

WATER GOVERNANCE AND MANAGEMENT – THEORY AND PRACTICE

(V.A. Dukhovny)

If imaging humanity as a certain structure, its supports are four potentials: natural, productive, financial, and human. They are in permanent relations and quite dynamic, depending on to such an extent the political system (governance) being a foundation of this structure is true and thorough, to such an extent the social environment created by this system being air of this structure is advantageous, and to such an extent the management system being its communications and impulses are operating correctly and clear. A combination of development potential, governance, and social environment defines the degree of development stability and its prospects. Water is a substantial part of the natural potential, and at the same time, it actively interacts with all other potentials; and therefore studying the correlation of water governance, the social environment, and resources management is important. Let us demonstrate the practical application of this approach through an example of water management in the Aral Sea basin.

The nature or the superior intelligence, while creating the civilization over a period of eight thousands years, has reached the modern society, as a combination of environment and social medium – community of “homo sapiens.” Original primitive society was a simple unity of natural and human potentials. In that era of beginning of mankind, this unity was developing through the interaction of human being and nature. Gradually when social forms were created, and the productive potential has simultaneously raised as it's derivation - firstly, in the form of wooden plough, spade, and potter's wheel, later as manufactures, mines, and factories, and at present, as huge production conglomerates and monopolies. Emergence of money as a means of exchange and trade has promoted the creation of another potential – financial. Today, the sustainability of life and development is predetermined by the availability and development of these four potentials in any territorial unit of the human environment: district, region, and even continent (Figure 2.1).

The productive potential as well as financial potential are the derivatives of natural and human potentials development. Moreover, there is an opinion that we should consider more rationally two potentials of humanity - natural and social; the latter consists of three constituents – productive, human, and financial potentials (in the judgment of N. Mirzaev). It may be possible to agree with this proposal; however, it does not change the idea of interactions in principle, but predetermines a subordinate role of each constituent. We assume, it is more accurate to consider four constituents. Their development, to a considerable extent, occurs due to transformation of capacities of nonrenewable natural resources into productive and financial potentials, as well as with renewable natural and human resources use. Development of the productive potential feeds the financial potential, but at the same time, the financial potential strengthens and develops a capacity of productive potential by multiplying production capabilities. In a similar manner, human, financial and productive potentials should provide mutual support and simultaneously stabilize the use of renewable natural and human resources and compensate the natural potential of nonrenewable resources. If all these potentials are developing in such proportions that provide a “mutual covering”, i.e. create a positive balance in accumulating their capacity, then a capability for reproduction is also maintained within each potential. Thus, in the frame of natural potential a self-adaptation of natural conditions is

provided. At the same time, in the frame of human potential, a human being develops himself and his likes. In the frame of the productive potential, one kind of economic activity generates another, and money makes money in the structure of financial potential.

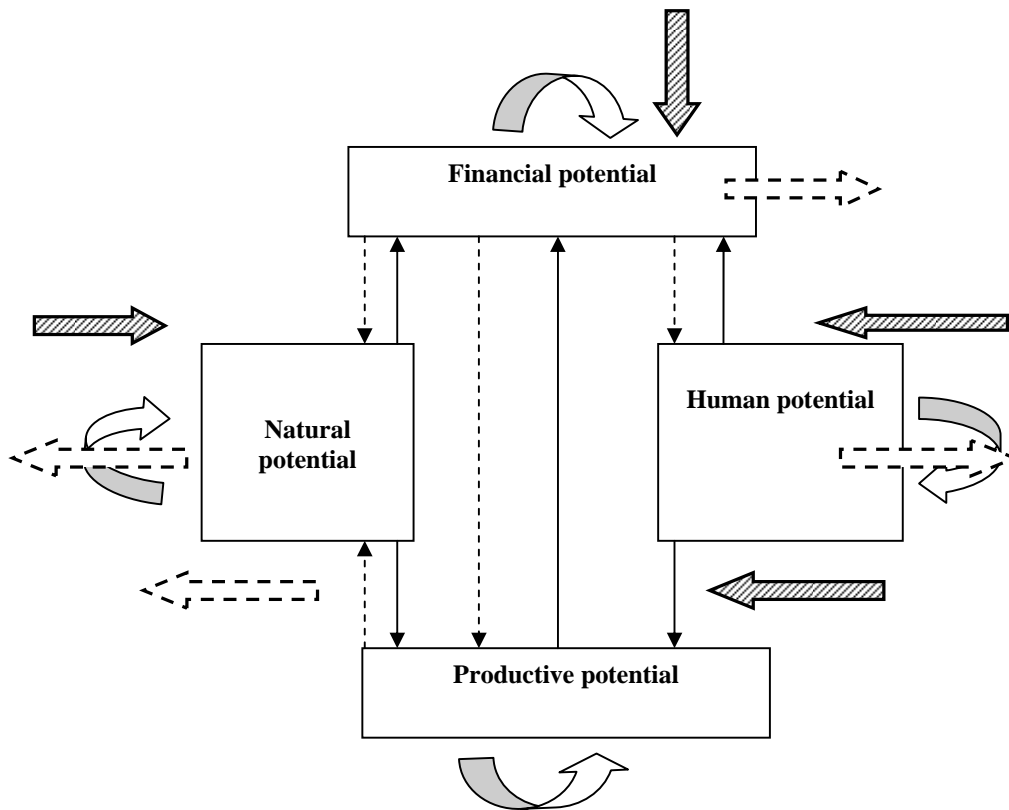


Figure 2.1. Diagram of Interacting Four Potentials that Provide the Sustainable Development

Within the territorial units (zones, countries or regions), exports and imports of human potential (labor force and experts) and financial potential (loans, credits, donors' grants, and outflow of funds by legal and illegal means) are quite important. The productive potential may be also

imported or exported by means of exporting raw materials and semi-manufactured goods and importing equipment, transport means, etc. Even natural potential, especially water, can be imported or exported through redistributing water resources or exporting and acclimatization of flora and fauna.

- ← Direct links
- ← Feedback link
- ← Self-reproduction
- ← Inflow
- ← Outflow

Sustainable human development is based on the abilities of human beings to support a balance of four potentials and their capacities for reproduction. The success is guaranteed due to the followings:

- Limitlessness of the technical progress and intellectual abilities of a human being;

- Some limits of reproduction within the framework of productive potential; and renewal capabilities of resources;
- Clear-cut understanding of the system of links and interaction of these potentials as well as of the limits of their use;
- Aspiration of achieving the potential productivity per unit of natural resources and building-up of the efficiency on the basis of the dynamic development;
- Presence of the obligatory universal regulations, postulates and rules for maintaining the policy that can and has to provide rational use of all four potentials, on behalf of not only some regions, nations, but also the human community as a whole.

Each of above-mentioned potentials consists of a diversified set of constituents and supporting components, composition and structure of which can change in the process of development, but a balance of key elements should be stable.

As a rough approximation, the composition of potentials can be presented as follows:

<p><i>I. Natural potential</i></p> <p>1.1. Climate</p> <p>1.2. Water resources</p> <p>1.3. Land resources</p> <p>1.4. Mineral resources</p> <p>1.5. Fauna</p> <p>1.6. Flora etc.</p>	<p><i>III. Productive potential</i></p> <p>3.1. Industry</p> <p>3.2. Agriculture</p> <p>3.3. Transport</p> <p>3.4. Communication</p> <p>3.5. Information technologies</p> <p>3.6. Roads</p> <p>3.7. Energy</p> <p>3.8. Construction</p> <p>3.9. Business environment</p> <p>3.10. Priorities, etc.</p>
<p><i>II. Human potential</i></p> <p>2.1. Population</p> <p>2.2. life styles</p> <p>2.3. Traditions</p> <p>2.4. Education</p> <p>2.5. Public health</p> <p>2.6. Culture</p> <p>2.7. Religions</p> <p>2.8. Science</p>	<p><i>IV. Financial potential</i></p> <p>4.1. Reserves of resources</p> <p>4.2. Gold and precious metals</p> <p>4.3. Funds</p> <p>4.4. Loans</p> <p>4.5. Capital assets</p> <p>4.6. Tariffs, dues</p> <p>4.7. Taxes, benefits</p> <p>4.8. Grants and awards</p>

2.9. Public associations	
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Each of above potential is very dynamic due to the needs in development and some destabilizing factors. Soil degradation, depletion of mineral resources and climate changes are observed within the frame of *natural potential*. Changes in a birth rate, death rate, population growth, consumption and social environment play a similar role in the frame of *human potential*. A depletion and deficit of funds in the frame of *financial potential*, and depreciation of assets, and technical progress, especially in related economic sectors, exert considerable impacts on the *productive potential*. At the same time, interrelations of these potentials and their dynamics, as well as the efficiency of these interactions are specified through three key aspects:

- Political environment that forms so-called governmental (legislative and regulative) and public relations – “governance”;
- Social environment that defines the status inherent in society and its attitude to the future – “social medium”; and
- Management system – methods and arrangements; means and regulations, information exchange, monitoring and evaluation – “management”

In other words, *the sustainability of developing human “complex”* is described by the collective notions: steadiness and appropriateness of its basis – political environment (governance); a public climate in the social medium that is formed under the influence of governance and development of all other potentials, especially, human potential (Figure 2.2). A management system that predetermines the sustainability, efficiency of use and rehabilitation of development potentials is formed on this basis. A distinguishing characteristic of this “complex” is not the steadiness, like in a building, but permanent dynamics (endogenous and exogenous) that specify both the internal state of each element of the potential and its status as a whole, and a proportion between them. At the same time, the steadiness of “complex” can be maintained only while there is certain equilibrium (between its major supports - potentials), which does not allow to upset the proportions in development and the balance. Otherwise, skewed structures of this “complex” are possible. Excessive development of the productive potential threatens, on one hand, by the loss of attention to support and preservation of the human potential or results in its one-sided development, but, on the other hand, by degradation of the natural potential, for example, due to excessive abstraction of nonrenewable mineral resources or contamination of the environment.

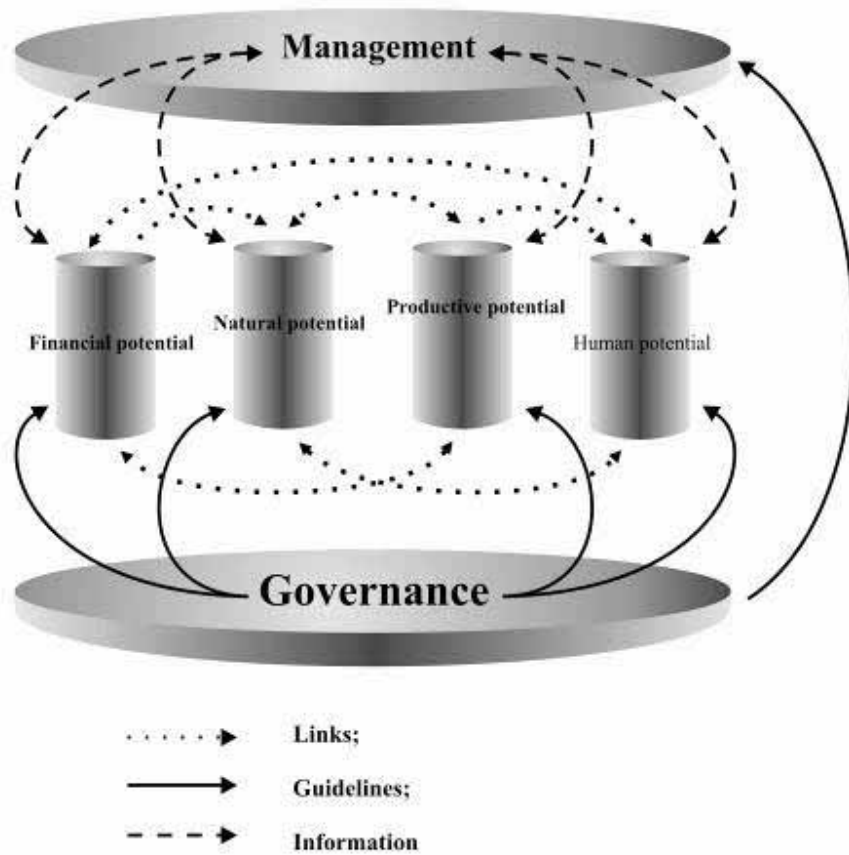


Figure 2.2 Links of Four Potentials of Sustainable Development with Water Governance and Management

The status of each potential and its elements (representing the process of accumulation or depletion) is also very important. In compliance with the principles suggested by our colleague Dr. Michael Glantz from the USA, the degree of risks in any natural or man-made event, the assessment of “current status” of the potential should be present in the form of a cone. In a phase of filling/ increasing – the base of the cone is directed downwards and in a phase of emptying/ depletion – the cone is turned upside-down. In the first case, a degree of risk is minimal, but in the second case, the degree of risk is catastrophic. Representing each potential and even its elements we can thus receive an “indicator for upsetting” the steadiness of development (Figure 2.3).

	Natural potential →					
Climate		◻	◻		◻	◻
Water resources	◻		◻	◻	◻	◻
Land resources	●	◻		◻	◻	◻
Mineral		●	●			

resources						
Flora						☐
Fauna	☐	●	☐		☐	
	Climate	Water resources	Land resources	Mineral resources	Flora	Fauna



Figure 2.3 Block of Natural Potential (No 1) and its Links with Other Potentials of Sustainable Development

Let us review all situations, taking into consideration the role of water resources and the water sector in the “framework” of this complex and in sustainable development as a whole. Water is the most important element related to all potentials and plays the following roles:

- resource element in the natural potential;
- consumption element in the human and productive potentials;
- element used in financial and productive potentials;
- supplying element in the human, natural, and productive potentials; and
- element predetermining the development in all potentials.

In sections above, we already came to realize that governance is the specific political environment, which with the help of different mechanisms forms the system of control over the society and should

ensure its sustainability and development¹. Governance, generally, as a basic platform of any country, society and economy, should meet some fundamental criteria, which are guarantees of sustainable existence and development, namely:

1. Understanding its role and responsibility towards society;
2. nature of integration;
3. Participatory nature;
4. Transparency;
5. Equality;
6. Efficiency;
7. Law-abiding and effective;
8. Accessible;
9. Ethical

A set of mechanisms and principle regulations concentrates in five major systems of governance: political, legislative, social, financial and institutional. Concerning water resources, all these criteria and guidelines are well grounded, but they gain the specific character related to water. At the same time, a ratio between “governance” and “IWRM” is kept in that form which was pointed in the publication [3, Page 13]. As was mentioned there, “*governance specifies rules of play and establishes the (regulative) mechanisms of incentives, but “management” (IWRM) is responsible for their detailed elaboration and implementation in the process of water distribution, regulation and protection in the framework of water management activity and regional water use at the level of water users.*

First, let us review criteria concerning water governance, taking into consideration that *water resources and the water sector are top-priority factors for the system of sustainable development of the world, regions, countries, and some areas.*

Therefore, the first criterion is “*Understanding the role of water and responsibility of governance towards society regarding the contribution of water to sustainable development*”. Responsibilities of “governance” here are quite broad and multifaceted. Let us indicate them:

- *Guaranteed water availability in water supply sources* (transboundary surface waters and aquifers, local rivers and sources); in our conditions, as will be shown below, the level of guarantee is yet very low and vice versa, the level of risk is very high. The experience gained during the dry years (2000-2001), less dry year (-2006) and even in years of average water availability proves this fact. Governance should be specified both as the system of water rights and as the administrative and organizational setup of transferring rights and duties to water management authorities and water users associations that have to create the counteraction to these risks. Procedures and regulations for allocating and using both national and interstate waters should be clearly indicated in legislative forms.

¹ This meaning corresponds to a sense of Greek word “politics” which is translated as the art of managing the State, “Dictionary of Foreign Words”, Moscow, 1955 or “Science of ruling the State”, V. Dal, “Explanatory Dictionary”, 1882

- *Technical capacities for water supply and drainage*, under present conditions and scope of implementing repair and rehabilitation works. Governance, based on analysis, has to correctly specify to whom in the country and in what way, those assets can be distributed between national, provincial and local water authorities and among water users united (or not) into their associations or co-operatives; their financial and technical capabilities. In Central Asia, most of the assets of large and small water management systems were created in the 1960s-1980s. The operational life of most infrastructures has reached the end of their economic life. O&M works are not properly organized; and aging of assets is going fast, and numerous failures of operation of some structures and systems, therefore, are regular. Detailed information concerning the drainage systems is given in the publication [6].
- *Governance should prepare the country for adaptation to unsustainable climatic conditions and climate-related hydrological trends, as well as for potentials of considerable natural changes.*

Influence of climate on shifts in a water management situation is a key factor that affects water consumption and the status of water resources as a whole (water reserves, floods and droughts). Continental climate in the Aral Sea basin results in alternations of dry years with droughts and wet years with abundant spring precipitation and floods. In addition, the basin can be characterized by substantial instability of poorly-predictable weather conditions in spring and autumn periods. One may recall the extreme floods in 1969, which created a catastrophic situation on all rivers, and only huge capacities of the former USSR allowed coping with this natural disaster. Then, 1974 and 1975 were extremely dry resulting in considerable economic losses in spite of the fact that according to the decision of the Cabinet of Ministers of the USSR even the dead volume of Toktogul Reservoir (5 km³) was released through the construction tunnel. The need, to be prepared for such natural events, is growing because during last 15 years the recurrence of extreme natural events was increasing – since 1990, we were witnessing of as many floods and droughts as during previous 40 years (Figure 2.4). Our experience shows that, even with a smaller deficit of water resources, uncoordinated actions, essentially, affect the socio-economic development as a whole.

On the other hand, water bodies with larger surface areas are creating or at least affects the climate. Shrinking of the Aral Sea and its effects, including salt and dust transfer, as well as the increase in the aridity on adjacent areas are well known, and have been sufficiently studied and described.

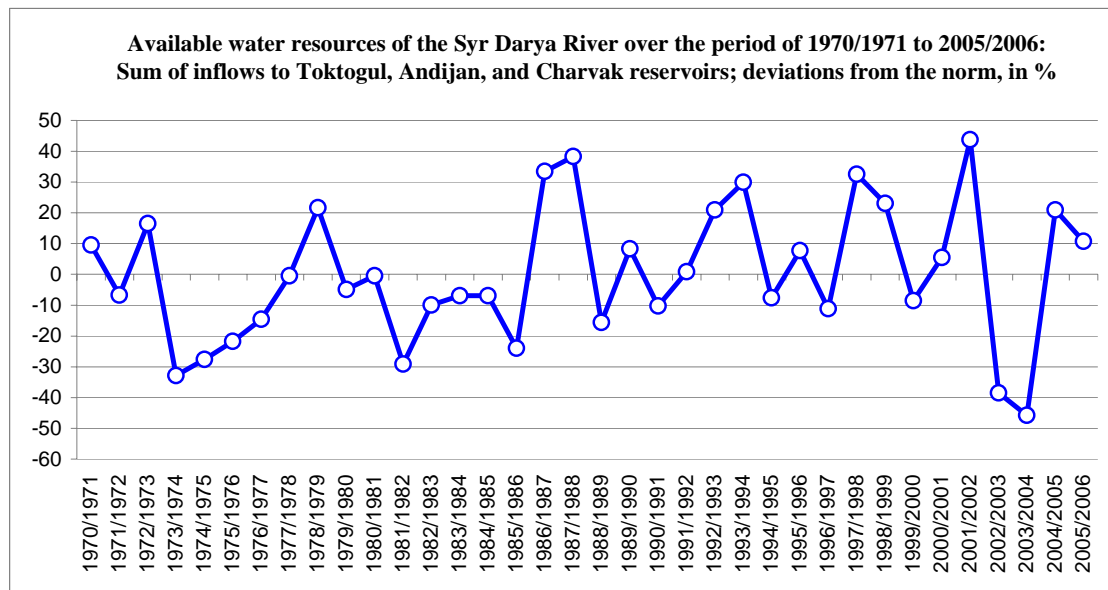


Figure 2. 4 Recurrences of Droughts and Floods in the Syr Darya River Basin

An integration nature of governance has to withstand the multi-faceted influence of water factor (see Chapter II), implementing interlinked measures, legislation and integrated approach, which prevents making narrow-sectoral or fragmentary decisions in water supply. For an example, in the irrigated farming sector, to the prejudice of water supply in sectors of public utilities and fishery and, especially, in meeting the environmental needs. We all look with melancholy at drying streams and rivers, but, at the same time, averting our eyes from them; we require additional water quotas for our district, province or republic. Integration reveals itself right in the environmental perception of water resources.

Water bodies are landscape's elements, and landscape, including water bodies with their specific water regimes in combination with flora and fauna, specifies *ecological water requirements* (ecological and sanitary flows). A certain *political will and governance* are needed to meet these requirements: inter-state agreements and national laws and regulations, etc.. The governments should clearly state the procedures of their implementation, as well as mechanisms for monitoring and evaluation.

In the Central Asian region, these requirements have to be reflected in the Agreement on Maintaining Ecological Requirements of Water Objects, the draft of which was already prepared in 6 versions, but "things are still where they started" (negotiations on this document are going on). There is an idea to include the controls of implementing ecological requirements into the functions of BWOs; at the same time, it is necessary to introduce compensation mechanisms to punish violators. On the other hand, clear-cut rules of implementing the established water quotas and preventing water-abstractions in excess of ecologically permissible levels, on all watercourses should be stated in national legislations.

Attention should also be paid for the following aspects related to natural potential of water resources:

- Preventing harmful impacts on climate, in order to avoid the reductions in glacier mass below a certain level, which could cause decrease in runoff fed by glaciers be catastrophic for existence of streams and can adversely affect the productive potential;

- Establishing joint monitoring of the conditions of natural objects' by all countries and sectors; this requires a political will and the overcoming ambitious, and sometimes egoistic, requirements concerning national sovereignty;
- Establishing national systems of meteorological and hydrological monitoring; at the same time, the regional organizations should have free access to hydrological information in the regime "on-line" without direct participation in joint monitoring, but co-financing of data collection by all stakeholders.

Participatory approach and transparency of water management systems are two very important aspects of water governance. These issues are described in special paragraphs. It is necessary to note here that *governance* needs to organize involving all stakeholders at each level of water management hierarchy in such a way that public representatives participate in decision-making in partnership and parallel to water administration. At the same time, if the latter should form water use limits and other restrictions, the public representatives should form the demand through the principles of "bottom-up" approach, concerning water supply regime, quantity and even quality. Such an approach will provide simultaneously *equality* of participation and accessibility, as well as important public initiative and funds along with creating trust, fairness, and openness in water distribution and use.

Efficiency and ethical aspects of "governance" will depend on the following factors: i) as far as governance will be able to form public philosophy; ii) creating such a social climate, under which all members of the society will get into the habit with their mother's milk. At all levels of education notions such as futility of damaging natural processes, sanctity of respecting water, its rational use should be introduced i.e. the return to former traditions and social climate, which we have lost during the Soviet epoch and continuing to loose now in the epoch of market relations and monetarism.

How public climate and ethical status of the society are formed? *Governance* is an understanding of the top circles, what is opposed to equitable and wise approaches to water use. What is the nature of local, sectoral, and professional hydro egoism? How to overcome the inertia of officials and employees of water administrations? How to move from 'fragmentary' to 'general' vision of water problems? How to struggle against corruption and aspiration for easy money using water (although, it would seem, the clean water is not compatible with dirty business, but corruption takes place in the water sector, too!!!)? What can withstand these negative things? Here, one remedy will help; it is necessary to establish "all-round defense" (Figure 2.5). How to establish it? This is public awareness - preparing the next generation in the family, school, and production sphere. This is use of the program "Water for Society", and the advocacy of traditions in communities and production teams. This is encouragement of the healthy style of living (for example, healthy diet requires water one and a half times less)! However, ethical efforts should be supported by a system of legal and institutional measures and, not in the last place, by a style of management!

The role of governance in water resources management and the water sector is especially important for the formation of the world-view that we should meet the needs of economy and society in water only with the meeting of water requirements of the natural complex. It can be provided under the associability of natural potential with other potentials concerning water resources. Constituents of *human potential* such as the population, life style, education, traditions, the status of public health, science are determinants for total water consumption, as well as such constituents as the attitude of society to water saving, conservation and protection. However, all above constituents result from the political environment in society and those ethical and legal frameworks which society has formed.

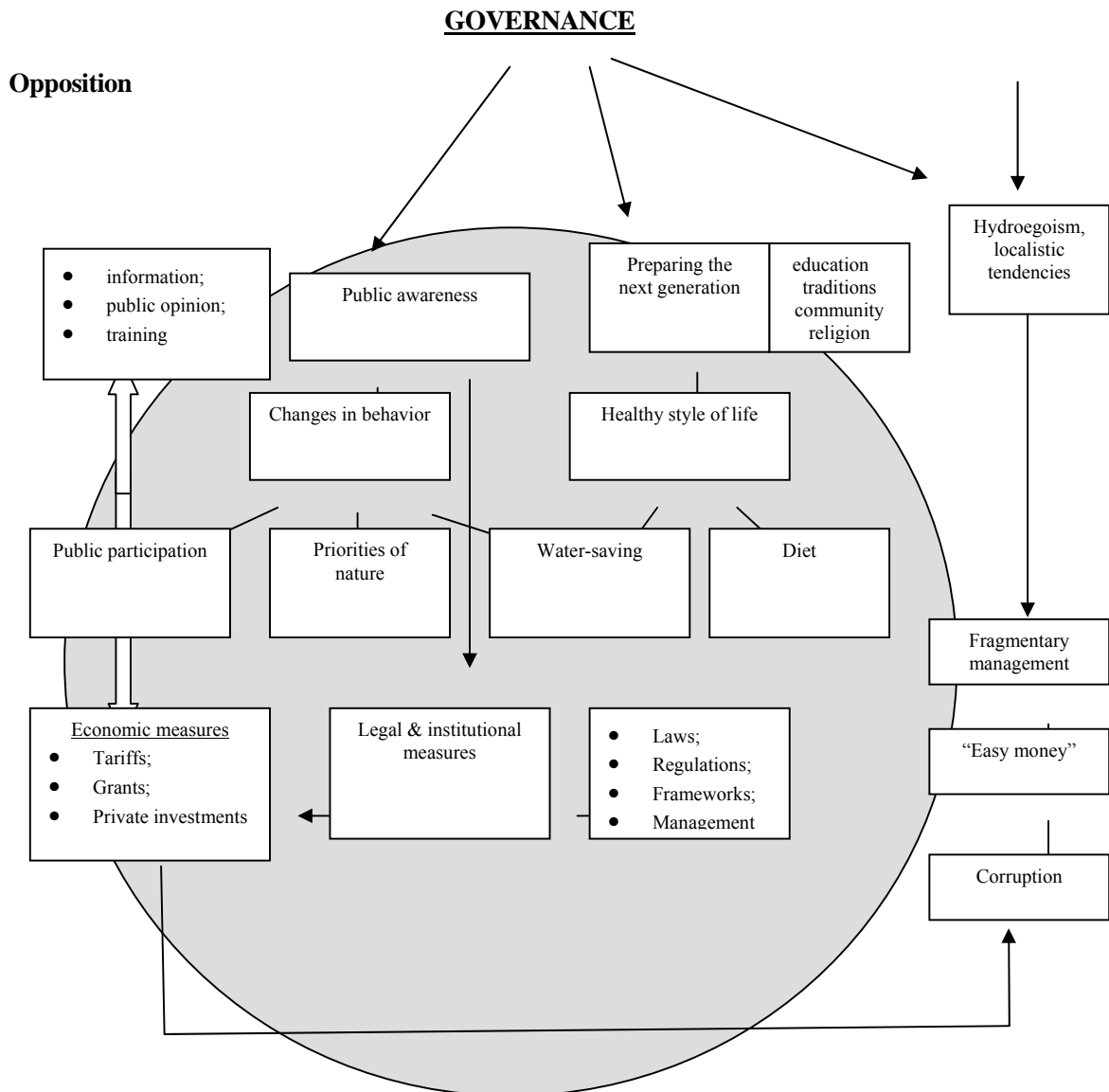


Figure 2.5 Governance as “All-Round Defense” to Provide Equitable Water Use

Let us review some mechanisms of the *government* in detail. The most important of them are political aspects (Figure 2.6), which specify:

- The place of water resources in the Constitution and the understanding of their role by politicians;
- Acknowledging UN Millennium Development Goals;
- Specifying the water policy and selecting priorities taking into consideration long-term objectives;
- Approving key provisions of the national water strategy and priorities;

- Recognizing IWRM as the basic direction for improving water management system;
- Acknowledgement of the principles of international water law;
- Participatory approach in water governance;
- Goodwill and support for the co-operation in respect of transboundary waters;
- Recognizing the ecosystem approach;
- Aiming at potential water productivity;
- Specifying the supporting policies of the State;
- Accounting the globalization processes; and
- Formation of water-ecological climate

Social mechanisms are directly linked and adjoin to political mechanisms. An important social mechanism is the recognition of water as a substance of public concern and responsibility to comply with centuries-old traditions.

The role of society in the water use and governance of the water sector is of primary importance. Another mechanism is the education of younger generation, and all that from “child’s pot.” Child should grow with the understanding that each droplet of water carries an element of life and has to use for somebody’s good, and if we do not do this, we do not allow somebody to quench his thirst or to satisfy his hunger. There should be a realization that poverty in rural areas results from water deficit (or water and land deficit), and that if we save water, we can give it to nature or use for developing virgin lands that provides new jobs and livelihood to many people.

Based on centuries-old traditions and modern progress in land reclamation, it is necessary to introduce the importance and the need for public and state partnership. All these mechanisms have to be applied in IWRM by means of developing the social mobilization as a key instrument of IWRM for social reforms.

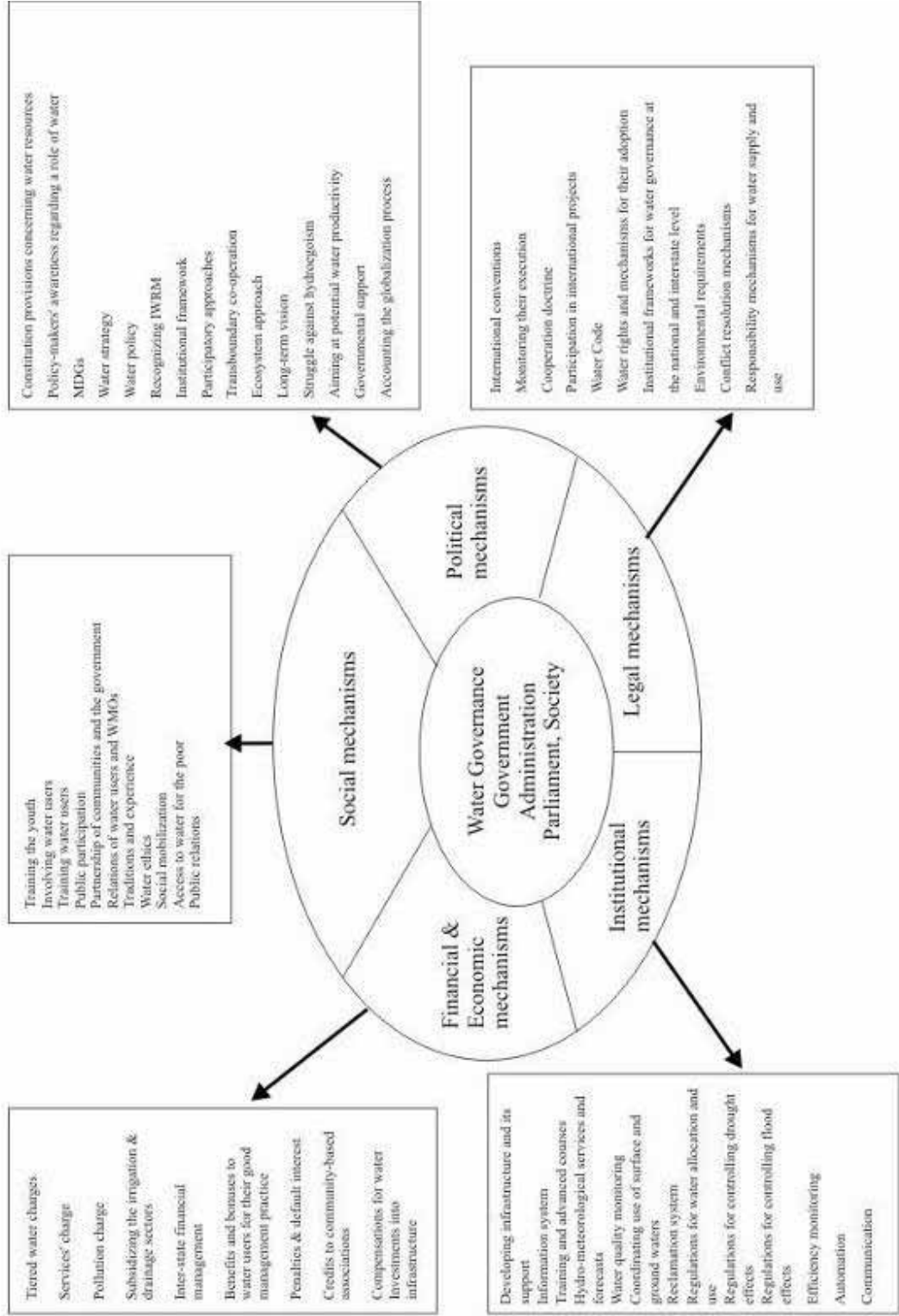


Figure 2.6 Elements and Links of Water Governance Mechanisms

In this context, although the social climates in five Central Asian countries are different, but too little guidance is given on water saving and retrieval of centuries-old traditions (prior to the Soviet period) of public participation in water management. A special gap is the lack of attention to education related to water agenda and developing a special water management curriculum. Currently, we are trying to develop them, and hope for assistance of international donors. However, restoring the prestige of water economy as a whole is much more important. In the past, mirabs (irrigators) were playing a leading role in the state governance, for example, in the 16th century Alisher Navoi worked as the Grand Vizier and Chief Mirab. Now, water education has lost its attractiveness, as well as the profession of water manager. Our task is to rehabilitate their prestige.

Transition from the administrative system of water management, the “top-down” principle inherited from the former USSR command system, to the market economy with numerous actors - water users, requires the drastic involvement of the society in the water management at all hierarchical levels. If, at lower levels of irrigation and water supply, WUAs or WUOs should play this role, at upper levels (main canals, irrigation system, or river basin) the combination of state governance with involvement of interested entities - Basin Committees or Irrigation System Committees is required. As a whole, this activity has been initiated and is in progress in the region, but in different forms. Thus, there is a vast field of activities related to social mobilization that should be promoted by the State.

The productive potential is the largest water consumer. It exerts the most pressure on water resources, and causes failures in the water cycle, especially in the irrigation sector. To promote effective water use in production sectors, a clear-cut state policy is required on the following matters: establishing institutional and technological mechanisms; support to the water sector; regulating activities of water management authorities and their relations with water users; attitude to IWRM and technical upgrading the water infrastructure; use of specific water-related norms and standards, and stimulating this activity. The role of the State is especially important in establishing institutional reforms of IWRM, providing self-descriptiveness, openness, and refusal to administrative pressures. Only such a framework can create the foundation for governance and the enabling environment for public participation. The following mechanisms are proposed:

- Establishing a powerful and sustainable structure for state governance at the governmental level that is aimed at solving not incidental problems but embodying the state policy concerning long-term water governance;
- Supporting hydro-geographical principle of establishing institutional structures with the maximum reduction in hierarchical levels;
- Establishing National Water Councils chaired by the national Prime Ministers, involving planning and organizational structures of the States;
- Coordinating activities of hydro-meteorological services and water management organizations and conservation agencies;
- Incorporating governance of surface and groundwater;
- Coordinating irrigation and drainage issues;
- Monitoring water project implementation and efficiency;
- Facilitating the scientific-technical progress, introducing SCADA systems, and upgrading water infrastructure;
- Proper O&M of infrastructure;

- Developing Management Information Systems; and
- Training /capacity building

A clear policy of the government is needed, in order to establish sustainable governance mechanisms for both water management and demand management. Financial and legal instruments developed by the state as well are needed.

What are the mechanisms and actions to support an effective introduction of pricing for water services? These include:

- Introduction of water fee charge and tariffs with the special modular system of progressive payment for excessive water use to encourage water conservation. The introduction of payment for water has already, actually reduced the overall water consumption in Kyrgyzstan, Kazakhstan, and Tajikistan.
- Pollution charges to ensure the ‘polluters pay’ for the disposal of untreated waste water;
- Subsidies on water infrastructure development and especially up-to-date types of drainage; An unfortunate experience of failed tube well drainage systems in Makhtaaral District in South-Kazakhstan Province is typical example. During the promotion period with subsidies for the operation of tube well drainage systems, sustainable the cotton yield was permanently higher than 3.0 tons/ha at gross consumption rates of water at 8,000-9,000 m³/ha. At present, crop productivity amounts to only 1.8 tons/ha at gross consumption rates 1.2 times higher due to partially failed tube well drainage systems and a lack of governmental will to subsidize O&M costs and inability of farmers to cover all these expenditures. At the same time, in richer USA, cotton produced under irrigation is subsidized to the amount of US\$ 1000 per one ton of fiber covering mainly water applications, O&M of drainage systems, and water distribution services.
- A system of benefits and bonuses for wise water use;
- Supporting extension services;
- A system of crediting WUAs; and
- Inputs in support of inter-state water resources management.

One of the most important aspects of water governance is *legal mechanisms*. Their development has to include the following key aspects: the formal acceptance of international conventions and protocols (the 1997 UN Convention, the 1992 Economic Commission for Europe Convention, the 1999 London Protocol etc.); obligatory participation in all international forums and developing their documents concerning rights and duties of nations, regions or special zones regarding transboundary watercourses or waters. A special emphasis should be made on issues related to preserving the environment for the future. Here, it is important to select the correct legal doctrine. Some countries alternately shift from the co-operation doctrine towards the doctrine of national sovereignty and back when this is profitable for them. In our region, the doctrine of national sovereignty reaches a deadlock. Our countries are so closely related within the limited drainage basins, closed by natural barriers that, even under the present technical progress, it is impossible to build up happy life only in one country without its interaction with neighboring countries. Each country, in case of some limiting actions or uncoordinated economic interventions of other countries, can initiate sufficiently troublesome arbitration litigations, regardless there are certain agreements between them or not. Such principles of

the international common law as “do not harm”, “equitable and reasonable water resources use”, “obligatoriness of notification and co-ordination” are in force based on UN status and documents, however, obtaining of a judgment in the international courts is quite difficult, as it was shown in the case of constructing the Gabchikovo Dam (in the Danube basin).

In our region, there are all opportunities to live according to the co-operation doctrine. Heads of Central Asian states, many times, expressed their political will to cooperate regarding transboundary waters in numerous inter-state declarations and in four inter-state agreements (in 1993, 1994, 1999, and 2003) that stated the need of establishing the IFAS and its executive bodies (including the ICWC) as well as their status, and then development of the Aral Sea Basin Program (ASBP-1 and ASBP-2) etc. Regional water resources management agencies were created and are operational; however, their capacity should be undoubtedly strengthened and developed.

Finally, the region has sufficiently abundant water resources and considerable hydropower potential; it allows meeting the present and future needs in water resources and electric energy under the presence aspirations, and provided open and honest co-operation prevails. Therefore, completing the legal base for international co-operation will allow establishment of a stronger platform for sustainable water supply from transboundary sources.

It is also important to establish the legal base for sustainable water supply at the national level. This activity should include the following actions:

Preparing a packet of water laws

This process should be transparent and involve water users and other stakeholders – decision-makers, ministries, departments, academic institutions and NGOs. Initiating this process needs to be started with analysis of former and present documents, evaluating their weaknesses and “bottlenecks”, where rules do not work.

Thereupon, it is necessary to prepare key matters of future regulations, principles, procedures and an institutional framework based on “basic regulations related to a water policy.” It is very important to develop the fundamental law – Water Code. Adopting this key document allows avoiding a lack of agreement in subordination of legal instruments. Water ownership, protection and accessibility should be reflected in the Water Code, its place in the national constitution has to be defined and match with up-to-date requirements and trends of the international water management processes.

Water resources ownership

Water resources have to be in the public ownership based on the state legislation adopted by the government that establishes the procedures of allocation and awarding water rights to users, as well as preservation of their rights in case of fulfilling commitments by them.

In compliance with the Bonn Declaration (2001), *the Government* is responsible for equitable water allocation and sustainable water resources management. At the same time, water delivery executed by private companies is not a water privatization; and the Government is accountable to members of society for the observance of their water rights.

Subordinated principles and regulation

- IWRM is one of key principles;
- Water resources use planning should consist of national, basin, and sub-basin plans;
- Guiding principles' list has to include water use priorities; and
- Observance of international commitments is especially important.

Regulating water use

Regulations include the followings:

- Distribution of responsibilities to ensure water rights and economical water use;
- An authorization-based system (licenses, usage criteria);
- Procedures for use and maintenance of water infrastructure;
- Duties of water users regarding the reservation of licenses;
- Measures for ensuring equality, efficiency; transparency and sustainability of water supply;
- Procedure for transferring water rights;
- Procedure for cancellation of water rights;
- Procedure for encouraging a water saving practice; and
- Procedures for water management during droughts or floods

Water resources conservation

- Controlling point and dispersed sources of pollution;
- Procedures for disposal of treated and untreated waste water;
- Regulation of land use;
- Establishing national standards of water quality;
- Rules for preserving eco-systems; and
- The "polluter pays" principle

Regulations for water infrastructure

- A part of legal regulations should be procedures for construction, maintenance, and rehabilitation of water infrastructure, as well as the procedure for implementation of public works;

- Responsibility for preventing emergencies and damages

Water sector institutions

The organizational framework consists of national ministry, basin organizations, WUAs and other organizational units with established links and procedures of their interaction. It is very important to specify the structure of land reclamation and irrigation organizations and to distribute their responsibilities.

Financing

The financial system specifies the state contribution in water resources management, and procedures for credit granting and receiving, as well as procedures of payment for water delivery services rather than for water. It is necessary to make efforts, at least, for covering O&M costs, but within the existing capabilities of water users to pay.

Undoubtedly, establishing a perfect governance system requires sufficiently long duration, but its formation is a key activity aimed at the skillful introduction of IWRM. At present, for example, the European Union has defined the needs for general transition towards IWRM, which should be completed by 2015. Prior to the adaptation of this decision, the European Union and its members went through a long way of the IWRM introduction at the national and inter-state level (EU Water Framework Directive; EU Water Initiative), but even today this process moves forward non-unambiguously.

During last years of co-operation, in the epoch of the sovereign states during the declining national economies and followed by gradual economic growth, all countries in our region have gained considerable experience. It became more clear that sustainable development in own countries should be based on joint regional efforts of national governments and communities in overcoming a water deficit, droughts and losses of dry years (2000, 2001 and 2008).

There is full assurance that IWRM mechanisms will be developed and introduced in all Central Asian countries owing to overall understanding that the region cannot survive without the introduction of joint rational use of transboundary waters, based on political will of governments and on long-term experience of mutual collaboration.

Governments of Central Asian countries should develop the systems of inter-state and national *governance* based on co-operation and co-ordination according to the principle of “hydro-solidarity” in order to optimize water resources use in all economic sectors, and especially for irrigation, hydropower generation, and nature protection.

