

RECOMMENDATIONS TO ECE GOVERNMENTS ON RATIONAL UTILIZATION OF WATER

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As a consequence of accelerated economic growth, increasing urban concentration, rapid industrial expansion, extensive agricultural exploitation, rising living standards and explosive tourism, in many countries water became a key element and even - in some cases - a limiting factor in the present socio-economic development of ECE countries. Water resources are becoming more and more scarce and their development and further exploitation are becoming increasingly difficult and expensive.

Furthermore, water is used far over actual needs as recognized by the United Nations Water Conference (Mar del Plata, Argentina). In certain cases water is even misused as an undue acceptor of increasing pollution loads, impairing its proper use. The elaboration and effective implementation of national policies for rational utilization of water should therefore be given priority in the interest of present and future generations, taking into account as far as necessary, *inter alia*, the following aspects:

- (a) Reduction of the water consumption rate in all sectors of the national economy;
- (b) Recycling and reuse of water;
- (c) Protection of water against pollution;
- (d) Legislation and administration;
- (e) Public participation.

It is therefore recommended that:

1. The application of water meters should be promoted for controlling the amount of surface and ground water withdrawn and monitoring the effluent discharged, not only for calculating fees and for levying charges but also to facilitate the detection of

water losses in the water grid. To this effect, all possible efforts should be made to detect and repair leakages in order to reduce as far as possible undue water losses in the supply grid.

2. Attention should be given to experiments which evaluate by direct methods the actual water demand of crops in both quantitative and qualitative terms and its distribution over the growth season. Attention should also be given to full-scale experiments with advanced irrigation techniques, which should be analysed and the results compared with traditional systems. Those methods which yield less water consumption and energy use per unit of agricultural product should be given priority.

3. Steps should be taken to minimize water losses during its transport to the irrigated fields and during its application, taking into account all aspects related to climate, soil, crop growth phase, and the operator's skill. In applying extensive irrigation and in the intensive use of fertilizers and pesticides, all necessary precaution should be taken to prevent over-exploitation and pollution of ground-water aquifers and surface water.

4. National policies should be geared to promote research and development of industrial technologies, production techniques and appliances that: (a) use less water and/or discharge less or no effluents; (b) allow recovery of usable substances contained in waste water and sludge; (c) permit recycling of water if necessary in closed or semi-closed water systems within the production process, as well as water re-use or successive and concurrent uses within the same industry, other industrial complexes or in agriculture. Water for industrial use should be supplied with the quality required for that purpose in order to save water that meets drinking water standards. Policies should also be directed to disseminate effectively relevant information and experience gained in the research for and development of new technologies.

5. More attention should be paid to cooling water management. Since the major part of water used by industries serves as cooling water, special attention should be paid to the development and application of industrial processes which allow conversion from water to air cooling, the re-use of cooling water as process and transport water, the recycling of cooling water with inserted cooling towers, heat exchangers or cooling ponds and the utilization of waste heat in the industrial, domestic and agricultural sector.

6. Measures should be taken and full-scale experiments should be carried out in order: (a) to gain more experience regarding the effects on crop, soil and ground-water when applying treated sewage and waste water for irrigation; and (b) to find ways and means to reduce treatment costs to render brackish water fit for use in irrigation.

7. Particularly strict regulatory, economic and technical control measures should be enforced for certain categories of hazardous pollutants, on the basis of their ecological characteristics, especially acute toxicity, their persistence and their bio-accumulation, with a view to preventing their dispersion into the environment. Therefore, these measures should not be limited to a few classical parameters such as BOD, COD and suspended solids. They also should include analyses of organisms. Effluent components should be expressed not only in terms of concentration but also in terms of load.

8. Strong emphasis should be given to the application of pollution control measures as close to the source as possible. In implementing these measures, which should be given high priority, care should be taken to ensure that uncontrolled pollution transfer to other water resources or to soil and air systems does not occur.

9. Consistent with prevailing physical, geographical, social, economic and other conditions, a long-term national policy should be formulated which fosters appropriate and efficient measures to rationalize the use of water for the present and future development of the national economy and the social and ecological benefit of people. This policy could be enacted by a national water act.

10. Priority should be accorded to the effective enforcement of the legal and administrative provisions which result in more rational utilization of water. Where necessary, legal provisions and administrative arrangements should be strengthened and rendered more effective to achieve this objective, including, *inter alia*, sanctions and exemplary punishment when specifications for water withdrawal or provisions set forth for pollution abatement are violated. The joint application of legal and administrative instruments on the one hand and of economic and financial instruments on the other hand should be promoted.

11. River basin oriented management should be encouraged to achieve an integrated and rational approach to a more efficient use of water, including water pollution control, within the river basin. Where advisable, this might be considered in an international framework and be reflected in public awareness programmes.

12. In the overall national planning process, thorough consideration should be given to the concept of rational utilization of water, and to alternative and multi-purpose uses of water and their impact on other natural resources. Therefore, it should be considered essential to integrate water experts into any multi-disciplinary planning approach, particularly in economic sectors such as human settlements, industry, agriculture, energy and transport. All planning actions should be applied equally to surface and groundwater and thereby all quantitative and qualitative aspects should be taken into account.

13. Economics of water utilization and all aspects related to the protection of the human environment should be balanced, so that further economic development may take place in a manner compatible with maintaining or improving the quality of life; this should include a re-evaluation of water-use practices in the light of the new energy situation.

14. As water economy is a capital-intensive sector which requires important and long-term investments, a careful analysis should be carried out to examine their economic effectiveness, also taking into account social and environmental criteria. To accomplish any water management investment programme, a financial mechanism should be established to ensure as far as possible that charges, fees, penalties and fines which provide a source of income to the regulatory authority can be re-invested in pollution control measures and allocated to those actions which increase the efficient use of water.

15. Emphasis should be placed on the importance of training managers and maintenance personnel so that their standard of training would ensure optimal exploitation of technologies.

16. Methods should be elaborated to assess the results of a given water-use policy in both socio-economic and environmental terms. It is advisable in this respect to develop knowledge of relations between economic activities and water demand as well as

those between discharges of pollutants and the quality of water bodies. Since an assessment of the value of recreational, aesthetic and other environmental "intangible" benefits within water-use management is desirable, efforts should be directed to develop methods which would permit an evaluation of environmental quality.

17. In conformity with the governmental structure and existing regulations, adequate involvement of citizen and water users in decision-making processes should be foreseen. To this end, it should be possible to impose, where appropriate, constitution of collective water supply corporations as well as sewage and waste water communities being formed as public law institutions with related legislative, executive and judiciary powers.

18. On a national and regional level, water-saving campaigns should be launched to make the public aware of questions related to the wasteless use of water and to increase public understanding of all measures to be taken in view of effective pollution abatement and rational use of water. In this context mass media should be engaged to the greatest extent possible.