

Water and Education

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There is one important factor that affects the current or recommended for the future measures, for the implementation of IWRM principles – the human factor. Water may be and should be saved not only by the introduction of water saving methods of management and economic incentives for water users, and selecting the correct and rational ways for solving problems, but also by an intensification of the human factor. Reorganizing public consciousness and attitude to water, through liquidation of gaps between the notions: "my" and "our" or "public", is needed. It can be achieved through adopting, especially among younger generation, the concepts such as «water is the greatest good and therefore the greatest value granted to us»; « like water, human beings are a part of nature, therefore he cannot be the master of neither nature, nor water». Also through the revival of solicitous attitude of our ancestors to water, expressed by statements such as “Water contamination is the greatest sin” and “Water is life!”. However, a few things can be achieved by slogans and appeals. Public consciousness can be shifted in the necessary direction only on the basis of purposeful, integrated and persevering training of people, employing stored knowledge, experience of water use gathered by our ancestors and contemporaries, not forgetting of mistakes made by the last generations in water management and nature management, as a whole. On a question «who is to be a trainee? » there is a natural answer - no doubt, the schoolchildren. In a few years, they will become adults and active part of the population. Generations, competent in water issues should come to take our place.

Now, strong dependence on the educational programs that were developed and applied still in the Soviet period is being traced in educational systems of most of Central Asian countries. However, specific improvements of the general educational programs in some states are, by this time, in progress. For example, the School Textbooks Publication System Improvement Plan was prepared in Uzbekistan. In accordance with this plan, textbooks and manuals with the general name: «People and Environment» have been prepared. Four textbooks “A Human Being and Water”, “A Human Being and Air”, “A Human Being and Land”, and “A Human Being and Biodiversity” will be published as well as the manual for teachers generalizing all four above-named themes. At present, the Environment Education Training and Research Laboratory of the Training and Methodical Center "Bioecosan" under the Ministry of Education of the Republic of Uzbekistan has prepared 19 scientific and methodical recommendations for secondary schools to promote the ecological education.

In support of the mentioned efforts in reforming general educational programs, the Global Water Partnership for Countries of Central Asia and Caucasus together with the SIC ICWC and Regional Ecological Center (CAREC) has proposed to include the water and ecological topics into the educational programs.

The goal of this initiative is to provide scientific and methodical assistance to experts of national education, to the training and methodical institutions to improve the general educational programs for a number of school subjects (history, geography, chemistry, economic and legal knowledge). This is in tune with the purpose of equipping pupils with good knowledge of the water problems, at the time of graduation, providing their conscious and solicitous attitude to water.

For the realization of this initiative in the Republic of Uzbekistan, it is necessary to keep in mind that the proposed measures and recommendations should not contradict with the laws adopted by the republic (Law on Education and Law on the National Professional Training Program) and the governmental decrees in the field of school education. It means that all amendments and modifications to the general educational programs should be in the context of the public education standard, and meet the principles incorporated in it.

One of principles of the state education standard says that education should meet requirements of the nation and society, and needs of personality. Today, the water matters are a subject of special attention of the State and affect more and more the interests of the society and personalities. Though curriculums of the listed school subjects contain elements covering those or other issues related to water resources management, water properties and data on water formation sources, etc., but all these actions under present conditions are absolutely not enough and do not meet requirements of the State, society and ordinary people.

Creation of a separate school subject: “Water Resources” or “Water Problems” now seems to be impossible, though it would enable to unify knowledge on water and its resources and to focus attention of schoolchildren to concrete practical questions. It is necessary to find ways of integrating the topic “Water resources” into curriculums of school subjects. Implementing this task by including these topics into different subjects seems to be acceptable to the most, but it is too difficult and uncertain. The following sequence seems to be logical: identification of what knowledge pupils have to learn in the complete set from 5 to 11 grade (as though there is a separate topic “Water Resources”), then to formulate what pupils should know in the final, and further. To define what they should be able to do. Such an order should be uniform under formation of topics of curriculums for all school subjects. It enables to find out what questions of the proposed list already are available in existing curriculums, what questions can be easily entered in them, what questions can be included by replacement of those or other parts in curriculums, and what questions remains excluded, and their inclusion or exclusion is to be decided by the relevant approving departments.

Pupils (5 to 11 grades) should get knowledge on the following matters under the topic “Water Resources”:

- What is water? Physical states of water and its chemical composition; Water in living matter;
- Natural water and its origin; Water in the atmosphere, on the Earth surface, and in the interior of the Earth; The natural water cycle;
- Total waters reserves (oceans, seas, rivers, lakes, glaciers, icebergs, underground water, soil water);
- Water resources of Central Asia, the Aral Sea Basin and some rivers in the region;
- Fresh water deficiency; the causes of fresh water deficiency;
- Ecosystems in river basins and reasons for their destruction;
- Hydrology of the rivers in Central Asia; Hydrological regimes of rivers and their transformation under anthropogenic impacts;
- River water quality; Transformation of river water quality on the way from river head towards its mouth and in time; the causes of river pollution;
- Drinking water, drinking water requirements, information on the drinking water standard;
- Water reservoirs in river basins, their influence on hydrology and other characteristics of rivers;
- Internal and interstate (transboundary) rivers; Examples of difference in flow management of such rivers;

- Canals, waterworks (intakes, control structures, and off-takes); water measurements at canals; canal efficiency;
- Water infrastructure and dam safety; Examples of dam destructions and their consequences;
- Development of river basins with a view of irrigated agriculture;
- Some information on the irrigation development history in the region stage by stage: before colonization of Turkestan by Russia, during the colonial period, and under the Soviet Power;
- Irrigation and water allocation; development of institutional and physical water infrastructure in the country
- The careful and solicitous attitude of our ancestors to water and its use; conceptions reflected in proverbs and sayings;
- Features of irrigation development during the Soviet period; Achievements, shortcomings, and mistakes resulted in drying up of the Aral Sea;
- Information on water resources management methods; the concept of integrated water resources management (IWRM);
- Water User Associations (WUAs) is a link between the public water suppliers and water users (dekhkan and private farms);
- Water is not only the most valuable and necessary natural resource, but also under the certain conditions - the good having a price;
- Economic mechanisms in the water sector;
- Interrelation between a national economy and its water safety, as well as water resources conservation;
- Legal issues related to water resources, their use and protection;
- Islamic statutes concerning water relations and water use;
- The national law on water and water use; the governmental resolutions in the field of water resources and their use

By the moment of graduation from school, pupils should know that:

- Natural waters of all kinds and physical states are, somehow or other, interrelated and are in permanent cycles - big and small cycles;
- Mankind, for its purposes, uses waters first of all the rivers (big and small rivers), freshwater lakes, dynamic underground water reserves;
- Fresh water to be used by people in the various purposes (drinking and domestic water supply, irrigation, many other needs for which fresh water is necessary) is quantitatively limited, is deteriorated owing to anthropogenic activities, disposal of waste water without treatment to water sources;
- Sustainable economic development of any country, hence, well-being of each of its citizen, directly depends on adequate provision of the country with fresh water resources. Therefore, water conservation and its rational use attract the public attention more and more and gain in the practical importance for society and people;
- Water is valuable natural gift, an irreplaceable resource, and under specific conditions, a good with a price tag. For this reason, use of economic mechanisms (purchase and sale) in water relations is quite naturally and promotes seeking solutions on water conservation and protection;
- Water conservation is a duty of each person here, there and everywhere, where qualitative fresh water is used. To save water means to preserve personal and public savings;
- Deficiency of fresh water (under its quantitative consistency) is irreversible process due to the population growth and development of water-consuming branches of the economy in the country.
- The duty of everyone is an understanding of decisions and measures of the government directed to mitigation of tension consequences related to water, and strict fulfillment of own duties regarding their implementation in practice.

What a graduate of the secondary school should be able to do?

- To eliminate or promote elimination of fresh water losses (leakage from taps and other plumbing fixture in apartments, basements of apartment houses, and other places), or its use not for direct purpose;
- To explain to relatives and close people the necessity of solicitous attitude to water and its economical use; to be able to measure volume of leaks in apartments with the help of improvised means (a bottle or a glass, and watch) and to express this loss in money;
- To explain people those around him main regulations and meaning of national laws concerning water and water use, last resolutions of the government on water resources and their use.

Quantitative indicators of the national education system specify a scope of necessary works for introducing water themes in the school curricula. For example, in the Republic of Uzbekistan there are 160 administrative districts in 12 provinces and the Autonomous Republic of Karakalpakstan; and the departments of education are active in each district. Taking into account large cities and their subdivision into districts (Tashkent, Samarqand, etc.), as well as towns in provinces (without subdivision into districts) with their city departments of education, the number of district departments of education amounts to 200. In 2005, about 9,737 schools including primary, secondary and special schools, lyceums and gymnasiums were functioning in Uzbekistan. Since our initiative does not cover the primary schools and from 1st to 4th-class pupils of secondary schools, hence 9,555 schools with 3,752,980 pupils (from 5th to 11th-class pupils) will be covered by this initiative. The total number of teachers amounts to 461,797 persons including 60,000 teachers who give lessons covering subjects (geography, chemistry, history, legal basics, economic basics, etc.), into which the water themes should be integrated (about 300 teachers per each district, on average).

This activities includes the following key directions:

- Preparatory works for establishing the system of centralized courses for training trainers with the follow-up daylong seminars under their leadership in all districts of the republic;
- Supporting activities of these centralized courses and the training necessary number of trainers;
- Organizing the one-day seminars (per each school subject specified for integration of water themes) in all districts of the republic with a coverage of all teachers who give lessons in subjects, which will be integrated with the water themes; and
- Preparation of various tutorials and learning aids to be used during training at centralized courses and one-day seminars, as well as in the future in the secondary schools.