

SAVING THE BIOLOGICAL RESOURCES OF THE DANUBE

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More than 15 European countries are situated in the Danube basin. It covers a territory of 817,000 km² and more than 80 million people live here. The river is a water source and an important transport way. This area is comprised of unique picturesque landscapes, it is a recreation zone, and it is a historical monument of the heroic past and present. Many works of outstanding European writers and poets sing the praises of the Danube, and such music as "On the marvellous blue Danube" by the well-known Austrian composer Johann Strauss have been entered into the treasury of the world culture.

Just recently, the Danube looked to be in the grey, with ground shades with floating oil spots, and an aggregation of white foam near the shore, formed from the residuals of washing means and surfactants. Other signs of the unfavourable ecological state of this beautiful and grand river are present as well.

The fate of the Danube and its tributaries has been a concern to the scientists of the Danube countries for a long time. Ukrainian scientists have studied the water quality and bio-production of the Danube since 1945. In the beginning, this was in preparation for the post-war international fishery regulation. Later, the Kilia Delta of the Danube became an object of fundamental investigations into water quality and the effects of the river runoff on the Black Sea ecosystem.

The world-wide known reserve, Dunayski Plavni, is situated in the Lower Danube. Experts from the Institutes of Zoology, Botany, Hydrobiology and other scientific institutions of the country have greatly contributed to its establishment. Now Romanian specialists, ecologists from Germany and the USA and other countries work together with Ukrainian scientists. A special international fund has been established to enhance the scientific activities and to promote the recommendations on the conservation of this natural monument.

To co-ordinate the activities, in the reserve and other protected territories, a special section has been created within the Ukrainian M&B Committee, where leading scientists from the scientific and educational institutions are involved.

Limnologists from the Danube countries have greatly contributed to solving the problems connected with water quality, biological diversity of flora and fauna, and ichthyological and fishing issues as well.

The effectiveness of problem solving, and the improved health of the Danube basin is possible only with international co-ordination. The XIIIth Congress of the International Association of Limnologists from Danube Countries proposes to establish an international organisation, which would combine scientists and experts involved in research of the Danube and its tributaries.

In 1956, the International Organisation of Limnologists of Danube Countries (IAD) was founded in Vienna. Well-known representatives from Austria, Bulgaria, Hungary, Germany, Yugoslavia, the Soviet Union and Switzerland have participated in its ruling bodies. After proclaiming independence, Ukraine became a successor of the former Soviet Union membership in this organisation.

Connected with the processes occurring in Eastern European countries, Slovakia and Croatia independently represent themselves in the ruling bodies of the organisation. The membership of Moldova and the Czech Republic is under consideration. During the 40 years of its life, the IAD has conducted 30 international conferences in which only Danube problems were considered. The conference held in September in Baya, Hungary, considered issues related to the Danube landscape and water resources management.

The International Limnologists Association played an important role in the summarisation and analysis of various scientific studies carried out in different scientific institutions of Danube countries. It initiated the international edition of the Danube Limnology, Danube Bibliography, and Danube Research Results for 1968-1994. These fundamental works were important to the understanding of river life, and became the guidelines for high schools teachers and students. They promoted the implementation of nature conservation measures when hydraulic engineering units in the Danube and its tributaries were constructed.

Ukrainian scientists greatly contributed to the elaboration of a scientific basis for an ecological assessment of the influence of hydraulic engineering construction on the Danube and other river systems in the Black Sea basin. Monographs elucidated the methodology of such assessments as calculation systems, mathematical and simulation models for forecasting remote consequences after intrusion to water ecosystems, and played an important role in decision-making concerning further large-scale hydraulic construction in the Danube. A comprehensive study by hydrobiologists from Danube countries, including Ukraine, has raised the problem of the river fauna and flora diversity to the international level.

Representatives from Danube countries and participants of many conferences have repeatedly discussed the idea to carry out an International Scientific Expedition along the Danube river. In 1985, a Conference in Bratislava endorsed the main objectives of the expedition, and named the Institute of Hydrobiology responsible for its organisation. The Academy of Sciences of the Ukraine provided equipment and logistics for the expedition. From 3 to 25 March 1988, the first scientific hydroecological expedition in the history of the Danube countries was thus carried out. There were 14 modern equipped scientific laboratories involved, where a total of 116 specialists from ten countries worked.

It is indeed evidence of international co-operation that colleagues from Romania, Bulgaria, Yugoslavia, Hungary, Czechoslovakia, Austria, Germany, as well as Switzerland, worked together with Ukrainian and Russian scientists. The specialists worked aboard during the entire expedition. Collaborators from national laboratories also studied the territorial aquatic area of respective Danube countries, checking and calibrating analytical methods and discussing the results obtained.

There were several concrete tasks which faced the expedition participants: to determine constant sites for sampling water, bottom sediments and hydrobiota within every Danube country and, on this basis, to establish hydroecological monitoring from the 20th kilometre of the Danube Delta to the 2226th km in Passau, Germany.

The results obtained during the expedition have facilitated the elaboration of recommendations for the management of water quality and bio-productivity of the Danube, and for the establishment of measures for water protection against pollution. This implementation of practical measures was proclaimed by the Bucharest Declaration of 1985, and concerned co-operation between Danube countries on water economy and its protection against pollution.

The expedition can be fully characterised as the beginning of collaboration among not only scientists but also among public European organisations. The world movement "Ecoforum for Peace" and the 4th World Congress "Alternatives and Environment" initiated a scientific/public expedition from Ruse, Bulgaria, to Passau, Germany, in October-November of 1988. The aim of the expedition was community-wide involvement in improving the health of the Danube basin. This drew the attention of the governments of Danube countries to the necessity of signing an agreement on non-admittance of further pollution of the Danube basin. Participants included scientists such as Nobel Prize Winner Richard Singe from Great Britain, Member of the Russian Academy of Sciences B.M. Laskorin, Academician Angel Bilavsky from Bulgaria, Professor Ernst von Weizsaecker from Germany, Professor Arthur Westing from the USA, and Imre Nagi from Hungary.

The environmental problems of the Danube are under constant consideration, not only by the scientific organisation of Ukraine, but by other scientific/technical organisations as well. Evidence of that is the International "Blue Danube" Expedition, conducted in 1990 by the Ukrainian Scientific/Technical Centre "Perun." Representatives from many organisations and research institutions in Ukraine, Russia, Moldova, Romania, Yugoslavia, Hungary, the Czech and Slovak Republic, and Austria participated. The main goal of the expedition was the further development of complex research and the determination of the medical/biological consequences of the ecological situation in the Danube north-western Black Sea water system. The expedition continued the research of the Danube ecosystem started in 1988, and special consideration was given to seasonal changes in water quality, in particular during the fall. The data obtained was used when the methodology of ecological monitoring was developing and during the complex assessment of the ecological state and classification of the Danube waters.

One of the most complex problems remains the wise use of Danube water resources. Six power stations, and the Dzherdap-1 and Gabcikovo hydro-electric complexes are known to be constructed in the river basin. Rhein-Main-Danube and Odra-Elba-Danube canals are already in operation as well. In addition, projects to create six reservoirs in Austria and Germany, to expand irrigation systems, and to construct new hydropower units are at the stage of technical/economical and ecological collaboration. All these require concordant solutions on Danube water resources use related problems, and the adoption of proper legislation documents which could regulate an admissible level of water volume for agricultural needs, and for the discharge of industrial, agricultural and municipal wastewater.

International agreements on the conservation of the water ecosystem have played an important role in the conservation of Danube biological resources, in particular, the Convention on Protection and Use of Transboundary Watercourses and International Lakes of 17 March 1992, and the Convention on Protection Against Pollution of 21 April 1992.

In 1991, plenipotentiary representatives from all Danube countries decided to prepare a long-term agreement on improving the Danube basin. This promoted preparation of the Convention on Danube River Protection. Compared to the Convention on Navigation, this Convention may be fully called an environmental one, since the improvement of the river basin and prevention from further pollution was the focus of the Convention. The Convention was signed by all Danube countries, including Ukraine, on 29 June 1994, in Sofia.

In 1991, the Regional Ecological Programme for the Danube basin improvement was proposed. The Conference of the Ministers for Environment, held in Dobris Castle near Prague in June 1991, supported the programme. The International Project on Danube Basin Improvement, drafted by the Institute of Hydrobiology of the NAS of Ukraine, was represented at the Conference on behalf of the Biosphere Scientific Council of Ukraine. According to the Conference resolutions, the first meeting of experts and representatives from Danube countries would be held as early as September of the same year. The concrete proposals to develop the International Programme on Danube Improvements were discussed. Representatives from nature and water protection organisations of Danube countries, international financing institutions and some NGOs, such as the International Water Quality Institute in Amsterdam, participated in the meeting. The development of the International Programme was of great interest not only in state nature and water protection organisations but, also, among groups of

European countries. Many research institutions and environmental movements participated.

This environmental programme, with its scope and number of participating organisations, had no analogy in world practice. Apart from the governmental institutions of Danube countries, another 17 international organisations were involved in its preparation. These were: the European Commission; several regional ecological programmes; the European Bank for Reconstruction and Development; the Global Environmental Facility, jointly operated by UNDP and UNEP; the World Bank; the United States Agency for International Development - USAID - and other international organisations. The Programme was also developed by NGOs such as the Cousteau Foundation, the Regional Central and Eastern Ecological Centre, the Peace Preservation Union, and the World Wildlife Fund. The International Programme has also been developed and one could anticipate its implementation. Unfortunately, so far, its international financing is still problematic. Independently of the future fate of the Programme, its development brought together scientists from different countries to define the priorities to be resolved on a complex basis.

The territory of Ukraine receives Danube water with pollutants which have already formed in upstream areas. The same refers to the Prut river whose catchment area includes considerable territories of Moldova and Romania. The Prut, flowing into the Danube above Reni, essentially affects the water quality of the Lower Danube. When preparing the National Report, the Ukrainian part of the Danube, the Kilia Delta, and water bodies and watercourses along with adjacent territories and aquatic areas were considered to be an integral part of the greatest water ecosystem of Central Europe - the Danube basin. Therefore, the question was raised that all general ecological and applied tasks, which face separate states of that region, can be only resolved by combined efforts on the basis of joint financing programmes and co-ordination. Taking into account the overall international importance of the Danube, it was proposed, along with ecological issues, to consider social, legal, jurisdictional, economic, recreational, and demographic ones, in the National Report of Ukraine.

The National Report of Ukraine also gives a complex assessment of, not only water objects but, also, adjoining territories where the Danube runoff is forming, indicating the scale and causes of degradation processes in that area. The effects of transboundary air transfer of hazardous chemicals from Western Europe, due to the conditions of life in the cities and settlements situated in the region, were also shown. The hydrogeological features of the territory, and general flora and fauna characteristics of the basin were estimated. Essential consideration was given to the ecological state of the Danube delta and fore-delta, the contiguous Black Sea region and the north-western Black Sea coastal area as a whole.

The chapter on "Optimisation of nature use, resource preservation and water protection" analysed the entrance of different kinds of contaminants into the water and the atmospheric precipitation from other countries to Ukraine and vice versa. General recommendations on resource conservation and water protection measures were made. The main sources of contamination in the river basin of Ukraine were specified and the medical/biological characteristics of the regions were given.

Measures to localise dangerous diseases and to develop a system of international control to improve the appearance of the sites were proposed. Based on the analysis, priority objectives were defined. Industrial and municipal enterprises would be reconstructed by incorporating environmentally-sound practices.

Development of the ecological programme, where the Danube countries and international organisations took part, raised a critical question concerning the development and adoption of a number of normative documents, including those concerned with the estimated quality of the hydrosphere, atmosphere, and soils. Unfortunately, present systems of environmental quality assessment vary in different countries. Therefore, comparison of the results of investigations conducted by different countries is inadequate.

Today the priorities of Danube basin improvement and the conservation of its biological resources are recognised. Further co-operation between scientific, public and state organisations of the Danube countries is foreseen on a multilateral basis. A short review of the improvement of the Danube basin gives us hope that, in the near future, clean water will flow along the picturesque banks of the legendary river, fauna and flora will be restored and the Danube will once again become blue.

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