing software and/or most simple methods like reporting during basin council meetings.

BP efficiency and performance depend on the adequacy of performed actions. Monitoring and evaluation of the implementation of all the interventions within the plan as well as their impact on the overall basin situation including environmental impacts are key to assessing the plan's efficacy.

Monitoring the efficiency of BP implementation can be done at different stages – starting from the implementation of separate actions up to evaluating/assessing the plan's performance on the whole.

Monitoring may have different focuses and target separate measures within the plan or its overarching effectiveness and efficiency.

It is important to formalize the mechanisms to monitor and evaluate the implementation early on, i.e. during the development phase, and approve them among stakeholders. BP should clearly identify the following aspects pertaining to monitoring and evaluation:

- measurable performance indicators (criteria) related to individual activities and the plan overall;
- sources, methods and channels of collecting and transferring information;
- information-processing technology(-ies);
- expenses related to monitoring and evaluation included in the plan's budget.

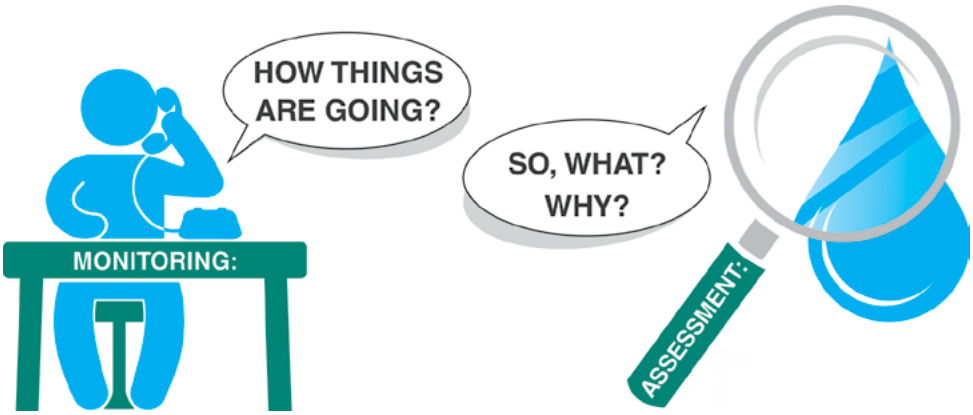
As we spoke earlier, development of performance indicators – or criteria as they are also called – is an important element of monitoring. The indicators are formulated at the time of iden-tifying BP expected results and basically should answer the main question of "What markers shall demonstrate that the plan's expected results were achieved?".

Those involved in basin plan development should be engaged in laying out performance indicators as well. As was mentioned in relation to the plan, the indicators should also be dis-cussed with all stakeholders. The indicators may be both quantitative and qualitative. They should be formulated during the development stage but may be adjusted during the implemen-tation.

Monitoring BP implementation and its performance evaluation should be done based on the same indicators. What is the difference between monitoring and evaluation?

First of all, monitoring is a routine (everyday) procedure allowing a response to the question "How things are going?". Monitoring can focus on the actual use of available resources, execution of activities and their outcomes, as well as shed light on the impacts of basin plan actions on the target area. Monitoring allows comparing planned outcomes with the situation of fact and, if necessary, adjusting planned interventions.

FIGURE 14



Evaluation (assessment) represents a higher level of outcome tracking, and answers the questions "What has changed and why?". Evaluation can be carried out in two stages. The first stage is a formative (genetic) evaluation, the results of which make it possible to adjust the progress of BP implementation. The final evaluation takes place while all planned actions have been already completed and aims to draw lessons learnt and make adjustments to future planning. Both moni-toring and evaluation are necessary to steward changes in the watershed and assess the attainabil-ity of the goals set.

One of the foremost tasks while developing monitoring and evaluation mechanisms is to identify entities/persons responsible for discharging M&E functions. They may be distributed among the stakeholders, for example:

- **water departments** – as policymaking agencies such departments may asses the plan's compliance with the overall development strategy;
- **basin-level departments** - as key departments responsible for BP imple-mentation such departments may be tasked with continuous monitoring of its implementation and performance;
- **basin councils/stakeholder committees** - due to jointly representing all stakeholders and participating in BP development, councils/ committees may be also charged with continuous monitoring of its implementation and per-formance;
- **non-governmental organizations** - monitoring of individual activities performed un-der the plan;
- **independent experts** - monitoring of individual activities performed under the plan.

CHAPTER 3.

ADAPTATION TO CLIMATE CHANGE AS A COMPONENT OF BASIN PLANNING

Already today, Central Asia is facing serious challenges caused by climate change some of which are more notable than others. The average annual temperatures throughout the region have increased by approximately 1°C. This has affected the CA hydrology – the thawing of glaciers has accelerated, and the level of snow cover during winter has decreased as well. Based on a number of forecasts, by 2050 the river flow in the Amudarya and Syrdarya Basins (main Central Asian rivers) will decrease by 10-15% and 2-5%, accordingly (CAREC, 2011). Experts say that about 70% of potential damage due to weather and climatic cataclysms will fall on agriculture.

To be able to properly react to issues related to climate change and adaptation, strategic planning must become an integral part of general planning done on national, regional and local levels. Likewise, it must become an element of basin planning. For this reason issues related to climate change adaptation should receive due attention during BP development.

The Second National Reports (SNR) of Central Asian states executed by national scientific and expert councils in 2006-2009 under the auspices of the UN Framework Convention on Climate Change described a number of common regional challenges tied to climate change which should be considered while developing basin plans:

1.1. Growing deficit of existing water resources and deterioration of their quality, **including:**

- accelerated thawing of glaciers and reduction of snow cover;
- changing hydrological regime of surface water;
- accelerated silting and drying out of lakes and rivers;
- accelerated desertification, degradation and salinization of lands;
- reduced access of populations to good drinking water.

2. Increasingly negative consequences for agriculture due to the lack of irrigation water, salinization of agricultural land, as well as droughts and dry winds leading to decreased productivity of agricultural plants, decreased productivity and change of pasture floral mix, decreased efficiency of cattle breeding and increased loss of cattle.

3. Increasingly negative consequences for power industry due to the growing tension on coordination and regulation of irrigation and power production regimes between neighboring countries which may threaten their energy security. The growing number of natural disasters increases the pressure on hydraulic-engineering facilities and impacts their safety.

4. Increasing risks of hazardous and extreme hydrometeorological phenomena, namely, the growing number and frequency of extreme weather conditions such as hail, hurricane, heavy rain, drought, excessively high or low temperatures leading to:

- increased number and force of high waters and floods;

• increased water erosion of land and washout of fertile soil;

• growing frequency of catastrophic mudflows;

• accelerated landslide processes and ravine formation.

5. Increasing risks of diseases and stresses related to climate change such as infectious diseases, blood system diseases, malignant tumors, cardiovascular system diseases; thermal (heat and cold) stresses; gastrointestinal diseases, etc.

6. Increasing threat to existing ecosystems and biodiversity including shifting of climatic zones and change of flora and fauna habitats, changes in land use and terrestrial cover.

Corresponding adaptation measures targeting problems identified at the time of BP development may include steps to improve applied technologies and restore/build new infrastructure/ facilities, for example, rehabilitation of old and introduction of novel and more effective irrigation systems (sprinkler and drop irrigation), construction of adjustable dams (mainly in Turkmenistan), etc.

Corresponding preventive measures may include strengthening research and information platforms:

• setting up networks ensuring systemic environmental monitoring;

• increasing reliability of hydrological forecasting;

• setting up snow cover and glacier monitoring stations in mountainous upstream regions of the Aral Sea Basin;

• introduction of science-based models in agriculture (ex.: selection of sustainable and high-yield crops, development of new natural protection techniques);

• strengthening institutional, technical and human capacities, for instance, by way of training farmers on alternative farm/ household management.

Measures to reduce risks of hazardous and extreme hydrometeorological phenomena (upgrading meteorological monitoring systems and services, enhancing early warning systems and strengthening emergency or urgent response services, suspension of logging in mountainous forests and overgrazing, strengthening of eroded slopes, etc.) may also find reflection in basin plans.

The inclusion of such issues in BP will allow mitigating the risks associated with adverse climate change impacts.

The instruments to analyze such consequences and identify optimal solutions to mitigate them are currently under development. Development-oriented climate-proofing[5] [6] is one of such mechanisms. It permits inclusion of optimal climate change adaptation measures in the planning processes.

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[5] M.Ling, L.Coppens, M. MacDevette, A. Mapendembe: An Introduction to Environmental Assessment, UNEP 2015 nterventions sponsored by the European Union Support of Water Management and Basin Organizations in Central

[5] Asia (WMBOCA)) are implemented within the 2nd phase of the GIZ Transboundary Water Resources Management in Central Asia Program carried out under the auspices of the German Ministry of Foreign Affairs

[5] Hooper, B. (2006). Key Performance Indicators of River Basin Management. Alexandria, VA: Institute for Water Resources, US Army Corps of Engineers.

Refer to the Integrated Water Resources Management in the Fergana Valley Project website at http://iwrm.icwc-aral.uz.

The document may be found on the Program's website at: http://www.waterca.org/programme/c2/isfara-kb.

[6] http://www2.gtz.de/dokumente/bib-2011/giz2011-0223ruclimate-proofing.pdf

DEVELOPMENT-ORIENTED CLIMATE-PROOFING – INCLUSION OF CLIMATE CHANGE ISSUES IN BASIN PLAN-NING PROCESSES

Based on the request of the German Federal Ministry for Economic Cooperation and Development, GIZ has elaborated a model called the development-oriented climate-proofing. This methodological approach allows including climate change issues in planning done on different lev-els – national, sector-specific, local, and project.

Development-oriented climate-proofing suggests ways to identify potential avenues of ac-tion and priorities during the process of adapting planning and revising existing priorities. Proper application of the model makes the plans and/or investment more climate-proof. The approach is most effective if used prior to formulating strategies and/or policies and before the execution of municipal plans and projects. Nonetheless, such analyses may be also carried out during revision or even project implementation.

Development-oriented climate-proofing is a model which is available to all stakeholders.

CHAPTER 4.

OPPORTUNITIES TO ENSURE ECONOMIC SUSTAINABILITY OF BASIN PLAN DEVELOPMENT AND IMPLEMENTATION

4.1. Costs associated with basin plan development and implementation

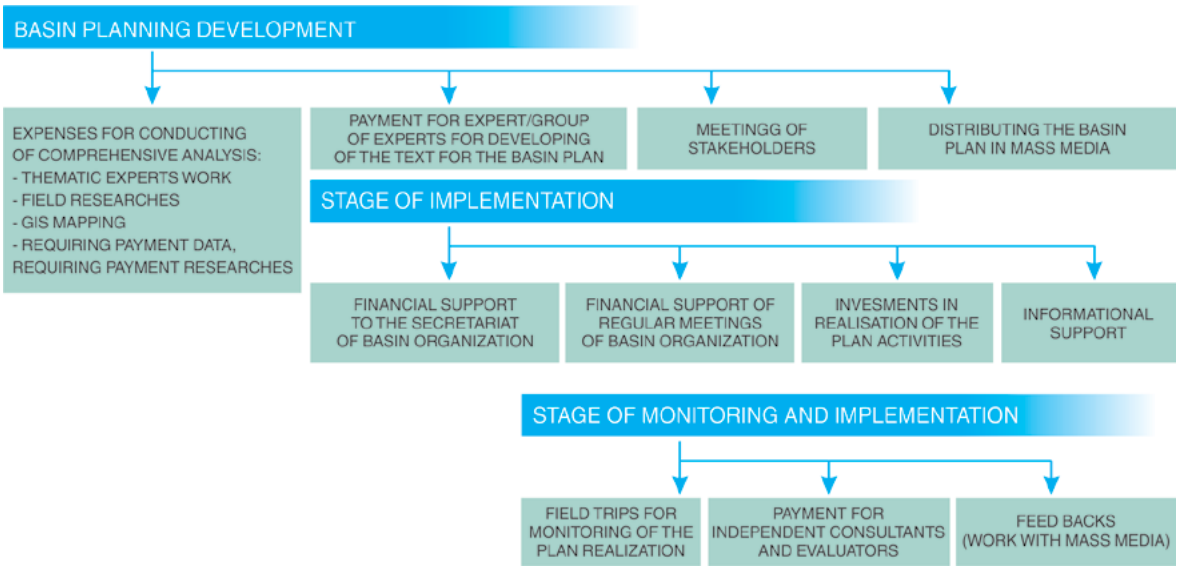
BP development is a long and labor-intensive process assuming certain expenses. Taking account of the considerable flexibility of approaches applied to design and implement such plans, as well as local specifics in each particular case corresponding costs and applicable funding mecha-nisms may vary as well.

A number of funding mechanisms are currently in place enabling BP execution. Devel-opment and execution of plans manifest lengthy and time-consuming processes associated with certain costs.

However, a flexible approach to developing and executing basin plans renders opportuni-ties for diversifying funding sources, finding alternative financing options and/or reducing costs. Both actual financial costs and applicable financing mechanisms will vary from basin to basin.

FIGURE 15

POTENTIAL COSTS ASSOCIATED WITH BASIN PLAN DEVELOPMENT AND IMPLEMENTATION



Costs related to BP development/implementation may be divided into 3 main sets:

1. Development of basin plan.

2. Implementation of basin plan.

3. Monitoring of basin plan implementation.

The figure above shows that each set includes several types of costs associated with the achieve-ment of objectives under each of the goals. It should be noted that not all costs identified above are obligatory.

During BP development phase, financial costs are minimal. For example, expert assess-ments may be performed by members of basin organizations and, thus, not require any remunera-tion. The necessary data may be provided by various agencies located inside the target watershed and interested in its sustainable development.

The text of the plan may be drafted by an initiative group made up of basin organization members and/or volunteers. Thus, expenses during the development phase may be reduced to the-se related to holding joint meetings which can be brought to minimum also.

The implementation phase is the most expensive. Target interventions, however, may be designed in such a way so as not to require extensive funding. For instance, greenery-planting ac-tivities in rural communities, garbage collection, clearing of springs, etc. may be carried out by lo-cal inhabitants on volunteer basis.

It is exactly during this phase that it becomes possible to attract funding through state budget programs or corporate social responsibility mechanisms. Donor assistance may be gained as well to support certain activities within the plan. Various mechanisms of attracting funding are described below in this chapter.

Like the development phase, the **monitoring and assessment** phase may not incur signifi-cant financial costs due to the involvement of basin organization members and/or general public. State agencies may be engaged in monitoring activities implemented under the auspices of special-ized state organizations.

As can be seen from the aforementioned, mechanisms for developing and implementing basin plans are quite flexible allowing including in them only actions which can be carried out at a given point in time. The less funding the fewer opportunities there will be for basin development and accelerating the execution of certain actions. However, lack of funding is not a barrier to de-veloping and executing basin plans.

4.2. Potential funding sources to support basin plan implementation

BA number of funding mechanisms allowing to carry out activities within BPs are available currently. They may be divided into 3 large groups – state and local budget funds, stimulation mechanisms and alternative funding mechanisms.

As of now, the first group – state and local budgets – is the most developed. It is formed based on various types of payments like taxes, tariffs, penalties, payment for using natural re-sources and pollution fees, etc. The mechanism of using assistance available within this group is

clear and is utilized in all Central Asian countries. State budgetary means are used to support government-approved initiatives including various national- and local-level programs.

It's worthwhile saying that all 3 basin planning phases described above may be supported using state budgetary means.

Since 2008 Kazakhstan has been implementing State Budget Program №093 «Integrated Water Resources Management and Improved Water Use Efficiency» aimed at the preservation, rational use and rehabilitation of fish stock, forest and animal resources, natural reserve facilities as well as creating conditions for sustainable water supply and effective water use. The Program may serve foundation for BP implementation.

Stimulation mechanisms targeting territorial development and introduction of cutting-edge practices (ex.: subsidies and loans) receive more and more emphasis.

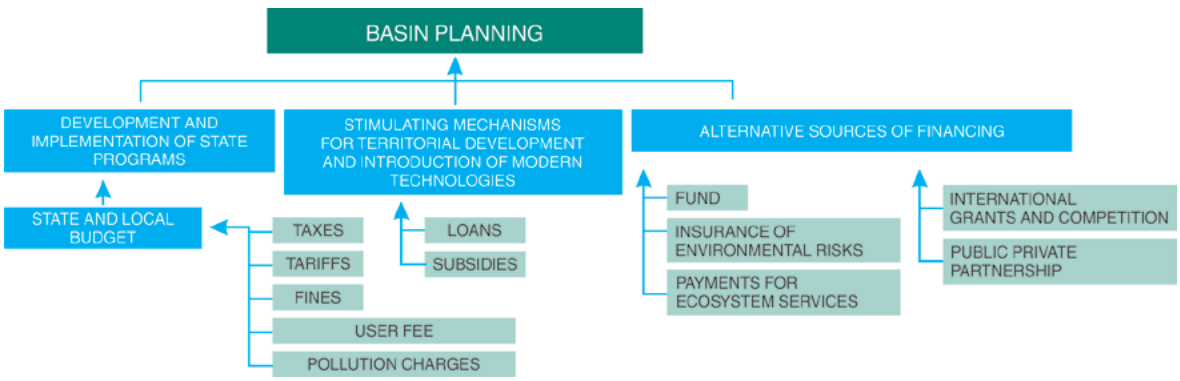
Although such mechanisms are not yet widespread in Central Asia, there are several real-life cases. For example, Kyrgyzstan subsidizes electricity for operating irrigation pumps. Kazakhstan also has a locally subsidized program to improve crop productivity and quality through the application of advanced technologies, including drip irrigation.

Subsidized water supply and disposal tariffs paid by certain categories of the population (war veterans, disabled persons, etc.) may be also considered a type of subsidies. Similar subsidized tariff schemes exist in all CAS.

Stimulation mechanisms are best applicable during the BP implementation phase.

FIGURE 16

FINANCIAL OPPORTUNITIES TO SUPPORT BASIN PLAN DEVELOPMENT AND IMPLEMENTATION



Alternative funding mechanisms may be divided into 2 large groups.

The **first group** includes mechanisms related to the organization of **volunteer-based collection** of financial means for various purposes and at various levels. The establishment of specialized foundations and payment mechanisms for ecosystem services are among such most advanced approaches. A more detailed account of this type of mechanisms is presented in the following section.

The **second group** includes 2 main mechanisms: attraction of **donor assistance** in the form of grants and competitions, and establishment of **state-private partnership.**

Every year, donor organizations support various projects including these aimed at the introduction of new technologies in the water sector as well as water supply and agricultural spheres. A lot of attention is rendered to climate change adaptation and emergency issue. Pri-ority concerns reflected in basin plans may be used to develop donor grant applications.

Corresponding measures may be implemented via state and non-governmental organiza-tions, as well as other basin organization members.

State-private partnership is a new mechanism for Central Asia. Its application is narrow and, as a rule, targets social issues and manifests itself in the construction of roads, schools, hospi-tals, etc. It should be noted, though, that involvement of large enterprises in the planning process as stakeholders provides opportunities to use this mechanism to support the implementation of BP actions.

Despite their novelty, all alternative funding mechanisms may be utilized in all Central Asian states – their national legislations stipulate that development and implementation of state, interstate and regional programs aimed at water resource use and protection may be supported from state and local budgets, by legal entities, using extra-budgetary funds and voluntary contri-butions by organizations and citizens.

4.3. Alternative means of funding for basin plan implementation

Quite often, the establishment of effective basin WRM requires large-scale investment. Rehabilitation and construction of irrigation systems, introduction of water preservation and en-ergy efficient technologies, optimizing management and engineering systems associated with access to potable and irrigation water – all these demand heavy financial backing.

Funds (foundations) are a mechanism currently gaining momentum around the world to provide for these needs. The organizational structure, purposes as well as operation level of such agencies may vary. Corresponding funds may be created within a given settlement, watershed or on the national level. Several types of funds are described below.

Revolving funds are an effective financial mechanism which may be used in case of financial deficit on behalf of local and/or regional administrations. The idea behind them is to accumulate financial resources in order to be able to invest them in large-scale projects with long payback periods. Continuous re-investment of funds into projects with small payback periods allows saving up new resources due to high money turnover. Usually, revolving funds are formed by way of accumulating parts of payments

for water or electric power supply, etc.

A revolving fund may be established in the form of a settlement account of local admin-istration. Thus, such local authority becomes the owner of corresponding projects and, at the same time, the owner of its revolving fund. It is extremely important for the operations/procedures of the revolving fund to be transparent for all participants of the accumulation process as it ensures their mutual trust.

Within the framework of basin planning, the accumulated money may be allocated to address most urgent issues identified by a respective basin organization.

Specialized thematic funds are the second type of funds. These are extra-budgetary foundations established to resolve urgent thematic issues like, for example, environmental funds whose interventions are aimed at ecological rehabilitation, compensation for suffered damages, etc. Reclamation funds are created to improve irrigated land, build and/or reconstruct CDSs, enhance infrastructure and facilities, etc.

Specialized thematic foundations may accumulate: 1) financial means coming from legal entities and individuals (including via payments for emissions, pollutant discharge into the environment, storage of waste and other types of pollution); 2) amounts received within lawsuits to compensate for environmental damages or environment-specific fines; 3) money received from sale of confiscated poacher hunting and fishing tools and illegal goods produced with their help, etc.

The main objective of such funds is to accumulate budgetary and extra-budgetary financial means in a bank account. Jointly with stakeholders, the fund's management develops long- and mid-term public programs to improve the environment.

Such funds (foundations) may become platforms to financially support BPs. Activities may be financed separately, by groups or within specialized sub-programs. Long-term and capital-intensive projects may be funded through such environmental foundations too.

RECLAMATION FUND OF THE REPUBLIC OF UZBEKISTAN

In the Republic of Uzbekistan, special attention is paid to reclamation-driven improvement of irrigated land. In 2005, the Fund for Reclamation Improvement of Irrigated Lands was established together with the adoption of the State Program for Reclamation Improvement of Irrigated Lands for 2008-2012. Drastic improvement of the reclamation condition of irrigated land by way of strict distribution of functions and increased responsibility of users and performers of reclamation services (works), existence of reliable funding mechanisms, enhancement of technical and physical capacities, renewal of reclamation equipment fleet of WMOs and WUAs, etc. are among the key priorities stipulated in the program as to further agricultural development.

The works performed during the 4-year period allowed improving the reclamation condition of 1 mln 164 thou. ha of irrigated land, reduce the area of heavily and moderately salinized land by 81 thou. ha, as well as to lower ground water table on 365 thou. hectares.

In 2012, the Fund allocated $120 mln for various projects.

Payments for ecosystem services (PES)* are another advanced mechanism of alternative funding. The Regional Environmental Centre for Central Asia is implementing several projects to promote this model. The first cases of using this mechanism in CA emerged in 2009. The first PES contract in Central Asia was signed December 5, 2011 in the Chon-Aksu River Basin in Kyrgyzstan. At present, the mechanism undergoes pilot implementation in Kazakhstan, Tajikistan and Uzbekistan.

*See Recommendations on Payments for Ecosystem Services in the Context of Water Resources Management. - UN, 2007

Ecosystem services (ES)** are the benefits received by human beings as a result of dynamic interaction of functioning ecosystems among plant, animal, microorganism and inanimate natural communities.

PES are schemes through which groups of communities receiving benefits from the improved state of the environment directly compensate costs borne by those who work on such improvements. There are different types of PES: monetary, natural, service-based, awards, certificates, etc. PES projects may be implemented based on 3 major schemes of cooperation – state, private-state and completely private.

PES mechanism may be used for basin plan interventions within which it is possible to identify the «seller» and the «buyer» of particular ecosystem services.

* См. Рекомендации, касающиеся платы за услуги экосистем в контексте управления водными ресурсами. – ООН, 2007

** Определение ОЭСР (2012)

PES EXAMPLE IN CENTRAL ASIA:

PES IMPLEMENTATION IN THE CHON-AKSU RIVER BASIN, KYRGYZSTAN

The Chon-Aksu River Basin is located north of Issyk Kul Lake, and includes hilly terrain covered with pastures and woods used for grazing cattle and farmland (closer to the lake) used to grow cereals, fodder crops and fruit.

Farmers who live downstream very often face shortage of water during irrigation period. They also suffer from high content of weighed deposits in river water due to excessive cattle graz-ing on the pastures upstream, as it eventually leads to clogging of their water supply piping.

ECOSYSTEM SERVICE: Stable supply of higher quality water.

Agreement contents and stakeholders:

Agreement duration: the first 1-year long PES agreement was signed December 5, 2011 with the extension option under the condition of the actual provision of ecosystem services of agreed quality.

BUYERS:

1. Water user association (irrigation users) **shall pay:**

- to the Forestry Department: 10 resource days a year to assist in planting trees and bushes, to build fencing, etc.;
- to the Pasture Committee: 20 resource days a year to improve the quality of pastures.

2. **Mushroom picking association** (forest services' user) shall pay 30 resource days a year to the Forestry Department to prepare soil, plant trees, etc.

3. **Tourists** (recreational services' users) shall make cash payment (20 som per person, 50 som per vehicle) to the Forestry Department upon entering the gorge.

SELLERS:

4. **Forestry Department** shall commit to

- allocate 10% of entry payments for planting trees in the gorge;

- fence off freshly planted landplots;
- fence off forest areas most strategic for natural reforestation;
- cooperate with pasture committees and rural administrations.

5. **Pasture Committees** shall commit to:

- develop pasture management plans;
- follow recommendations on maximum grazing load, repair infrastructure allowing access to remote pastures, and temporarily fence off pastures for self-recovery;
- limit and control cattle grazing in wooded areas.

Intermediary organization and monitoring:

The multisector group consisting of 12 persons shall monitor fulfilment of obligations within this PES agreement. Monitoring results shall be presented for review by the Project Coor-dination Committee consisting of 20 representatives of all main stakeholder sectors.

Financial mechanism

Payment form: all payment shall be done in the form of non-cash remuneration.

RESULTS:

1. on May 7, 2012, 4 ha of land were planted with trees (13,000 saplings) by 32 repre-sentatives of mushroom pickers and 3 water users. It is expected that these trees will allow improving the forest ecosystem as well as will prevent land erosion in the water-shed's upstream part;

2. the Forest Department created several «micro reserves» in the wooded part of the basin and on the border between forest and pasture. The goal of fencing off was to demonstrate to pasture users the negative impacts of cattle grazing on pasture ecosystems (land degradation, erosion, impossibility for natural vegetation self-recovery);

3. the first monitoring visit to assess the fulfilment of obligations within this PES agree-ment took place on September 5, 2012;

4. on September 6, 2012, the Coordination Committee decided to extend the agreement until next year.

As was demonstrated in this chapter, there exists a whole array of sources to support BP development and implementation financially. A synergy of all funding mechanisms and tools ensures their execution. In case of basin planning, though, it is necessary to analyze the ap-plicability of potential funding approaches to support individual events/interventions early on during BP development phase.

CONCLUSION

In summary, it's worth mentioning that the proposed approach is universal and may be applied in different countries, on different levels and under different initial conditions.

Despite the model's universal nature, BPs developed for different watersheds will not fully repeat each other. Even within the borders of one state there will not be two identical basin plans. Nevertheless, the following main principles of their development and implementation remain unvaried:

- integrated baseline analyses and developing a registry of all existing problems/issues/ challenges serve as the foundation for BP development;
- all identified problems have to be ranked based on their priority. The most urgent concerns form the plan's core;
- on the one hand, activities within the plan should aim resolving the foremost basin problems; on the other hand, less urgent issues not included in the BP's initial version should be subject to continuous monitoring. Based on their monitoring and performance evaluation of the previous plan, priorities may change and/or will have to be updated and, thus, might be included in subsequent BP versions;
- basin plan is not a static document; it has to undergo regular revision and, if necessary, be updated accordingly. Development of new plans has to become a regular and widely applied practice;
- the single most important principle of basin planning is the involvement of all stakeholders in all phases of its development, implementation and monitoring. All stakeholder opinions should be accounted for and compromise must be reached re all conflicting interests;
- existence of a basin organization – be it formal or informal – guarantees sustainability of the established basin planning mechanisms;
- availability of funding is another important aspect of basin planning. It is necessary to use all available funding models and/or their combinations to ensure financial support of BP execution.

Each of the principles above is imperative for successful development and implementation of basin plans. Their observance will allow designing relevant, realistic and effective basin plans.

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