

# Environmental Approach: Nature is an Equal Partner

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Over a long period of time, mankind considered itself as all-powerful and able to bend nature to its will. However, instead of the slogan: “We cannot wait for favors from Nature ...” has come the understanding that “a human being has got nature not as a gift from his ancestors, but borrows it from his descendants.” Such a concept adopted in the water sector, first of all, implies the recognition of rivers, lakes and other water bodies as “water consumers” along with other economic entities, and without specific ecological water flows they can lose their natural essence. Today, the priorities of water management organizations, frankly speaking, are aimed at current momentary needs of mitigating the consequences of floods and droughts as well as the satisfaction of daily wants. It is easy to see that even people living in the vicinity of the epicenter of environmental disaster in the Pre-Aral region in the end of 1980s and suffering from a decline in fisheries and loss of the river delta, nevertheless have preferred to take away the water from their sea for increasing rice production in Karakalpakstan and Kyzyl-Orda Province in Kazakhstan. After independence, some shifts in raising ecological awareness of society affected by this crisis took place. However, on the whole, conservation and especially restoring the disturbed environment are staying in the “backyard” of water policy and, to some extent, are being an obvious attempt to follow the fashion. The water culture level of a country, region, zone, and even water management administration is defined by the observance of nature protection regulations in current practice. This concerns such areas of activity as: (i) maintaining the minimum ecological flows in natural streams supporting their eco-systems and capability for self-purification, (ii) sanitary water-releases for dilution of harmful ingredients, and finally (iii) satisfaction of water requirements of deltas and estuaries. At the same time, this approach should be applied not only to large rivers and water bodies, but also to small streams, water sources and affected entities.

The environmental aspects of IWRM specify activities and awareness going in two directions: to prevent harmful events related to water resources, and to meet the water requirements of eco-systems. From the ecological point of view, the main features of water are its high mobility and ability to dissolve different chemical components of the natural complex. A key condition providing the sustainable natural and anthropogenic cycles is to minimize the negative impacts of interacting sources of water and territories in use, as well as the interaction of surface and ground water.

In respect to providing environmental sustainability in the drainage basin, it is possible to propose an approach under which such principles and interrelated conservation factors, as water quality in its sources and accumulation of pollutants over areas under economic use are taken as sustainability criteria. In other words, the criteria of well-being in the drainage basin would be represented as follows:

- The pollution level of the area under economic use and affected eco-systems should not exceed the permissible concentrations, and trends of accumulation of toxic pollutants are to be negative, i.e. gradual reducing of pollution over the concerned area is in progress;
- Concentration of contaminants in water sources over all zones of the drainage basin, from headwaters to its mouth, shall not exceed the maximum permissible concentrations for all water users utilizing water from these water sources; and
- Anthropogenic pressure on eco-systems over the catchment area should not exceed the optimal limits that ensure maintaining of their biodiversity and bio-productivity.

Another important issue is the observance of ecological requirements for water resources, when we keep in mind the requirements of eco-systems for water supply as the basis of sustainability of flora and

fauna, as well as of aesthetic characteristics of natural complexes. It is important not only to preserve natural flora and fauna of small and large rivers, but also to keep their natural attractiveness for people. Undoubtedly, many natural streams have lost their original status: rivers Zarafshan, Murgab, and Tejen have lost their links with the Amu Darya, and in a similar manner, rivers Chu, Talas, and Assa have lost their links with the Syr Darya River. However, our task is to stop this grievous process.

It is clear that IWRM shall provide the real observance of ecological requirements of water as a key task of hydro-ecological management. A number of the provisions that need to be considered in the practice of water resources management may be formulated from the positions of an ecosystem-defined approach.

1. In compliance with the IWRM principles, water, land, and other resources within a catchment area should be considered *as components of joint use, management, conservation, and development*. Responsibility and duties should be distributed among water users at national, sectoral, local and “bottom” level in such a way that the regulation of water demand and use would provide sustainable preservation and/or development of the natural potential as well as preventing its reduction. Based on those considerations, all water resources within the basin have to be considered in their interaction with economic activities, taking into account some limitations in use of water, land, and other resources, and reclamation measures in order to ensure sustainable development.
2. On the basis of the legislation, regulations, and international agreements, the State assumes the responsibility, with the assistance of its conservancy agencies, water management organizations and public mobilization, to monitor ecological and sanitary flows and the norms on preserving natural streams that were discussed above.
3. Step by step inclusion of the environmental component into IWRM in the form of the participation of conservancy agencies in decision making at all levels of the water management hierarchy as equal partners should be accompanied by the introduction of hydro-ecological management, as a top stage of IWRM. This type of management is formed by means of priority-driven consideration and observance of environmental requirements, assessment of ecological service and transforming the Basin Water Council into the Basin Council of Natural Complexes that should consider maintaining the sustainability of ecosystems as its primary task. In the BWOs “Amudarya” and “Syrdarya”, the initial phase of such an approach should be the inclusion of the Delta Water Users Association as the most important and full member into the Basin Council for defending the interests of natural complex.
4. Water resources management has to be based on the rigid principle of *ecologically permissible water abstraction (EPWA)* to prevent the possibility of irrevocable water consumption. When this level is exceeded (such a situation took place in the past), countries-consumers shall make their contribution to the international basin fund as a payment for excessive use of natural resources and implement mitigation measures. For example, in the Aral Sea basin, this recommended level of total water abstraction from water sources is about 78 km<sup>3</sup> against the present water abstraction of 106 km<sup>3</sup>, and 123 km<sup>3</sup> in the past (1990)! If each water consumer who exceeds the ecologically permissible water abstraction will make a contribution to the fund for ecological safeguarding of the basin, then opportunities to use these funds to improve environmental conditions within the basin as a whole will arise.
5. For the purpose of preserving rivers and water bodies as natural ecosystems, drawdown of water of reservoirs and river flows *should not be less in summer and more in winter than mean annual runoff (that is specified based on long-term flow rate measurements)* in respective seasons. The observance of this rule can prevent transformation of rivers into runoff ditches. Water requirements of ecosystems in deltas and estuaries and flow-through and closed water bodies should be specified

taking into consideration their bio-productivity and sustainability, based on monitoring data along with taking into account requirements of countries that are using water resources.

6. Environment aspects should be included into IWRM plans at the levels of basin, sub-basin, and region. Ecological problems that need to be solved exist in each irrigation systems or WUA. These activities includes: (i) rehabilitation of disturbed natural landscapes due to water erosion, water logging, and deforestation; (ii) correcting such matters as excessive abstraction and use of local water sources; and (iii) inventory of sources of pollutants and damaged zones, and their control and localization. All these activities have to be implemented within the environmental component of IWRM and by public bodies established for management of irrigation canals and WUAs. At the same time, a department of ecological control should gradually introduce the management practices at basin and sub-basin levels as an effective measure for rehabilitation of natural ecosystems.
7. Drainage and drainage water management is an important component of nature protection complex. The interrelations of surface water, groundwater, and drainage is a very sensitive aspect of water and land reclamation management because excessive water supply for irrigation or leaching of soils results in not only water losses and deterioration of water as a resource, but also degrades the land and loss of soil fertility. The incorrectly designed drainage systems mobilize vast volumes of salts from lower stratum. In addition, unevenness of irrigation and drainage results in increasing water losses and non-uniformity of crop over an irrigated area. In order to identify these shortcomings in water management in a timely manner, it is necessary to enhance the activities of land reclamation services, to equip them with relevant equipment and measuring instruments, to introduce GIS and remote sensing methods for monitoring and evaluation of land conditions. It is note worthy to remember that land salinization and water logging are some of the main factors causing decreased crop yield and water productivity in irrigated farming, because apart from the fact that there is a reduction in yield, water consumption is high.

It is clear that at present, water requirements of ecosystems cannot further be met according to “a residual principle” (delivering of residuary water after satisfaction of the economic needs). Meeting of water requirements of ecosystems should be one of priority activities within IWRM.