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BASIN PLANNING

Handbook

Basin Planning Handbook

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PREFACE

Integrated Water Resources Management (IWRM) is one of the key approaches to ensure sustainable environmental management within the UN declared Inter-national Decade for Action “Water for Life” (2005-2015). Implementation of IWRM principles is a long process of enhancing decision-making systems on all management levels. Development and implementation of basin plans serves as one of the main components of the integrated water resources management.

This Handbook is based on the review of the international basin planning experience as well practices applied during the process of developing the Basin Plan for the Kazakhstan part of the Aral-Syrdarya Basin. In addition to corresponding theoretical overview the Handbook describes a wide spectrum of practical tools to assist in the development of basin plans with the account of modern models.

The Handbook is a universal methodological tool suited for application in different 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 developed with the support of the European Union within the framework of the Support of Water Management and Basin Organizations in Central Asia (WMBOCA) projects of the Transboundary Water Resources Management in Central Asia Program of the German Society for International Cooperation (GIZ) in partnership with the Central Asian Regional Environmental Center.

LIST OF ABBREVIATIONS & ACRONYMS

ASB	Aral-Syrdarya Basin
BC	basin council
BWM	basin water management
CA	Central Asia
CDS	collection drainage system
CWUU	canal water user union
ES	ecosystem services
ES	emergency situation
EU	European Union
GIS	geo-informational system
IUCN	International Union for Conservation of Nature
IWRM	integrated water resources management
PE	payments for ecosystem services
RRWRD	Regional Reclamation and Water Resources Department
SEA	strategic environmental assessment
SNR	2 nd National Report on Climate Change
UN	United Nations
WRIUPS	Water Resources Integrated Use and Protection Scheme
WRM	water resources management

INTRODUCTION

The International Experience of Implementing IWRM Principles

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

According to 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 having specific features in each given case.

Recognition of complementary dependence of all types of water usage serves foundation of the integrated water resources management. Based on this approach, decisions regarding use and distribution of water resources are made jointly by all stakeholders with the account of the impact each type of water use has on other usages. Basin'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 the integrated water resources management (or the Dublin Principles) became the basis for subsequent water management reforms in many 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 policy-makers at all levels;*
- **Principle 3** – Women play a central part in the provision, management and safeguarding of water;
- **Principle 4** – Water has an economic value in all its competing uses and should be recognized 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 within the EU 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 ecosystem conditions and related water and marsh grounds, promote sustainable water use as well as regulate processes connected to 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 based on watersheds. An authorized body responsible for the development of a corresponding basin management plan has to be established in each such basin. Engagement of the general public and other stakeholders in management processes is one of the most important elements of the Directive.

This Handbook stems from the fundamental IWRM and basin planning implementation elements of the Water Framework Directive mentioned above.

During the Soviet period respective governments of Central Asian republics laid out their water resource management policies (water policies). General Water Resources Integrated Use and Protection Schemes (WRIUPS) were developed regularly.

After the breakup of the Soviet Union water resources management systems of all Central Asia states (CAS) underwent certain changes. Nonetheless, they all share a number of similarities potentially leading to inefficient water use. For example, management based on administrative division results in prevalence of local as opposed to overall basin development interests. Planning is done by 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 of Central Asia countries. Such a model does not allow consideration of 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 importance and are not resolved.

Obviously, introduction of IWRM principles is directed towards resolving such problems and allows to create conditions for effective water resources management.

Interagency coordination mechanism – establishment of basin councils or coordination groups – is among the key IWRM advantages. This approach guarantees streamlined co-ordination and synergy of actions on all levels of management hierarchy.

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 to

entertain the interests of all water users. Measure to shape public opinion around the need to preserve water resources and to promote incentives enhancing water use efficiency and productivity also play a central role.

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.

Comparison of WRIUPS and basin plans main features

	Basin Planning	Integrated Schemes
Scale and style of water resources management	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 development of the plan	Notification about the major elements of the scheme
Technical decisions vs. institutional projects	Balanced presentation 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

Based on the table there are no obstacles for developing a basin plan in a basin which already has a WRIUPS. A basin plan is more of a living document and may be developed based on research and/or calculations performed within the WRIUPS. Due to limited target-ed funding from CAS budgets basin plans appear to be the most appropriate approach as they allow decentralization of corresponding costs and efforts to locate funding.

Conceptual And Methodological Approaches to Development And Implementation of Basin Plans

Numerous methodological approaches as to basin plan 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 preparing basin plans.

For example, the main goal of the **transboundary monitoring assessment system**¹ is to identify and develop optimal strategic basin planning models with the account of political, social, economic, and environmental development needs of a given basin. The overarching principle of the system is the mutual beneficial nature of planned interventions for all stake-holders. As a rule, this methodological tool is used by joint river basin organizations to investigate urgent issues and locate best solutions. The matrix consists of 4 development factors and 3 sources of water resources. It should be noted that development factors can be added in each individual case.

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.

Strategic environmental assessment

(SEA)² is one of the main tools applied both during assessment and stakeholder engagement as well as planning phases. SEA is aimed at identifying core environmental aspects of planned activities and responses to them.

The assessment allows exploitation of various tools such as basin development scenario analysis, risk assessment, modeling and forecasting of possible environmental consequences as well as economic calculations to pinpoint best solutions. SEA is generally used in the course of developing basin plans to spot pressing environmental concerns specific to a particular basin and review optimal preventive steps.

Each of the approaches described above is intended for different purposes. Elements pertaining to different approaches may be used simultaneously.

The Basin Planning Concept³ developed within the framework of project Support of Water Management and Basin Organizations in Central Asia (WMBOCA)⁴ sponsored by the European Union formed the basis of this Handbook.

The Concept is based on the EU Water Framework Directive and describes several principles applied in other methodological models described earlier. For Handbook purposes the hydrographic basin watershed is taken 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 SEA – Strategic Environmental Assessment. World Bank (2009). Strategic Environmental Assessment-Improving Water Resources Governance and Decision Making: Case Studies, Paper No. 116., Washington, DC, USA.

³ The document may be found on the Program's website at: <http://www.waterca.org/resources/reports>.

⁴ Interventions sponsored by the European Union (Support of Water Management and Basin Organizations in Central 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.

CHAPTER 1. BASIN-LEVEL MANAGEMENT AND THE ROLE OF BASIN ORGANIZATIONS IN DEVELOPING AND IMPLEMENTING BASIN PLANS

1.1. Existing Basin-Level Organizations: Advantages and Disadvantages

A key principle of introducing IWRM and basin planning is the creation of organizational structures which will be charged with developing and executing the basin plan.

There exists a wide spectrum of such institutional agents in the world. In some cases the

operate as informal organizations representing advisory bodies, in other cases – they make up formal basin organizations. Altogether, there are 8 types of such organizations.

Table 2.

Types of Basin Organizations (Hooper, 2006)⁵

Types of basin organizations	Organizational Peculiarities and Functional Responsibilities
Type 1: Committee	An advisory and consultation body consisting of groups of representatives from countries mem-bers of the committee. Functional responsibilities include development of general principles and discussion of urgent issues of general nature or specific concerns within the basin. The committee does not have staff.
Type 2: Water Management Organization	An authorized body charged with performing all interventions within the basin. Decisions are mandatory for execution by respective national authorities. The organization has a constantly operating staff.
Type 3: Association	A public organization with the following functional responsibilities: education and informing on general basin-specific issues.
Type 4: Commission	An authorized body comprised of members appointed by parties thereto with the following func-tional responsibilities: performance, coordination and monitoring of all interventions within the basin as well as fulfillment of national obligations of participating countries within the framework of international agreements. The commission has a staff and a technical secretariat.
Type 5: Council	An intersectorial group of stakeholder representatives with public involvement. The functional responsibilities include discussion and coordination of basin-specific issues, development of basin plans as well as implementation monitoring. Councils are usually established on sub-basin level or in accordance with hydrographic division. The council may have a secretariat in case of presence of necessary funding.
Type 6: Corporation/joint stock company	A legal entity performing all types of activities within the basin on commercial basis.
Type 7: Tribunal/arbitrage	A judicial basin management body with the following functional responsibilities: resolution of controversial issues between water users and water consumers.
Type 8: Federation	An association of various stakeholder representatives with the aim to coordinate joint positions, develop basin plans, execute and monitor corresponding works, exchange information and promote best practices.

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

Presently, there are 108 river basin organizations operating around the globe 68 of which are international/transboundary⁶. Basin organizations may be differentiated based on their structure and functional responsibilities.

Committees, commissions, water management organizations, and councils are the most widespread types of basin organizations.

Each type has its peculiar features and may be appropriate in certain conditions. One river basin may have several basin organizations depending on their functions and management level.

The Colorado River Basin in the US with a number of water quality monitoring councils is a bright example of this model.

STRATEGIC PLANNING AND MANAGEMENT IN THE COLORADO RIVER BASIN (US)

The Colorado River Basin is one of the most diversified basins in North America with the area of 629 000 km². The river runs for 2330 km. It begins in the Rocky Mountains at the height of 4300 m, goes through the territory of Mexico and flows into the Gulf of California forming a delta.

The Colorado River Basin is divided into 7 large regions representing big sub-basins. Each of these 7 regions has its own corresponding concepts, rules and management procedures. Management of such a large basin demands a special basin organization. Development of basin plans is done in accordance with certain rules.

Altogether, the basin territory has 9 operating Regional Councils working in close cooperation with respective local administrations and authorized state agencies. Each Regional Council has the right to make decisions on establishing standards, issue permits to dump waste water, oversee compliance with these permits as well as take necessary steps in case of their violation.

Each Water Quality Monitoring Regional Council in the Colorado River Basin has a special website containing special data on various water quality parameters accessible by all stakeholders.

There is no formal basin plan encompassing the whole Colorado River Basin. Regional Councils, however, develop their individual Water Quality Management Strategic Plans which serve foundation for developing initiatives to manage Colorado River watersheds.

The main principle of developing such strategic plans is the practical application of the integrated natural resources management coupled with economic and other interests.

Thus, basin planning within the Colorado Basin is a comprehensive process which includes monitoring, identification of priority issues related to water resources in sub-basins and regions as well as development of strategic objectives and implementation of specific thematic interventions.

Nevertheless, it should be noted that no other basin organizations except the councils mentioned above operate in the Colorado Basin. Local administrations are the main authorized organizations working in close cooperation with respective state Environmental Protection Agencies.



⁶ GWP & INBO 2009. A handbook for Integrated Water Resources Management in Basins. Report of the Global Water Partnership and the International Network of Basin Organizations. Elanders Publishers, Sweden.

Basin organizations operating in Central Asia are generally focused on water distribution and are not engaged in general basin management. On the one hand, there are very few basin organizations which could potentially focus on implementing IWRM and basin planning principles. On the other hand, several examples of establishing such organizations deserve noting. Their formats are different and they cover different management levels. Nevertheless, they can serve role models to disseminate the approach across the region.

The first one of them is the Canal Water User Union (CWUU) in the Fergana Valley established within the framework of the IWRM-Fergana Project⁷.

A public body with structural divisions was established as an alternative to existing organizations managing pilot canals based on the administrative-territorial principle to transit to IWRM. Initially the Union was viewed as merely a public body. Later on, such an approach brought about some problems. Due to that it was decided to transform the CWUU of pilot canals into a legal entity in accordance with corresponding legal procedures.

The organizational structure of the CWUU is as follows:

- CWUU General Assembly – CWUU supreme body;
- CWUU (previously, CWC) Council – CWUU executive body;
- CWUU Council Board – a technical body responsible for routine activities of the CWUU Council.

The Union is an example of resolving water distribution issues based on involvement of all stakeholders. It is comprised of water users', water management organizations', local authorities' and other stakeholders' representatives interested in using respective water resources.

A lot of attention is paid to establishing basin organizations in Kazakhstan. In 2006-2007 8 basin councils (BC) were created in accordance with the number of large hydrographic basins.

Basin councils review issues related to water resources usage and protection, water supply and water disposal. Basin authorities ensure operation of basin councils.

Basin councils in Kazakhstan consist of 30-45 members representing state agencies, main basin

water users, non-governmental organizations, and experts.

BC meetings are held on a regular semi-annual basis and have been included in the state budget funding program since 2008.

According to the Water Code of the Republic of Kazakhstan basin councils may and should sign basin agreements involving large water users, representatives of local authorities, non-governmental organizations and other stakeholders.

BCs are also authorized to develop, implement, approve, and monitor implementation of basin plans. Such plans have been already developed for the Aral-Syrdarya and Balkhash-Alakol Basins.

CASs have a record of establishing transboundary institutional structures as well. With the GIZ support – extended within the Program for Transboundary Water Resources Management in Central Asia – the Governments of the Kyrgyz Republic and the Republic of Tajikistan are in the process of creating a Joint Water Commission and basin committees to foster cooperation and use of international rivers⁸.

Considering the fact that basin establishments serve platforms for implementation of institutional as well as technical basin planning and management activities it was suggested to create the following joint bodies: commissions, basin committees and secretariats was offered. Figure 1. illustrates the proposed structure.

The experience in Central Asia demonstrates various opportunities for introduction of the IWRM and basin planning principles. The organizations described above prove that in CA there not only exist prerequisites to establish such organizations but there are examples of implementing basin planning.

1.2. Legal Framework of Basin-Level Management

Water Codes form the foundation of water legislation in Central Asian countries. To this or that extent each of the codes contains opportunities to introduce the IWRM and basin planning principles.

Table 3. below reflects IWRM and basin planning elements within the CAS water codes.

⁷ Refer to the Integrated Water Resources Management in the Fergana Valley Project website at <http://iwrn.icwc-aral.uz>.

⁸ The document may be found on the Program's website at: <http://www.waterca.org/programme/c2/isfara-kb>.

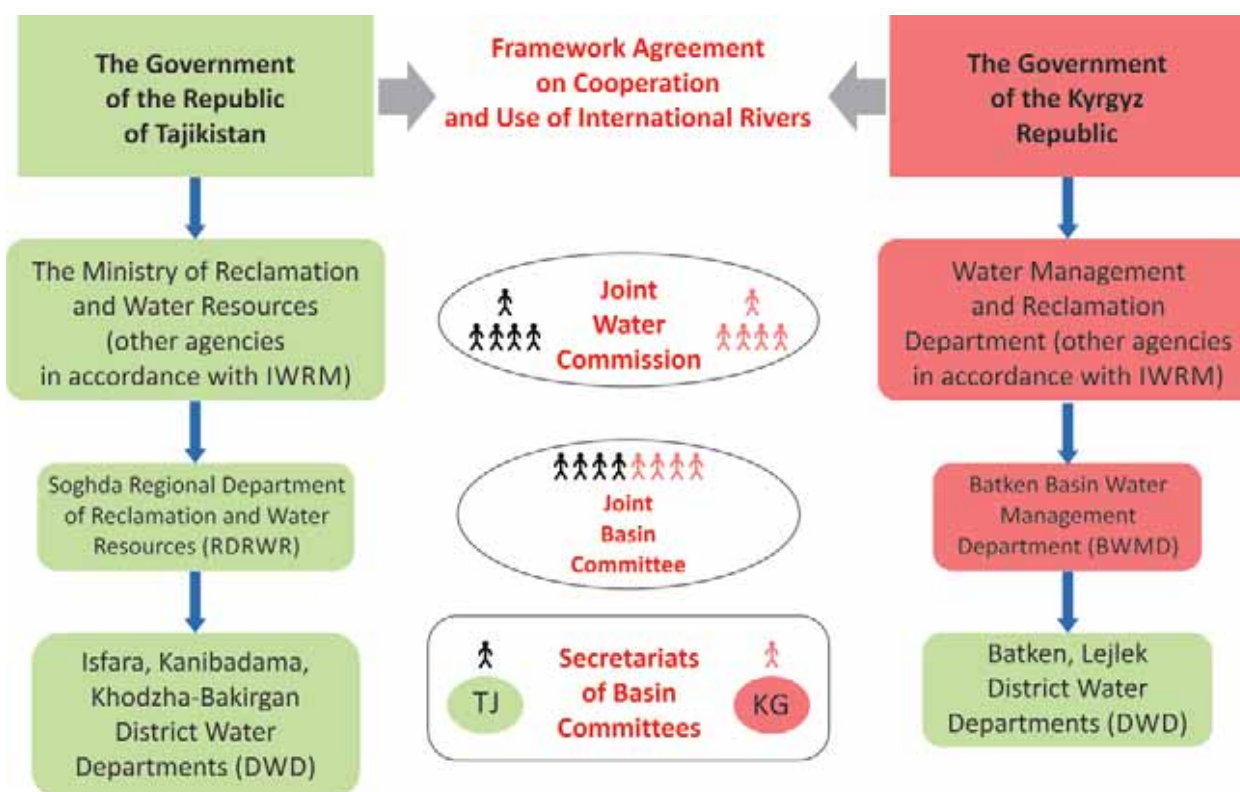


Fig. 1. Proposed organizational structure on cooperation and use of international rivers between Kyrgyzstan and Tajikistan.

Table 3

IWRM and Basin Planning Elements within the Central Asian states' Water Codes

IWRM and basin planning principles	KAZAKHSTAN the Water Code of the RK of July 9, 2003 with amendments of January 25, 2012	KYRGYZSTAN the Water Code of the KR of January 12, 2005 with amendments of October 10, 2012	TAJIKISTAN the Water Code of the RT of 11.10. 2000 with amendments of April 16, 2012	TURKMENISTAN the Code «On Water» of Turkmenistan of November 1, 2004
Coverage of all water resources (public water resources)	Chapter 1, Article 4	Chapter 1, Article 4	Chapter 1, Article 4	Chapter 1, Article 3, 4
Public participation, gender aspects	Chapter 1, Article 9; Chapter 5, Article 33; Chapter 12, Article 63	Chapter 1, Article 6	Chapter 1, Article 13	Chapter Iv, Article 11
Horizontal and vertical coordination	Chapter 5, Article 33; Chapter 7, Article 40; Chapter 9, Chapters 48-49	Chapter 2, Articles 7-10	Chapter 1, Articles 6-7	Chapter Ii, Article 7, 8, Chapter Iii, Article 10
Water resources and basin management, plan-ning (integrated natural resources management and protection schemes, water balance)	Chapter 5, Article 34; Chapter 7, Articles 40-43; Chapter 8, Articles 44, 47	Chapter 1, Article 5; Chapter 2, Articles 9,10; Chapter 3, Article 20	Chapter 1, Articles 2, 9; Article 69, Article 74 Chapter 23, Articles 138, 139	Chapter 13-14 Chapter Xxiv, Articles 101-102

Kazakhstan

The Water Code of the Republic of Kazakhstan (RK) was the first one among similar CAS documents to incorporate such concepts as the IWRM, basin councils and basin planning. The Code is based on the basin (or hydrographic) management principle.

Kazakhstan pays considerable attention to establishing BCs and concluding basin agreements. By 2012 26 basin agreements had been signed in the RK. Fulfillment of the requirements of the Water Code of the RK is included in its state budget funding program. Since 2008 various efforts to introduction IWRM principles have been supported using state budgetary means.

IWRM AND BASIN PLANNING ELEMENTS IN THE WATER CODE OF THE REPUBLIC OF KAZAKHSTAN (of June 9, 2003 with amendments of January 25, 2012)

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».

Article 9 (Chapter 1): principles of water legislation:

- Fair and equal access to water of the population;
- Publicity and involvement of the public in decision-making related to use and protection of water resources;
- Availability of information on the condition of water resources of the Republic of Kazakhstan.

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Article 34 (Chapter 5): main principles of public administration related to use and protection of water resources:

- Basin management.

Article 40 (Chapter 7): basin management related to use and protection of water resources:

- Integrated management of a hydrographic basin's water resources based on the basin principle;
- Coordination of activities by parties to water relations related to water resources use...;
- Development and implementation of basin agreements to restore and protect water bodies based on long-term plans and development programs within respective basins;
- **setting up a basin council, holding consultations with the basin council members on issues related to use and protection of water resources within the territory of the basin, assessment of recommendations executed by the basin council, carrying out measures to implement them, distribution of basin council recommendations among concerned state agencies and water users.**

Article 42 (Chapter 7): basin agreements on restoration 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:

- A basin council shall be deemed an advisory and consultation body established within a respective basin...

Article 45 (Chapter 8): water resources balances

Article 46 (Chapter 8): water resources integrated use and protection schemes:

- WRIUPSs shall be developed to ensure decision-making on issues of integrated water resources management.

Kyrgyzstan

Foreign experts consider the Water Code of the Kyrgyz Republic to be a modern piece of legislation reflecting the best WRM international practices.

The Water Code of Kyrgyzstan acknowledges water resources management based on basin approach. According to the Code each main basin 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 hydrogeographic borders of the main basins, drafting the National Water Strategy, drafting other legislation, etc. is yet another interesting fact deserving attention.

Thus, the legal framework of Kyrgyzstan corresponds to the principles of integrated water resources management and basin planning both on the national and local levels.

IWRM AND BASIN PLANNING ELEMENTS IN THE WATER CODE OF THE KYRGYZ REPUBLIC (of January 12, 2005 with amendments of October 10, 2012)

IWRM ELEMENTS

Article 5 (Chapter 1): Water resources management and basin approach:

- «Basin approach means that management of water resources' use and protection shall be carried out within the territory of the main basin based on the hydrographic principle...»;
- «Within each main basin corresponding basin water administration and basin council shall be responsible for certain aspects of water resources management...».

Article 6 (Chapter 1): principles of water resources management:

- The principle of pollution pricing;
- The principle of specific guarantees: providing water users with specific guarantees of implementing their interests and legal protection;
- The principle of accessibility: information related to the state and use of water bodies and water resources shall be available to public representatives.

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Article 10 (Chapter 2): basin councils and their 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 development, use and protection of water resources:

«Draft basin plans shall be developed by basin councils...»

The basin plan may do the following:

Assess the quantity and the quality of water resources within the basin;

- Identify water needs for environmental purposes and for use by 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 be focused on implementation of corresponding basin plans...»

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

Tajikistan

Water legislation of the Republic of Tajikistan is also based on the Water Code of the Republic of Tajikistan. A number of water resources issues, though, are regulated by more than 50 other legal acts.

In April 2012 several **IWRM-related amendments** were introduced into the Water Code of Tajikistan. **Such concepts as the *integrated water resources management, basin water resources organization, the national water***

***council and basin water council* were integrated into the Code.**

According to the Code Tajikistan shall establish water councils comprised of representatives of enterprises, establishments and other agents involved in planning, use and protection of water resources within a particular basin.

Draft basin plans on water resources use and protection will be gradually developed for all basins in Tajikistan and shall be based on the IWRM principles.

IWRM AND BASIN PLANNING ELEMENTS IN THE WATER CODE OF THE REPUBLIC OF TAJIKISTAN (#821 with amendments of April 16, 2012)

IWRM ELEMENTS

Article 2. Main concepts:

Integrated water resources management – a management system based on account and interaction of (surface, underground and returned) water, land and other related natural resources within certain hydrographic borders which aims to coordinate interests of various branches and levels of the water and natural resources usage hierarchy and involves them in the processes of decision-making, planning, funding, protecting and developing water resources to ensure sustainable social development and environmental protection;

Basin water resources organization – a territorial structure of authorized state agencies regulating water resources use and protection and responsible for water resources management within the borders of the main basin;

National water council – an advisory and consultation body with the Government of the Republic of Tajikistan coordinating efforts of ministries, departments and other state agencies as well as non-governmental organizations related to water resources planning, management, use and protection;

Basin water council – an advisory and consultation basin body coordinating activities of state and non-governmental organizations related to water resources planning, use and protection in a given water basin.

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Article 9. Public administration related to water use and protection:

Public administration in the field of water use and protection shall be based on a combination of **basin...** management principles and shall be executed by the Government of the Republic of Tajikistan, local executive authorities as well as **authorized state agencies regulating water use and protection** in accordance with the law.

Article 69. Approval of water use plans:

Water use plans shall be approved at different levels:

- internal water use plans – by water providing organizations and appropriate local executive authorities supervising respective territorial-administrative divisions;
- district (basin) level plans – by local executive authorities supervising respective territorial-administrative divisions;
- inter-district, regional (basin), and national level plans – by **respective authorized state agencies regulating water resources use and protection and their local offices** jointly with agricultural bodies.

Article 74. Water bodies' use for the needs of water user and other public associations.

Article 139 (Chapter 23): water resources integrated use and protection schemes:

- General and basin water resources integrated use and protection schemes shall identify key water management and other measures subject to implementation to satisfy prospective water needs of the national population and economy as well as to protect water and to prevent its harmful impact.

Turkmenistan

The Code On Water of Turkmenistan aims to expand the rational use and protection of water resources and to promote the establishment of water and environmental legal framework ensuring Turkmenistan's economic security.

The Code does not directly stipulate the basin-based approach to water resources management in Turkmenistan. However, it refers to the calculation of water resources balances done based on the quality and the extent 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 impact.

According to the Code On Water the public may facilitate and be directly involved in activities aimed at the rational use and protection of water and implemented by state agencies in accordance with the legislation of Turkmenistan.

Analyses of the legal framework pertaining to water management shows that all CAS have elements referring to IWRM, basin planning and stakeholder involvement in planning and decision-making processes. In fact, national laws are being constantly improved to render more attention to IWRM and basin planning issues.

IWRM AND BASIN PLANNING ELEMENTS IN THE CODE "ON WATER" OF TURKMENISTAN (of November 1, 2004)

BASIN PLANNING

Article 10. (Chapter III) State, interstate and regional programs on water use and protection:

State, interstate and regional programs on water use and protection shall be developed to ensure implementation of targeted and effective measures to satisfy the water needs of the population and branches of the economy, to preserve, rationally use and protect waters, and to prevent its harmful impact.

Article 101 (Chapter XXIV): water resources balances:

Water resources balances estimating the quantity and the extent of use of water in river basins...

Article 102 (Chapter XXIV): water resources integrated use and protection schemes:

General and basin (territorial) water resources integrated use and protection schemes shall identify key water management and conservation measures aimed at preserving water resources...

PUBLIC INVOLVEMENT

Article 11 (Chapter IV): the procedure and forms of engaging public associations and citizens in the implementation of measures aimed at the rational use and protection of water:

In accordance with their charters (by-laws) public associations as well as citizens shall facilitate and be directly involved in activities aimed at the rational use and protection of water and implemented by state agencies in accordance with the legislation of Turkmenistan.

CHAPTER 2. BASIN PLAN DEVELOPMENT.

BASIN MANAGEMENT CYCLE

2.1. Water Resources Management: Planning Cycle

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

Drafting and implementation of basin plans gives water management (basin) organizations an opportunity to do integrated baseline analysis and assessment of their respective water management situations as well as to carry out short-term (2-3 years), medium-term (5-7 years) and long-term (10-15 years) basin-specific water use planning. 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.

Planning cycles may be utilized within various management system be it for basin or commercial enterprise management purposes. An IWRM plan developed in accordance with this model may be applied from state and interstate down to small river basin levels.

Figure 2. below shows the modern IWRM planning cycle with its 7 major phases.

Each of the phases will be thoroughly reviewed below.

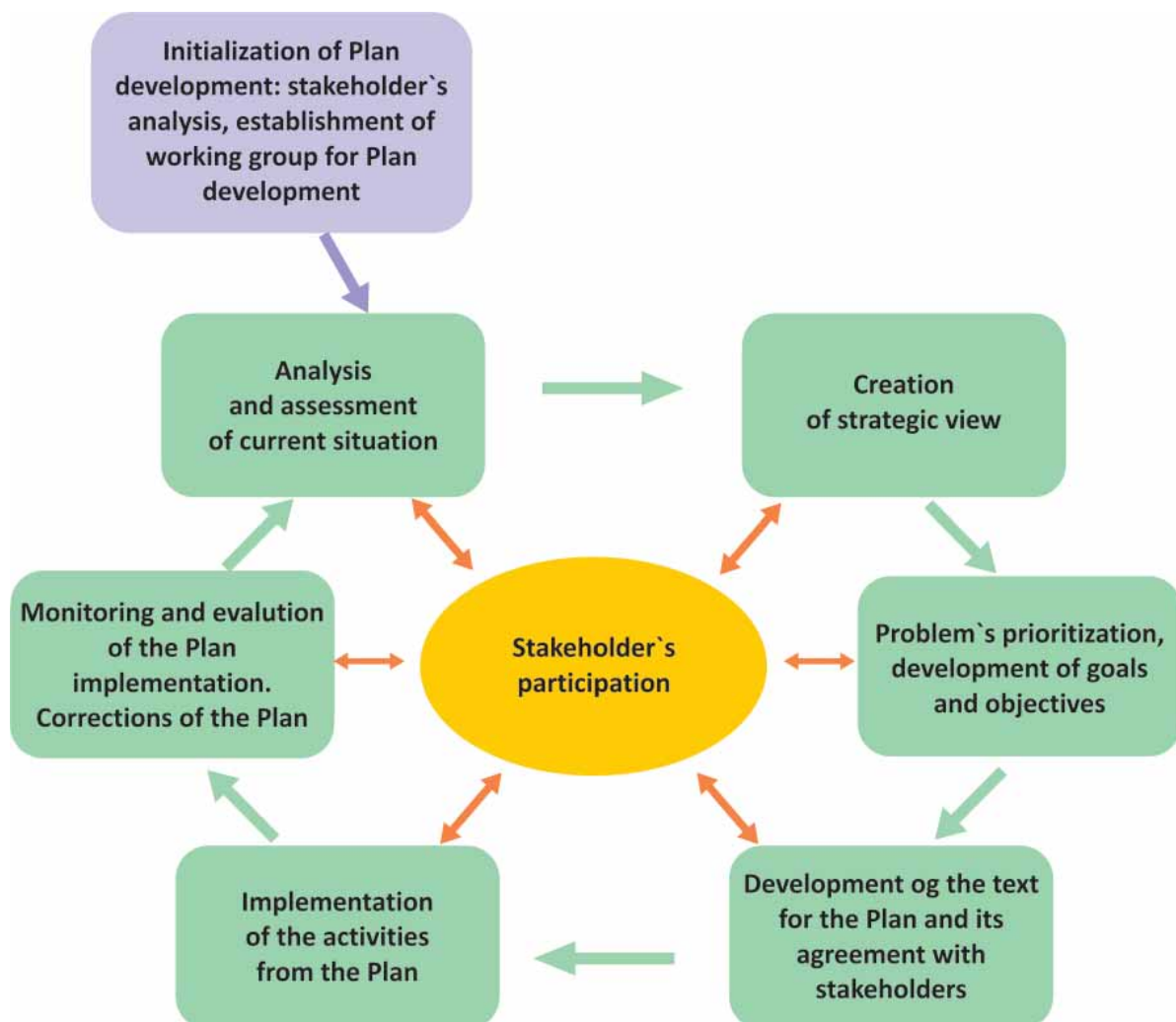


Fig. 2. Basin planning cycle

2.2. Stakeholder Analyses

Stakeholder involvement is key during all stages of drafting and/or execution of a basin plan..

Для каждого государства, для каждого бассейна
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 territory in question as well as present industrial enterprises and public organizations, current environmental situation, potential emergencies, etc.

Participation of each of the stakeholders allows to identify, formulate and prioritize existing

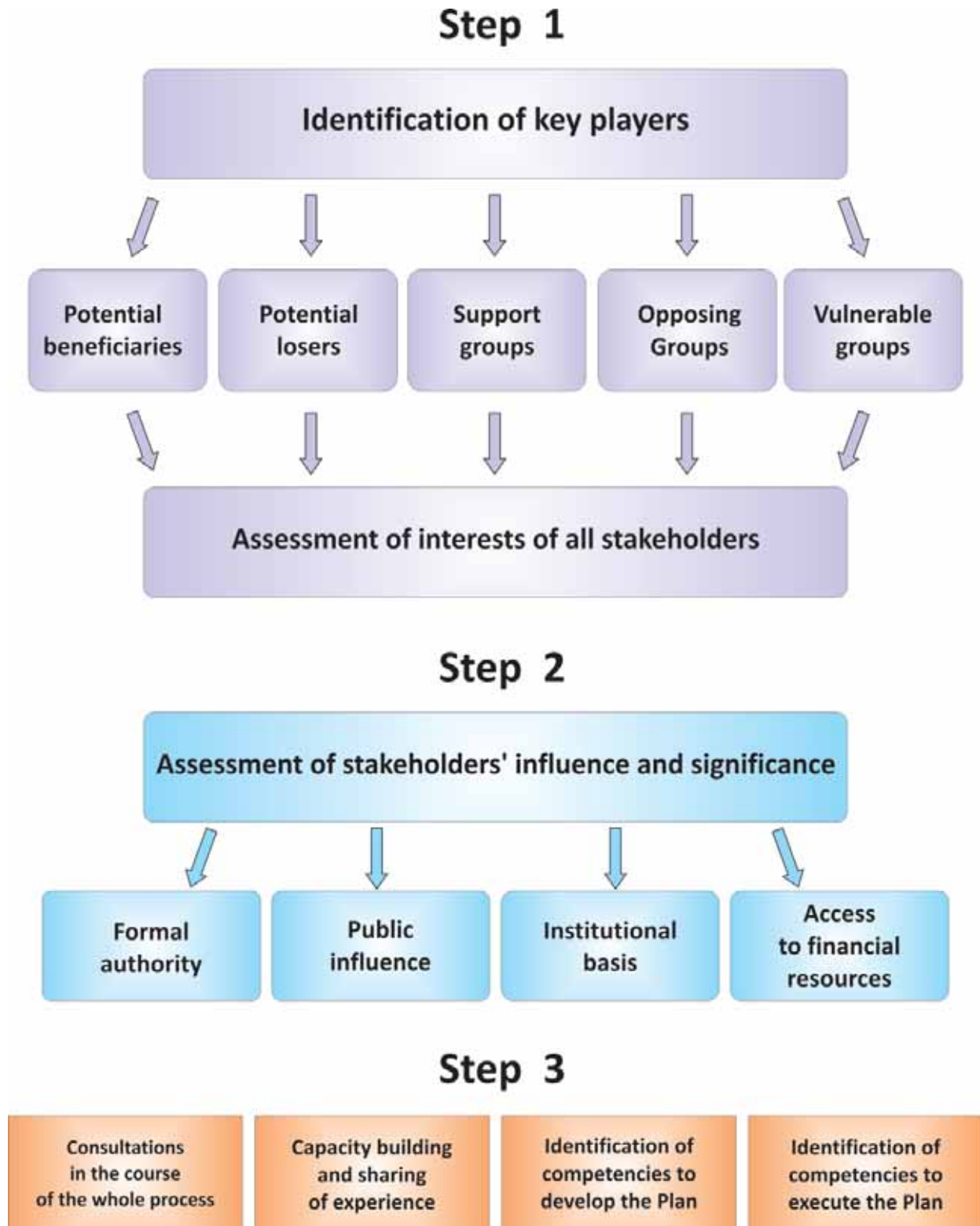


Fig. 3. Steps to stakeholder involvement

problems in all sectors and to discuss possible solutions considering everybody's interests.

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 conflict.

It is necessary for concerned parties to strike a compromise and agree on shared decisions 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 or their poor management to a larger extent;
- Consensus at early basin plan drafting stages reduces potential for future conflicts;
- Transparency of public and private activities;
- Trust-based relations among all participants of the process.

2.3. Strategic Vision: Development Phases

Commitment of a given state to achieving a goal, i.e. establishment of a corresponding policy and/or development strategy – «**shaping the vision**» – lays out the foundation for basin planning. The overall political course of a nation should be its cornerstone.

The following may serve basis for the development of a **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.

A vision should be realistic and relevant, time-based and issue-oriented as well as accessible by all stakeholders.

Strategic vision development includes several mandatory phases:

1. Baseline analyses of water policy and strategy compliance to sustainable development and IWRM principles.
2. Analysis of available resources and needs.
3. Holding official and informal consultations to ensure consideration of interests of all stakeholders.
4. Ensuring political support of the vision or strategy.
5. Adoption of the vision.

VISION DESCRIBES THE ULTIMATE LONG-TERM GOAL OF BASIN DEVELOPMENT

Strategic vision is a long-term (usually 20-25 years) document identifying basin development prospects.

2.4 Baseline Analyses And Assessment

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 additional third experts and should include the following:

- assessment of existing water resources management procedures to locate problems and possible solutions;
- analysis of all key aspects causing problems and demanding improvement;
- listing problems and recommendations to resolve them;
- identification of current priority issues.

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 maximum spectrum of problems.

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.

The broad application of the following cutting-edge information and communication

technologies is an important aspect of conducting an assessment:

- 1) Online databases.
- 2) GIS (geographical 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.

Comprehensive analysis may reveal a significant number of issues and problems requiring due attention. They should be organized into a list called the **problem register**.

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

- water supply to the population and food production;
- ensuring public health;
- mitigating negative environmental impact;
- increasing management efficiency;
- monitoring development;
- research and/or technical upgrading, etc.

The **register** is formed based on the procedure of identifying, assessing and updating all basin-specific concerns. All revealed problems 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 the issues. Top-priority items, then, are used to determine the goals and objectives within a given basin plan and to develop a corresponding action plan.

Table 4

Sample basin problem register

Identified problem	Negative impact and risks	Causes	Activities	Indicator	Rank score
Lack of irrigation water	<ul style="list-style-type: none"> • irrigation water losses; • decreasing land productivity; 	<ul style="list-style-type: none"> • long use of irrigation networks; • depreciation of irrigation systems; • lack of regular maintenance of systems 	Agriculture (irrigation cropping)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • decreasing water quality in water bodies; • growing risk of infectious diseases 	<ul style="list-style-type: none"> • absence of cleaning arrangements within the CDS; • violation of water conservation zones and regions; • low community culture; 	Municipal utility services	<ul style="list-style-type: none"> • volume of waste water discharged into rivers; • river water quality indicators; • number of illegal dumps; 	
Shallowing of delta lakes	<ul style="list-style-type: none"> • marsh formation; • fish stock losses; • decreasing productivity of lakeside pastures; 	<ul style="list-style-type: none"> • water intake for irrigation purposes; 	Agriculture (irrigation cropping)	<ul style="list-style-type: none"> • lakes water surface; • fish stock; • fish species diversity; • pasture lands; 	

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

It is necessary to remember that it is possible to improve the overall basin situation only by addressing its root cause. This is why while putting together a problem register it is essential to identify the case-specific underlying issue 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 sample problem tree is presented below. A thoroughly built and detailed tree allows to locate the root cause and to reflect it in the problem register.

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 is inserted into corresponding register columns upon which each problem 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 environmental, economic or social development. All problems should be clearly identified, formulated and classified.

2. **Negative impact and risks** – a list of adverse events which may happen if a problem persists.

3. **Causes** – a list of reasons which led to the appearance of a particular environmental problem.

4. **Activities** – a list of spheres (areas, etc.) of human involvement which are based on interaction with the environment and lead to the appearance of specific environmental problems.

5. **Indicator** – a system of indicators allowing to monitor the status of a particular environmental problem (growing or decreasing).

6. **Rank score** – a digital indicator given to every problem identified after their ranking.

Table 5

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

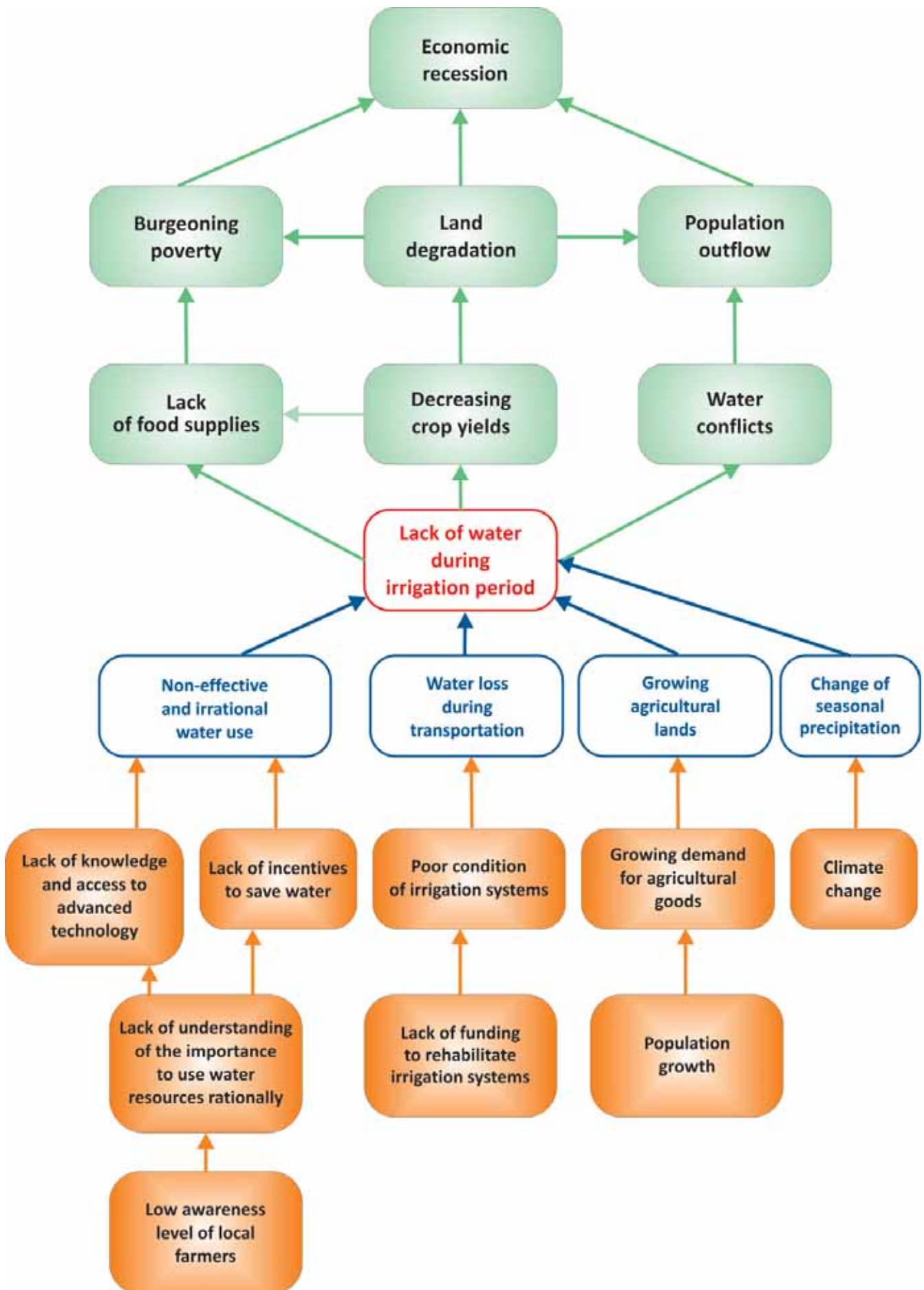


Fig. 4. Problem tree

Problem assessment may be also done against the criteria presented below. The assessment criteria to be applied in each particular case, however, may depend on the specifics of a particular basin. The number of the criteria is determined by the stakeholders.

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 considerable areas. «2» means local-level impacts with a potential for gradual expansion during a long period of time. The minimal value of «1» refers 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 situation causing a particular problem. Maximum values (from 3 to 5) correspond to problems which are possible to resolve both technically and financially. Exigent 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 of «1» is given to problems characterized by the lack of public interest. Problems causing local-level interest of a limited number of stakeholders receive the value of «2». Problems characterized by 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 in the Priority Rating column. A high score indicates that a particular problem is significant and that it is possible and necessary to address it immediately.

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 independently obtained rating scores are added together to get corresponding average values. Rating may be performed within a meeting or remotely. This approach allows elimination of the subjectivity factor.

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.

Identification of the foremost issues does not mean that the other ones may be neglected. The problem register should be revised and the problems should be re-ranked on a regular basis. The frequency of such reviews is decided by the stakeholders.

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

2.5. Identification of Goals and Objectives

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

- **Correlation** with water policies and international obligations;
- **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 to resolve certain basin problems);
- **Clear timing** (possibility to set a timeframe for achieving a particular goal);
- **Goal coordination** (a particular goal correlates with other basin-specific goals).

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 present. 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, local (community) programs and development plans.

The Problems 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-level problems and their solutions may be deemed objectives. Third-level issues may help to formulate necessary actions to implement the plan. Thus, the Problem Tree may be transformed into the Goals and Objectives Tree.

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

Goal: to satisfy population needs of irrigation water.

Objectives:

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

2.6. Basin Plan Development and Approval

After fulfilling all preliminary steps the obtained data and materials have to be integrated into a single document – the actual basin plan.

When drafting the text of the plan a number of **key principles** should be observed:

- Participation of the public in the development, discussion and approval of the plan;
- Conducting a baseline assessment of basin-specific water resources management;
- Identification of specific goals/objectives, performance indicators as well as monitoring mechanisms to oversee implementation of the plan;
- Setting clear priorities;
- Distribution of responsibilities related to plan execution, monitoring its implementation, drafting financial plans and setting required timeframe;
- Focusing on major water resources management restrictions;
- Consideration of the general hydrologic cycle/all river basins.

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

It should be noted that a person (persons) engaged in drafting the plan's actual text should be involved in all planning phases – from baseline

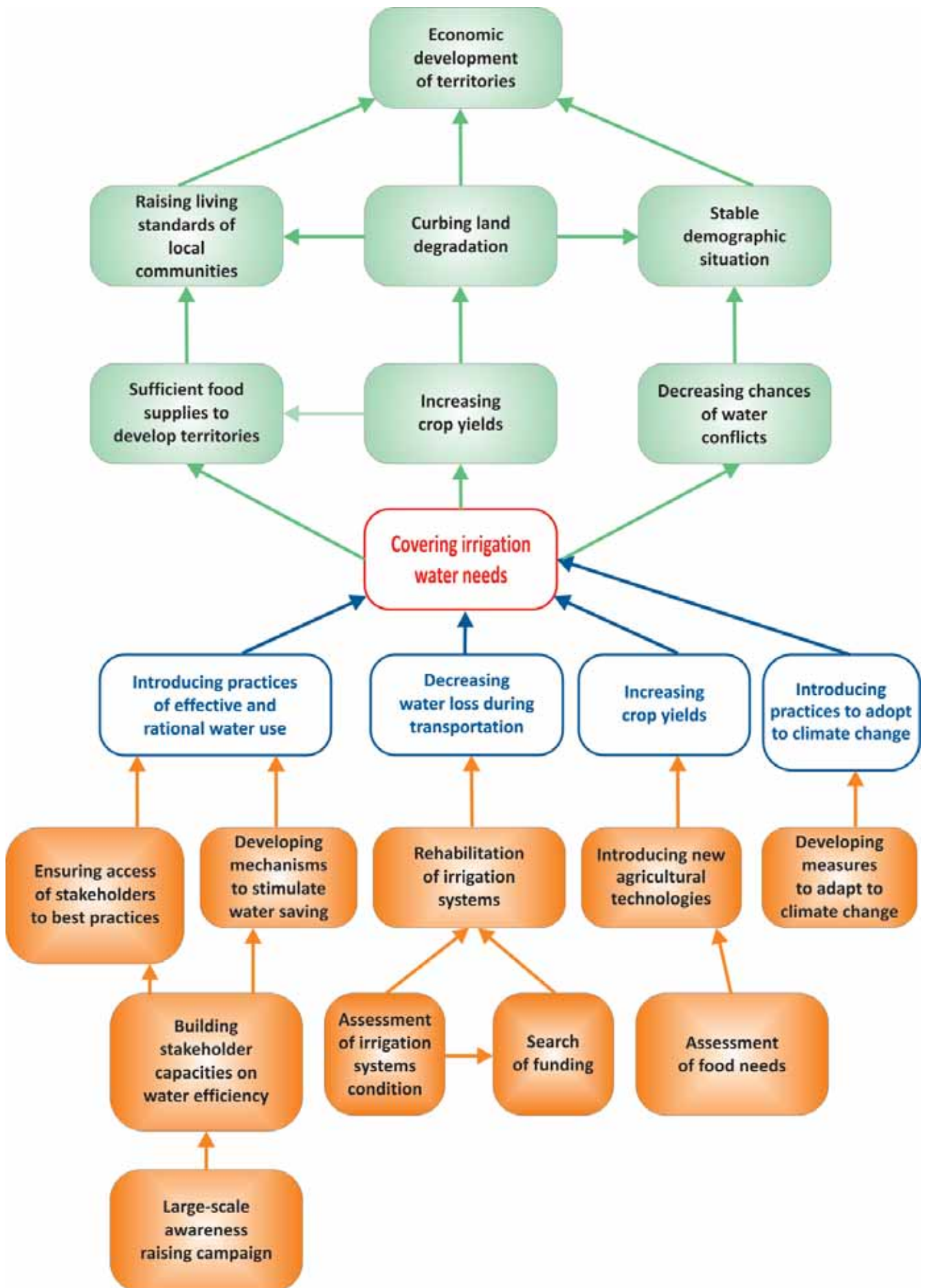


Fig. 5. Goals and objectives tree

assessment to finalizing corresponding measures/activities.

The first item of the plan to be written is its contents. The corresponding decision should be made jointly by all stakeholders.

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

The contents of the plan may vary depending on a country/basin and their priorities. The following items, however, should be included in all basin plans regardless of their specifics:

- Baseline analysis and assessment;
- Goals and objectives;
- Action plan;
- Expected results.

The actual text of each of the plan's chapters may be different and depend on basin peculiarities and the decision of stakeholders.

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

Such an approach allows to simplify 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 were already reviewed at the planning phase.

The finalized version of the basin plan should be widely distributed and be made available to all stakeholders. As a rule, such plans are posted on the websites of basin organizations.

The opportunity to continuously and regularly update and review the plan is also essential. Each basin plan is a living document which should be constantly changing according to the situation. For this reason, the plan is required to stipulate 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 Management 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 region.
6. The 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. The Role of Basin Organizations in Review, Approval and Implementation of Basin Plans

Due to the fact that the implementation of a basin plan is built 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.

As was stated in Chapter 1. above 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 water resources management in a particular river basin.

Each member of such an advisory body may participate in the development of the plan in the following way:

- 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 the basin plan development ensuring its effectiveness and reducing the risk of negative impact;
- Disseminating information about the phases of plan development and forming the public opinion regarding corresponding activities;
- Lobbying sector-specific interests during the process of prioritizing the elements of the plan, etc.

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

2.8. Monitoring and Evaluation of IMRM Plans Implementation

Basin plans' efficiency and performance depend on the adequacy of performed actions. Monitoring and evaluation of the implementation of all initiatives within the plan as well as their impact on the overall basin situation are key to assessing the plan's efficacy.

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

It is important to formalize the mechanisms to monitor and evaluate the implementation early during the development phase and approve them among stakeholders. The plan 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;
- 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 identifying the plan's expected results and basically should answer the main question of «What markers shall demonstrate that the program's expected results were achieved?»

Those involved in the development of the plan should be engaged in laying out performance indicators as well. As was mentioned in relation to the plan the indicators should also be discussed with all stakeholders. The indicators may be both quantitative and qualitative; **are formulated during the development stage** but may be adjusted during the implementation.

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

- **Water departments** – being policy-making agencies such departments may assess the plan's compliance with the overall development strategy;
- **Basin-level departments** – being key responsible departments for the implementation of the plan 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 the development of the plan councils/committees may be also charged with continuous monitoring of its implementation and performance;
- **Non-governmental organizations** – monitoring of individual activities performed within the framework of the plan;
- **Independent experts** – monitoring of individual activities performed within the framework of the plan.

CHAPTER 3. ADAPTATION TO CLIMATE CHANGE AS A COMPONENT OF BASIN PLANNING

Already today, Central Asia is experiencing serious problems caused by the 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 the winter has decreased as well. Based on a number of forecasts by 2050 the river flow in Amudarya and Syrdarya basins (the 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 the agriculture.

In order 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 adaptation to climate change should receive substantial attention during the preparation of basin plans.

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 problems tied to climate change which have to be considered during the development of basin plans:

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;
- strengthening of silting and drying out of lakes and rivers;
- acceleration of 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 lands, droughts and dry winds which lead 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 growing tension on issues of 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 temperature leading to:

- increased number and force of high waters and floods;
- increased water erosion of lands 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 basin plan development may include steps to improve applied technologies and restore/build new infrastructure/facilities, for example, rehabilitation of old and introduction of novel more effective irrigation systems (spraying and drop irrigation), construction of adjustable dams (mainly in Turkmenistan), etc.

Corresponding preventive measures may include strengthening of 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 be also reflected in basin plans.

Inclusion of such issues in basin plans will allow to mitigate the risks of negative consequences of the climate change.

The instruments to analyse such consequences and identify optimal solutions to mitigate them are being developed currently. Development-oriented climate-proofing⁹ is one of such mechanisms. It permits inclusion of optimal climate change adaptation measures in the planning processes.

Development-oriented climate-proofing – inclusion of climate change issues in basin planning processes

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

Development-oriented climate-proofing suggests ways to identify potential avenues of action and priorities during the process of adaptation 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 execution of municipal plans and projects. Nonetheless, such analyses may be also done during revision or even project implementation.

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

⁹ <http://www2.gtz.de/dokumente/bib-2011/giz2011-0223ru-climate-proofing.pdf>

CHAPTER 4. OPPORTUNITIES TO ENSURE ECONOMIC SUSTAINABILITY OF BASIN PLAN DEVELOPMENT AND IMPLEMENTATION

4.1. Costs Associated With Basin Plan Development and Implementation

Basin plan development is a long and labour-intensive process assuming certain expenses. Taking account of the considerable flexibility of approaches used to develop and implement such plans as well as local specifics in each particular case corresponding costs and applicable funding mechanisms may vary.

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

Затраты на разработку и реализацию бассейновых планов можно разделить на три основных блока:

1. Development of the basin plan.
2. Implementation of the basin plan.
3. Monitoring of the basin plan implementation.

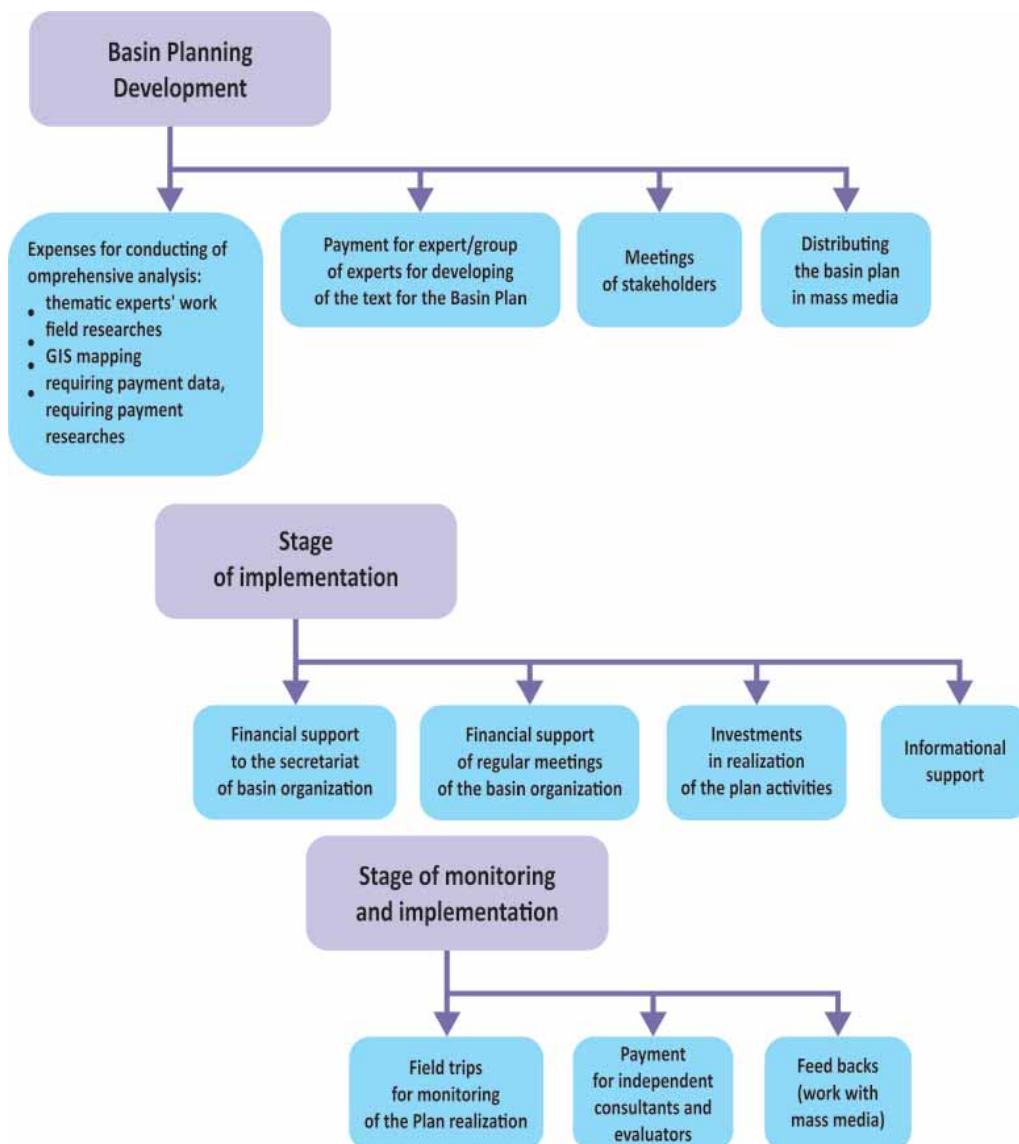


Fig. 6. Potential costs associated with basin plan development and implementation

The figure above shows that each set includes several types of costs associated with the achievement of objectives within each of the goals.

It should be noted that not all costs identified above are obligatory.

During the basin plan **development phase** financial costs are minimal. For example, expert assessments may be performed by members of basin organizations and, thus, not require any remuneration. Necessary data may be provided by various agencies located on the territory of the basin 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 volunteers. Thus, expenses during the development phase may be reduced to those related to joint meetings which may be also minimized.

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 example, greenery-planting activities in rural communities, collection of garbage, clearing of springs, etc. may be done by local 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 significant financial costs due to involvement of basin organization members and/or general public. State agencies may be engaged in monitoring activities implemented under the auspices of specialized state organizations.

Thus, although lack of financial means may limit the opportunities for quick and effective implementation of target interventions, it should not be considered an obstacle to developing and/or implementing basin plans.

4.2. Potential Funding Sources to Support Basin Plan Implementation

A number of funding mechanisms allowing to carry out activities within basin plans 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 resources and pollution pricing payments, etc. The mechanism of using assistance available within this group is clear and is applied in all CAS. State budgetary means are used to support government-approved initiatives including various national and local-level programs.

It should be noted 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 *The Integrated Water Resources Management and Improved Water Use Efficiency* which is aimed at 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 implementation of basin plans.

More and more emphasis is being given to **stimulation mechanisms** targeting territorial development and introductions of cutting-edge practices (ex.: subsidies and loans).

Although such mechanisms are not yet widespread in Central Asia there are several examples of their application. For example, in Kyrgyzstan there are subsidies to pay for electricity used to operate irrigation pumps. Kazakhstan also has a locally subsidized program to improve productivity and quality of crops through application of advanced technologies including drop irrigation.

Subsidized water supply and disposal tariffs paid by certain categories of the population (war veterans, disabled persons, etc.) may be also

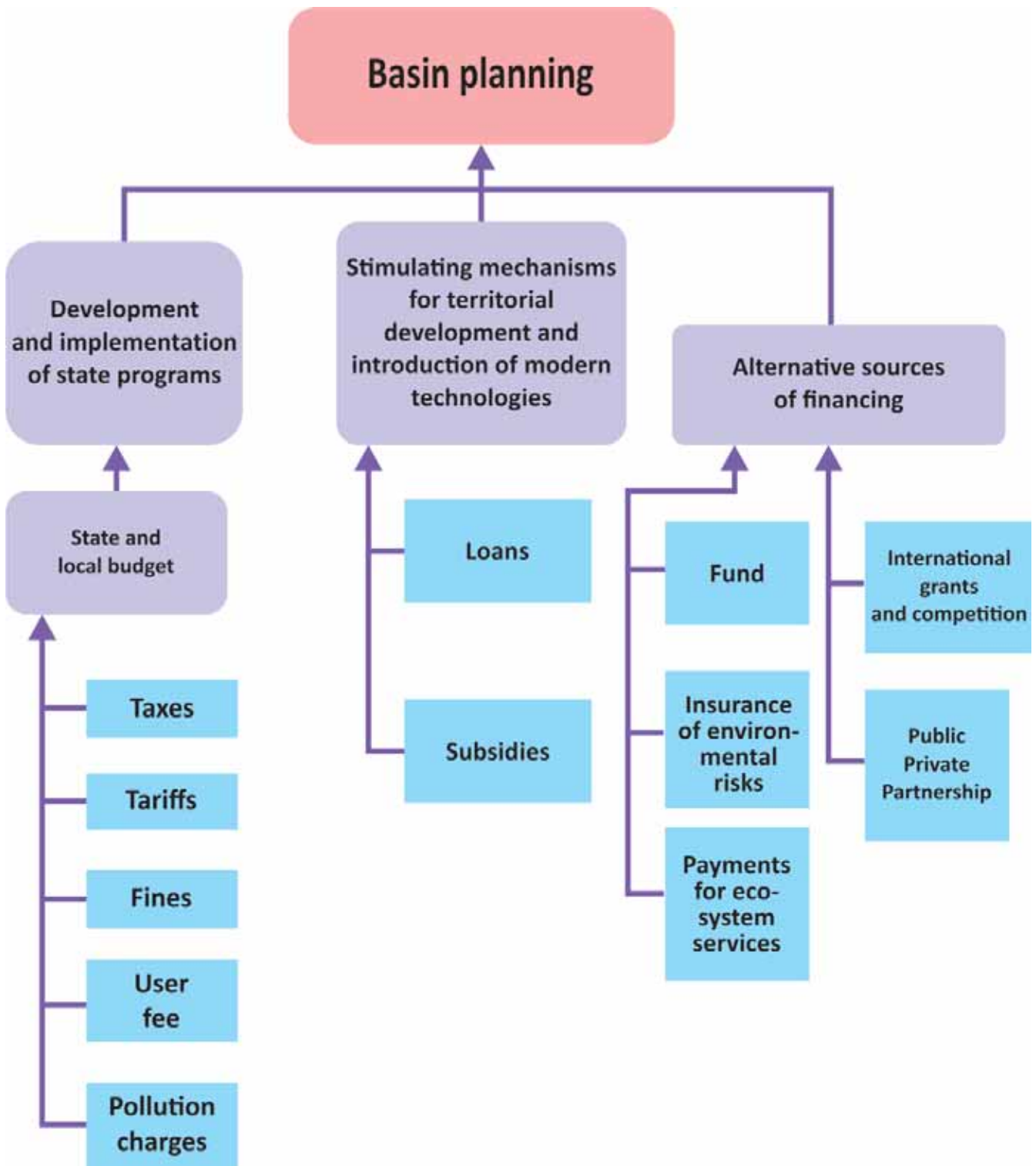


Fig. 7. Financial opportunities to support basin plan development and implementation

considered a type of subsidies. Similar subsidized tariff schemes exist in all CAS.

Stimulation mechanisms are best applicable during the basin plan implementation phase.

Alternative funding mechanisms may be divided into 2 big groups.

The **first group** includes mechanisms related to organization of **volunteer-based collection** of financial means for various purposes and at various levels. 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 devoted to issues of adaptation to climate change and emergencies. Priority concerns reflected in basin plans may be used to develop donor grant applications. Corresponding measures may be implemented via state and non-governmental organizations and other basin organization members.

State-private partnership is a new mechanism for Central Asia. Its application is narrow, as a rule, targets social issues and manifests itself in the construction of roads, schools, hospitals, 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 implementation of basin plan activities.

Despite their novelty all alternative funding mechanisms may be used in all CAS – their national legislations stipulate that development and implementation of state, interstate and regional programs aimed at water resources' use and protection may be supported from state and local budgets, by legal entities, using extra-budgetary funds and voluntary contributions by organizations and citizens.

4.3. Alternative Means and Ways of Attracting Funding For Basin Plan Implementation

Establishment of effective basin water resources management systems quite often requires large-scale investment. Rehabilitation and construction of irrigation systems, introduction of water preservation and energy efficient technologies, optimization of 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. Organizational structure, purposes as well as the operation level of these organizations may vary. Funds may be created within a given settlement, river basin 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 of local and 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 to save 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 administration. Thus, such local authority will be 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 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 rehabilitation of the environment, compensating for suffered damages, etc. Reclamation funds may be created to improve irrigated lands, build and reconstruct collector

and drainage systems, 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 wastes 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 the stakeholders the management of the fund develops long- and mid-term public programs to improve the environment.

Such funds (foundations) may become platforms to financially support basin plans. 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.

Payments for ecosystem services (PES) are another advanced mechanism of alternative funding. The Regional Environmental Center for Central Asia is implementing several projects to promote this model. The first examples of using

Reclamation Fund of the Republic of Uzbekistan

In the Republic of Uzbekistan special attention is paid to reclamation-driven improvement of irrigated lands. 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 reclamation condition of irrigated lands 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 water management organizations and water user associations, etc. are among the key priorities stipulated in the program as to further agricultural development.

The works performed during the 4-year period allowed to improve the reclamation condition of 1 million 164 thousand hectares of irrigated lands, to reduce the area of heavily and moderately salinized lands by 81 thousand hectares as well as to lower the level of ground water on 365 thousand hectares.

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

this mechanism in Central Asia appeared in 2009. The first PES contract in Central Asia was signed December 5, 2011 in the Chon-Aksuu River basin in Kyrgyzstan. At present, the mechanism undergoes pilot implementation in Kazakhstan, Tajikistan and Uzbekistan.

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 improvement of the 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.

* OECD definition (2012).

PES EXAMPLE IN CENTRAL ASIA: PES IMPLEMENTATION IN THE CHON-AKSUU RIVER BASIN, KYRGYZSTAN

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

Farmers who live downstream very often face shortage of water during the irrigation period. They also suffer from high content of weighed deposits in river water due to excessive cattle grazing on pastures upstream because 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 opportunity to extend its duration 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 pasture lands.
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 payments associated with entrance into the gorge for planting trees in the gorge;
 - to fence off freshly planted lands;
 - to fence off forest areas most strategic for natural reforestation;
 - to cooperate with pasture committees and rural administrations.
5. **Pasture Committees** shall commit:
 - to develop pasture management plans;
 - to follow recommendations on maximum grazing load, to repair infrastructure allowing access to remote pastures, to temporarily fence off pastures for self-recovery;
 - to limit and control cattle grazing in wooded areas.



Intermediary organization and monitoring:

The intersectorial group consisting of 12 persons shall monitor fulfilment of obligations within this PES agreement. Monitoring results shall be presented for review by the Project Coordination 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 hectares of land were planted with trees (13 000 saplings) by 32 representatives of mushroom pickers and 3 water users. It is expected that these trees will allow to improve the forest ecosystem and will prevent land erosion in the upstream part of the watershed.

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

3) The first monitoring visit to assess fulfilment of obligations within this PES agreement took place on September 5, 2012.

4) On September 6, 2012 the Coordination Committee decided to renew the agreement for the next year.



As can be seen from this chapter, there is a whole array of sources to financially support basin plan development and implementation. Synergy of all funding mechanisms and tools ensures their execution. In case of basin planning, though, it is necessary to think about the applicability of potential funding approaches to support individual events/interventions early on during the development phase.

CONCLUSION

In summary it is 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 plans developed for different basins will not repeat each other. Even within the borders of one state there will not be two identical basin plans. At the same time, the following main principles of their development and implementation remain unvaried:

- Integrated baseline analyses and development of the register of all existing problems serve as the foundation for the development of basin plan;
- 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 be aimed at resolving the foremost basin problems; on the other hand, less urgent issues that were not included in the initial version of the plan should be under continuous monitoring. Based on their monitoring and performance evaluation of the previous plan the priorities may change and/or will have to be updated and, thus, might be included in subsequent versions of the plan;
- A basin plan is not a static documents; it has to undergo regular revision and, if necessary, be correspondently updated. Development of new plans has to become a regular and widely applied practice;
- The major principle of basin planning is 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 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 the plan implementation.

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

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Additional Thematic References

The Program's website (<http://www.waterca.org>)
(more will be added; still collecting feedback)

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